(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
01 February 2018 (01.02.2018)

WIPO | PCT

(10) International Publication Number
WO 2018/019821 A1

(51) International Patent Classification:
G06Q 40/08 (2012.01)

(21) International Application Number:
PCT/EP2017/068745

(22) International Filing Date:
25 July 2017 (25.07.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
PCT/EP2016/067619 25 July 2016 (25.07.2016) EP

(71) Applicant: SWISS REINSURANCE COMPANY LTD. [CH/CH]; Mythenquai 50/60, 8022 Zürich (CH).

(72) Inventors: PERL, Andri; Sandrainstrasse 6, 8156 Oberhasli (CH). BONGERS, Sebastiaan; Aublickweg 2, 8804 Au (CH). GENOVESE, Donato; Allenmoosstrasse 142, 8050 Zurich (CH).

(74) Agent: LEIMGRUBER, Fabian; ThomannFischer, Elisabethenstrasse 30, 4010 Basel (CH).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: INTELLIGENT, SELF-ADAPTIVE AUTOMOTIVE APPARATUS FOR DYNAMIC, SCORE-BASED RISK-MEASUREMENT AND AGGREGATION WITH A TELEMATICS CONNECTION SEARCH ENGINE AND CORRESPONDING METHOD THEREOF

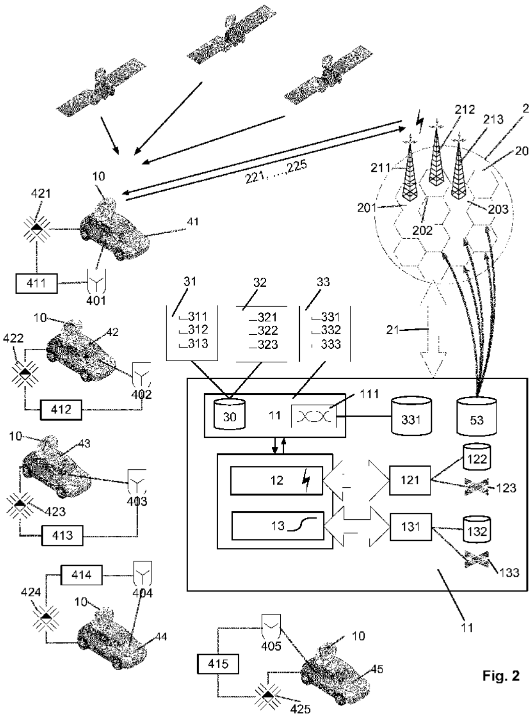

Fig. 2

(57) Abstract: Proposed is an intelligent, self-adaptivemobile automotive car system (1), and method thereof, for a dynamic, telematics-based risk-measurement and a dynamic connection search engine and telematics data aggregator, wherein risk- transfer profiles (124) are captured and categorized in a resultslist (118) from a plurality of first risk-transfer systems (12) based on dynamically generated driving score parameters (10131/1111,...,1117) by means of appropriately triggered automotive data (3). For the self-adaptive, real-time risk measurements, telematics data-based triggers (1012)are dynamically applied based on self-learning structures of an intelligent central automotive circuit (11) triggering, capturing, and monitoring operating parameters (40121) and/or environmental parameters (40111) during operation of the motor vehicle (41,...,45). By means of a driving score generator (111/1013) of thecentral automotive circuit (11) a single or compound of variable scoring parameters (1111,...,1117/10131) are measured providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle (41,...,45) based on the triggered, captured, and monitored operating parameters (40121) and/or environmental parameters (40111).

WO 2018/019821 A1

Intelligent, Self-adaptive Automotive Apparatus For Dynamic, Score-based Risk-Measurement And Aggregation With A Telematics Connection Search Engine And Corresponding Method Thereof

Field of the Invention

The present invention relates to mobile real-time systems reacting dynamically to captured environmental or operational parameters, in particular to automotive system's monitoring, capturing and reacting to automotive parameters of motor vehicles during operation. The present invention further relates to telematics based, self-adaptive and self-learning automated risk-measuring, alert and real-time notification systems for motor vehicles and wireless technology used in the context of telematics, in particular with associated dynamic risk-transfer structures. Finally, the invention also relates to telematics-based real-time expert systems. The term telematics, in particular traffic telematics, refers to systems that are used for communications, instrumentation and control, and information technology in the field of transportation. Thus, the present invention relates to the use of telematics together with real-time risk-measuring, risk-monitoring, dynamical and automated risk-transfer systems based on captured and measured usage-based and/or user-based telematics data.

Background of the Invention

Modern automotive engineered car driving (including completely manually controlled driving, partially autonomous car driving, driverless cars, self-driving cars, robotic cars) is associated with vehicles that are capable of sensing their environment and operational status or use. At the same time, the use of sensors in cellular mobile phones, in particular in so called "smart phones", has strongly increased in recent years, making it possible to monitor or time-dependent track the operation mode of the smart phone as well as surroundings, use or even behavior of the user. Modern, mobile smart phones comprise touchscreens, accelerometers, gyroscopes, GPS, cameras, microphones etc., allowing to capture a vast mixture of contextual parameters during the use of the mobile device. At the same time, modern automotive engineered vehicles are capable of detecting a wide variety of operational or surrounding parameters using for example radar, LIDAR (measuring device to measure distances by means of laser light), GPS (Global Positioning System), odometry (measuring device for measuring changings in position over time by means of using motion sensor data), and computer vision. In modern cars, advanced control systems often interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signage. The sensors may comprise active and passive sensing devices, wherein sensors are physical converter devices measuring a physical quantity and converting the measured physical quantity into a signal that can be read by an observer or by another instrument, circuit or system. Commonly used sensors for automotive motor vehicle or mobile cell phones are for example infrared sensors containing an infrared emitter, and an infrared detector, for example used with touchless switches, passive infrared (PIR) sensors reacting and detecting only on ambient IR such as motion sensors, speed detectors e.g. radar guns such as microwave radars using the Doppler effect (the return echo from a moving object will be frequency shifted) or IR/Laser radars sending pulses of light for determining the difference in reflection time between consecutive pulses to determine speed, ultrasonic sensors emitting a sound and detecting the echo to determine range, accelerometers measuring the rate of change of the capacitance and translating it into an acceleration by means of a proof mass, gyroscopes measuring a mass oscillating back and forth along the first axis, and plates on either side of the mass in the third direction where the capacitance changes when a rotation is detected around the second direction, IMU-sensors (Inertial Measurement Unit) providing a sensor with a full 6-degrees of freedom by using a combination of accelerometer and gyroscope, force sensing resistor e.g. for contact sensing, touchscreens based on resistive, capacitive or surface acoustic wave sensing, location sensors such as GPS (Global Positioning System), triangulation or cell identification systems, visual sensors such as cameras and computer visions, SIM-based or RFID-based (Radio-Frequency Identification) sensors, or environment sensors as moisture sensors ,humidity sensors ,temperature sensors etc.

The development of device and user monitoring above outlined, also referred to telematics, is mirrored, in the electronic, telecommunication and insurance industries, by a fast technological development of similar or even consistent technical strategies and components to improve the effectiveness of interactions with customers.

Social networking, telematics, service-oriented architectures (SOA) and usage-based services (UBS) are all interacting and pushing this development. Social platforms, such as Facebook, Twitter and YouTube, offer the ability to improve customer interactions and communicate product information. However, the field of telematics is larger still, as it introduces entirely new possibilities that align the technical input requirements and problem specifications of dynamic risk-transfer, technology and mobility. SOA and telematics are becoming key to manage the complexity of integrating known technologies and new applications. Technically, telematics being a composite of telecommunications and information technology, it is an interdisciplinary technical term encompassing telecommunications, vehicular technologies, road transportation, road safety, electrical engineering (sensors, instrumentation, wireless communications, etc.), and information technology (multimedia, Internet, etc.). Thus, the technical fields of mobile parameters detection, data aggregation or telematics are affected by a wide range of technologies such as the technology of sending, receiving and storing information via telecommunications devices in conjunction with controlling remote objects, the integrated use of telecommunications and informatics for application in vehicles and for example with control of moving vehicles, GNSS (Global Navigation Satellite System) technology integrated with computers and mobile communications technology in automotive navigation systems. The use of such technology together with road vehicles is also called vehicle telematics. In particular, telematics triggers the integration of mobile communications, vehicle monitoring systems and location technology by allowing a new way of capturing and monitoring real-time data. Usage-based risk-transfer systems, as for example provided by the so-called Snapshot technology of the firm Progressive, link risk-transfer compensation or premiums to monitored driving behavior and usage information gathered by an in-car "telematics" device. In the past five years, telematics devices have shown expanded use by a factor of 10 to 100 in cars. On such a broadened platform, telematics devices and systems may help to increase safety and improve driving behavior.

Vehicle telematics refers to installing or embedding telecommunications devices mostly in mobile units, such as cars or other vehicles, to transmit real-time driving data, which for example can be used by third parties' system, such as automated risk-monitoring and risk-transfer systems, providing the needed input needed for instance to measure the quality and risks of individual drivers. The telematics instruments for such changes are available in the state of the art. Vehicle tracking and global positioning satellite system (GPS) technologies are becoming commonplace, as are the telecommunications devices that allow us to be connected from almost anywhere. In particular, dynamically monitored and adapted risk-transfer could be imaginable by interconnecting telematics with other real-time measuring systems. Advantages provided by such systems could for example mean that after being involved into a car accident, emergency and road services could be automatically activated, vehicle damage assessed, and the nearest repair shop contacted. In summary, the customer experience could be transformed beyond traditional operability of risk-transfer systems and insurance coverage to real-time navigation and monitoring, including the automated activation of concierge service, safe driving tips, video-on-demand for the kids in the backseat, in-car or online feedback, and real-time vehicle diagnostics.

In addition to real-time surveillance, it bears mentioning that an insurance agent may want to exchange information with a customer associated with the insurer for a number of different reasons. However, the information exchange between the customer and the insurer and/or the insurer and the reinsurer is still largely cumbersome and time-consuming, and the risk-transfers provided by such structures thus typically remain static within a fixed agreed upon time period. For example, an existing or potential consumer may access an insurance agent' s web page to determine a yearly or monthly cost of an insurance policy (e.g., hoping to save money or increase a level of protection by selecting a new insurance company). The consumer may provide basic information to the insurance agent (e.g. name, business type, date of birth, occupation, etc.), and the insurance agent may use this information to request a premium quote from the insurer. In some cases, the insurer will simply respond to the insurance agent with a premium quote. In other cases, however, an underwriter associated with the insurer will ask the insurance agent to provide additional information so that an appropriate premium quote can be generated. For example, an underwriter might ask the insurance agent to indicate how often, where and at which time a motor vehicle is primarily used or other data such as the age of the motor vehicle and its indented use (transportation etc.). Only after such additional information is determined, may an appropriate risk analysis can be performed by the insurer to process an adapted underwriting decision, and/or premium pricing.

Integrated telematics technologies may offer new technological fields, in particular in monitoring and steering by means of centralized expert systems, in risk-transfer technology, for example, where this may take the form of far more accurate and profitable pricing models provided by such automated expert systems. This would create a huge advantage, in particular for real-time and/or usage-based and/or dynamically operated systems. The advantage of such telematics systems is not restricted to risk transfer but also includes advantages, for example, in fleets' management that monitor employees' driving behavior via telematics to improve asset utilization, reduce fuel consumption and improve safety, etc. Other fields may also benefit from such integrated telematics systems, as state and local governments strive striving to improve fuel consumption, emissions and highway safety. Some states, for example, recently issued dynamic pay-as-you-drive (PAYD) regulations, which also on the other side allows insurers to offer drivers insurance rates based on actual versus estimated miles driven. It is a financial incentive to drive less.

Telematics technology already provides the above-mentioned features such as an accelerometer making it possible to assess drivers' style and behavior, thus expanding the risk factors normally tracked from the current 40 to more than 100. As demand for accelerometers has increased, auto-makers and device manufacturers have been able to push down the unit cost. The need for increased connectivity and access (driven by the "always-connected" consumer) will allow additional device applications. It bears mentioning that most technologies in the telematics ecosystem are not unique to vehicle's insurance. Social listening, neighborhood protection portals and home monitoring have an impact on how home and property insurance risks are assessed. Further, monitoring systems are available to adjust home temperature controls or automatically dispatch service providers should there be a water, heat or air-conditioning issue in a home. Also, telematics technologies are being developed for healthcare and senior living products, including location-based alerts, health-monitoring, and family-tracking services that may be used for how individual risk is assessed, allowing optimized risk-transfer in the life risk-transfer field. Examples also include robotic nurse's aides designed to remind the elderly about routine activities, which also guides them through their homes and calls for help in case of emergencies. These sorts of applications will continue to evolve as technology becomes more reliable and cost effective and as the need for such solutions increases in the elderly and home care sectors.

Telematics technology, used according to the present invention, may also provide the basis technology for Service-oriented architectures (SOAs) or usage-based and/or user-based applications. Both are considered to be among the most promising of today's technologies. SOAs allow companies to make their applications and computing resources (such as customer databases and supplier catalogs) available on an as-needed basis, either via an intranet or the Internet. Based on a plug-and-play concept, SOA provides reusable software components across multiple technology platforms. It offers a new approach to software deployment while also tackling serious problems, such as complexity and ineffective data integration. This approach provides a consistent technology making it easier to access data and integrate both new and old content. Information and services are centralized and reusable, shortening development times and reducing maintenance costs. When a software service is needed (such as retrieving customer information) the user or system sends a request to a directory, which determines the proper service name, location and required format, and then sends back the desired output (in this case, customer information). Users and other applications do not need to know the internal workings of the data handling or processing, nor do organizations need to own and maintain software; they simply access the appropriate service over the Internet or network, or another data transmission network.

However, telematics technology, as used in the way of the present invention, may also provide the basis technology for other platforms, as e.g. IoT-platforms (Internet of Things), which provide the network of physical devices, vehicles, buildings and/or other items embedded with electronics, software sensors, actuators, and network connectivity that enables these objects to collect and exchange data. In particular, IoT allows objects to be sensed and controlled remotely across existing network infrastructure, also allowing for a more direct integration of the physical world into processor-driven systems and computer means. This integration results in improved efficiency, accuracy and economic benefit, When IoT comprises sensors and actuators, the technology becomes a more general system-class of cyber-physical systems, which may encompass technologies as smart grids, smart homes, intelligent transportations, and smart cities. In IoT, each thing is uniquely identifiable through its embedded computer system, and is also able to interoperate with the existing Internet infrastructure. IoT provides advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. There are incorporated herein by reference. The interconnection of these embedded devices (including smart objects), is applicable in automation in nearly all fields, while also enabling advanced applications like a smart grid, and smart cities. Things in IoT refer to a wide variety of devices but in particular to automobiles with built-in sensors, analysis devices for environmental monitoring or field operation devices that can assist car drivers e.g. in search and rescue operations. Thus, things in IoT can comprise a mixture of hardware, software, data and/or service. Such devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current examples include the numerous prototype autonomous or half-autonomous vehicles currently developed, including Mercedes-Benz, General Motors, Continental Automotive Systems, IAV, Autoliv Inc., Bosch, Nissan, Renault, Toyota, Audi, Volvo, Tesla Motors, Peugeot, AKKA Technologies, Vislab from University of Parma, Oxford University and Google, for example, using interconnected telematics devices with appropriate network technology for control, monitoring, operating and steering of the half or fully automated vehicles.

In the prior art, US9390452B1 discloses a system and apparatus for determining and sharing of relative risk in an insurance pool between an insurer and a plurality of safety vendor. Predefined portions of the insurance pool are allocated among the insurer and the safety vendors. The system of the insurer aggregates loss information, e.g. collected by telematics sensors of a risk-exposed vehicle, and transmits the loss information to the safety vendors. The safety vendor may use the results of the analysis of the telematics data to generate one or more recommendations provided to the policy holder. In line with such recommendations, the policy holder can e.g. counsel the driver of the vehicle or discipline the driver to improve the driver's behaviors in operating the vehicle. The goal to identify specific behaviors and target those behaviors for training and modification is to reduce possible losses under the insurance policy which the insurer, reinsurer, and/or safety vendor would otherwise have had. US2016/0171521A1 describes an apparatus for determining a safest road segment for traveling between a first location and a second location. The road segment safety rating is determined for a plurality of road based on historical data associated with the road segments (e.g., accident history data, traffic volume data, etc.) and/or based on driving behavior data of the operator of the vehicle. An indication of the road segment determined as being the safest is provided to the operator of the vehicle. The actual route of travel of the vehicle is captured and compared to the safest route. If the vehicle has traveled the safest route, the operator earns an award. If not, the operator is notified that an award may be earned when an indicated safest route is traveled. Finally, US 2011/0153367 A1 shows a system for transmitting telematics data from a vehicle. A communications link is provided between a smartphone and a vehicle computer, through the smartphone dataport and the vehicle onboard diagnostics (OBD) port. A n appropriate smartphone holder keeps the smartphone in a stable, known position and orientation with respect to the vehicle, such that data from an accelerometer in the smartphone can be calibrated. The smartphone accelerometer data and telematics data from vehicle telematics sensors is then transmitted via the smartphone or stored locally.

Summary of the Invention

It is one object of the present invention to provide a mobile automotive system reacting dynamically, in real-time, to captured environmental or operational parameters of motor vehicles during operation, in particular to measuring parameters of automotive systems, allowing a user to adapt the vehicle's operation or driving risks dynamically and in real-time by means of an automated risk-transfer engine making it possible to select appropriate risk-transfer profiles dynamically based on monitoring, capturing and reacting to automotive parameters of motor vehicles during operation. Further, it is an object of the invention to dynamically triggered, automated, telematics-based automotive systems based on real-time capturing of vehicle telematics data. In particular, it is an object of the present invention to extend the existing technology to a dynamic triggered and dynamically adjustable, multi-tier risk-transfer system based on a dynamic adaptable or even floating first-tier level risk-transfer, thereby reinforcing the importance of developing automated systems allowing self-sufficient, real-time reacting operation. Another object of the invention seeks to provide a way to technically capture, handle and automate dynamically adaptable, complex and difficult to compare risk transfer structures by the user and trigger operations related to automate optimally shared risks and transfer operations. Another object of the invention seeks to dynamically synchronize and adjust such operations to changing environmental or operational conditions by means of telematics data invasive, through the harmonized use of telematics between the different risk-transfer systems based on an appropriate technical trigger structure approach, thus making the different risk-transfer approaches comparable. In contrast to standard practice, the resource pooling systems of the different risk-transfer system will create a comparable risk-transfer structure, making it possible to optimize a risk-transfer operation with the desired, technically based, repetitious accuracy that relies on technical means, process flow and process control/operation. Along the automated insurance telematics value chain, there are many technologies offering individual elements, but it is an object of the present invention to provide a holistic technical solution that covers the whole range from device installation and data capturing to the automated and accurate risk measuring, analysis and management. Finally, it is a further object of the invention to provide a dynamic, expert scoring system based on real-time scoring and measurements, and further to provide a technically scalable solution based on scoring algorithms and data processing making it possible to adapt and compare the signaling to other field of automated risk-transfer.

According to the present invention, these objects are in particular achieved with the features of the independent claims. In addition, further advantageous embodiments can be derived from the dependent claims and the related descriptions.

According to the present invention, the above-mentioned objects for an intelligent, self-adapting mobile automotive system for a dynamic, telematics-based connection search engine and telematics data aggregator, are in particular achieved in that, the intelligent, self-adaptive mobile automotive system with the dynamic, telematics-based connection search engine and telematics data aggregator for real-time risk-monitoring based on captured and measured usage-based and/or user-based and/or operational automotive telematics data captures and categorizes risk-transfer profiles in a dynamic adapted result list, wherein the result list is provided for display and selection by means of a mobile telematics application of a mobile telecommunication apparatus, in that the mobile telecommunication apparatus comprises one or more data transmission connection to integrated sensors of the mobile telecommunication apparatus and/or an on-board diagnostic system or automotive telematics devices of a motor vehicle, wherein the integrated sensors of the mobile telecommunication apparatus and/or the on-board diagnostic system or the automotive telematics devices comprise proprioceptive sensors for sensing operating parameters of the motor vehicle and exteroceptive sensors for sensing environmental parameters, in that a data link is set by means of the wireless connection of the mobile telecommunication apparatus over a mobile telecommunication network between the mobile telematics application as client and an intelligent central automotive circuit, wherein the mobile telecommunication apparatus acts as wireless node within said mobile telecommunication network, and wherein the operating parameters and the environmental parameters are measured and collected in dataflow pathway as automotive telematics data during operation of the motor vehicle via the mobile telecommunication apparatus by means of a mobile telematics application and transmitted to the central automotive circuit, in that the intelligent central automotive circuit comprises a telematics-driven core aggregator with a plurality of dynamically applied telematics data-based triggers triggering, capturing, and monitoring said operating parameters and/or environmental parameters during operation of the motor vehicle in the dataflow pathway by means of a mobile telematics application of the mobile telecommunication apparatus, in that the intelligent central automotive circuit comprises a driving score generator measuring and/or generating a single or compound of variable scoring parameters providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle based on the triggered, captured, and monitored operating parameters and/or environmental parameters, in that a shadow request is transmitted to a plurality of automated risk-transfer supplier systems, decentrally connected to the central automotive circuit over a data transmission network, wherein the shadow request comprises at least risk-related parameters based upon the measured and/or generated single or compound set of variable scoring parameters, wherein a plurality of individualized risk-transfer profiles are provided by the automated risk-transfer supplier systems varying time-dependently based on the generated single or compound set of variable scoring parameters measuring the time-dependent use and style and environmental condition of driving during operation of the motor vehicle, and wherein in response to the emitted shadow request, the central automotive circuit receives a plurality of individualized risk-transfer profiles based upon the dynamically collected single or compound set of variable scoring parameters, and in that the central automotive circuit dynamically captures and categorizes the received plurality of individualized risk-transfer profiles of the automated risk-transfer supplier systems, wherein the shadow requests are periodically transmitted to the plurality of automated risk-transfer supplier systems at least based on the dynamically-generated single or compound set of variable scoring parameters, wherein the results list is dynamically adapted and provided for display and/or selection to the mobile telecommunication apparatus by means of the mobile telematics application based on the triggered, captured, and monitored operating parameters or environmental parameters during operation of the motor vehicle, and wherein the mobile automotive system automatically adapts a risk-transfer of a user, if a more preferable risk-transfer profile is triggered in relation to a selected risk-transfer profile. The central automotive circuit can, for example, comprise a real-time measuring system detecting risk measuring pattern, wherein by means of pattern recognition the detected risk measuring pattern are compared to stored sample risk measuring pattern of the pattern database, wherein in case of triggering specific risk measuring pattern, the single or compound of variable scoring parameters are dynamically adapted by the intelligent, self-adaptive mobile automotive system providing a continuous monitoring of the physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle based on the triggered, captured, and monitored operating parameters and/or environmental parameters. The real-time measuring system can, for example, detect continuous and non-continuous pattern of a risk measuring pattern, wherein fragmented stored sample risk measuring pattern of the pattern database are at least partially detectable by non-continuous, pattern-comprehensive recognition. The real-time measuring system can, for example, be arranged to generate a control signal on the basis of said measured and detected risk measuring pattern, and to provide said control signal to adjusting means for adjusting and dynamically adapting said single or compound of variable scoring parameters providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle based on the triggered, captured, and monitored operating parameters and/or environmental parameters. The real-time measuring system can, for example, comprise an optical image conversion device generating an optical, multi-dimensional representation pattern of the measured risk measuring pattern, and that the real-time measuring system can, for example, comprise an optical image detection device for optical pattern recognition of the measured risk measuring pattern based on the optical, multi-dimensional representation pattern and the stored sample risk measuring pattern of the pattern database. The optical image conversion device can, for example, be a line scan converter and said optical, multi-dimensional representation pattern consists of a plurality of pixels arranged in one or more lines, each of said plurality of pixels representing an area of the surface being imaged and having a pixel value corresponding to physical characteristics of said area. The single or compound of variable scoring parameters can, for example, be dynamically adapted until no or a specified maximal deviation is detected between antecedent measurements of the single or compound of variable scoring parameters and subsequent measurements of the single or compound of variable scoring parameters by the intelligent, self-adaptive mobile automotive system within a given time-frame. The optical, multi-dimensional representation pattern can, for example, comprise a discretized voxels structure in from of a polyhedral meshwork structure, wherein a combination of measured risk measuring pattern are mapped onto the discretized voxels of the polyhedral meshwork structure. The stored sample risk measuring pattern of the pattern database can, for example, be dynamically adapted by means of a self-learning structure of the real-time measuring system, wherein by triggering newly occurring or identified risk measuring pattern, the single or compound of variable scoring parameters are dynamically adapted by the intelligent, self-adaptive mobile automotive system feeding historical single or compound of variable scoring parameters and actual single or compound of variable scoring parameters to the self-learning structure of the real-time measuring system, wherein in case of adaption, the newly occurring or identified risk measuring pattern are added to the stored sample risk measuring pattern of the pattern database, and wherein the application of the telematics data-based triggers of the telematics-driven core aggregator is dynamically adapted and optimized based on the newly occurring or identified risk measuring pattern and the stored sample risk measuring pattern of the pattern database providing a continuous, and dynamically adapted monitoring of the physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle based on the triggered, captured, and monitored operating parameters and/or environmental parameters. As a further variant, the mobile automotive system captures user-specific generated risk-transfer profiles and categorizes the risk-transfer profiles in a result list, and wherein the result list is provided for display and selection to a user of a mobile telecommunication apparatus by means of a mobile telematics application, i.e. a cellular mobile node application, of the mobile telecommunication apparatus, in that the mobile telecommunication apparatus comprises one or more data transmission connection to integrated sensors of the mobile telecommunication apparatus and/or an on-board diagnostic system and/or an in-car interactive device and/or an automotive telematics device of a motor vehicle, wherein the integrated sensors of the mobile telecommunication apparatus and/or the on-board diagnostic system and/or the in-car interactive device and/or the automotive telematics device comprises proprioceptive sensors for sensing operating parameters of the motor vehicle and/or exteroceptive sensors for sensing environmental parameters during operation of the motor vehicle, in that the mobile telematics application comprises a vehicle telematics-driven core aggregator with telematics data-based triggers, which trigger, capture, and monitor said operating parameters and/or environmental parameters during operation of the motor vehicle in the dataflow pathway of the integrated sensors of the mobile phone and/or the on-board diagnostic system and/or the in-car interactive device and/or the automotive telematics device of the motor vehicle, in that the mobile telematics application comprises a score generator measuring and/or generating a single or compound of variable scoring parameters profiling the use and/or style and/or environmental condition of driving during operation of the motor vehicle based on the triggered, captured, and monitored operating parameters or environmental parameters, in that a data link is set by means of the wireless connection of the mobile telecommunication apparatus between the mobile telematics application as client and a central automotive circuit over a mobile telecommunication network, wherein the mobile telecommunication apparatus acts as wireless node within said mobile telecommunication network, and wherein the central automotive circuit automatically collects said single or compound of variable scoring parameters, in that a shadow request is transmitted to a plurality of automated risk-transfer supplier systems, decentrally connected to the central automotive circuit over a data transmission network, wherein the shadow request comprises at least risk-related and/or relevant parameters based on the measured and/or generated single or compound set or record of variable scoring parameters, and wherein, in response to the emitted shadow request, the central automotive circuit receives in response to the emitted shadow request a plurality of individualized risk-transfer profiles based on the dynamically collected single or a compound set of variable scoring parameters, and in that the central automotive circuit dynamically captures and categorizes the received plurality of individualized risk-transfer profiles of the automated risk-transfer supplier systems, wherein the result list is dynamically updated and provided for display and selection to the user of the mobile telecommunication apparatus by means of a mobile telematics application based on the triggered, captured, and monitored operating parameters or environmental parameters during operation of the motor vehicle. The plurality of individualized risk-transfer profiles provided by the automated risk-transfer supplier systems can e.g. time-dependently vary based on the measured time-dependent use and/or style and/or environmental condition of driving by means of the triggered, captured, and monitored operating parameters or environmental parameters during operation of the motor vehicle. The single or compound set of variable scoring parameters profiling the use and/or style and/or environmental condition of driving during operation of the motor vehicle and generated by means of the driving score module can e.g. at least comprise scoring parameters measuring a driving score and/or a contextual score and/or a vehicle safety score. The variable driving score generated by the driving score module can e.g. be at least based upon a measure of driver behavior parameters comprising speed and/or acceleration and/or braking and/or cornering and/or jerking, and/or a measure of distraction parameters comprising mobile phone usage while driving and/or a measure of fatigue parameters and/or drug use parameters. The variable contextual score can e.g. be at least based upon measured trip score parameters based on road type and/or number of intersection and/or tunnels and/or elevation, and/or measured time of travel parameters, and/or measured weather parameters and/or measured location parameters, and/or measured distance driven parameters. The variable vehicle safety score can e.g. be at least based upon measured ADAS feature activation parameters and/or measured vehicle crash test rating parameters and/or measured level of automation parameters of the motor vehicle and/or measured software risk scores parameters. The mobile automotive system for a dynamic, telematics-based connection search engine and telematics data aggregator can e.g. further comprise a linked or electronically associated rating engine for the transmitted risk-transfer profiles of the first risk-transfer systems. The generated scores among the collected telematics data of the driver directly impacts the premium/offer/quotation made by the first risk-transfer systems towards the potential policyholder. The rating engine may e.g. be realized for generating a hierarchic listing in the dynamic result listing based on the rating parameters of the rating engine. The automated risk-transfer supplier systems can comprise associated automated first risk-transfer systems to provide a first risk-transfer based on first risk transfer parameters from the motor vehicle to the respective first risk-transfer system, wherein the first risk-transfer system comprises a plurality of payment transfer modules configured to receive and store first payment parameters associated with risk-transfer of risk exposures of said motor vehicles for pooling of their risks. The risk-relevant parameters of the shadow request can at least comprise usage-based and/or user-based and/or operating automotive data generated by the mobile telematics application of the mobile telecommunication apparatus based upon the triggered, captured, and monitored operating parameters or environmental parameters, and the generated single or set compound of variable scoring parameters. The one or more wireless connections or wired connections of the mobile telecommunications apparatus can e.g. comprise Bluetooth as wireless connection for exchanging data using short-wavelength UHF (Ultra high frequency) radio waves in the ISM (industrial, scientific and medical) radio band from 2.4 to 2.485 GHz by building a personal area networks (PAN) with the on-board Bluetooth capabilities and/or 3G and/or 4G and/or GPS and/or Bluetooth LE (Low Energy) and/or BT based on Wi-Fi 802.11 standard, and/or a contactless or contact smart card, and/or a SD card (Secure Digital Memory Card) or another non-volatile memory card.

As an alternative embodiment variant, the mobile telecommunication apparatus, such as a smart phone device, can for example comprise as integrated device components all proprioceptive sensors and/or measuring devices for sensing the operating parameters of the motor vehicle and/or exteroceptive sensors and/or measuring devices for sensing the environmental parameters during operation of the motor vehicle. The mobile telecommunication apparatus can e.g. comprise at least a GPS module (Global Positioning System) and/or geological compass module based on a 3-axis teslameter and a 3-axis accelerometer, and/or gyrosensor or gyrometer, and/or a MEMS accelerometer sensor comprising or consisting of a cantilever beam with the seismic mass as a proof mass measuring the proper or g-force acceleration, and/or a MEMS magnetometer or a magnetoresistive permalloy sensor or another three-axis magnetometer. The defined risk events associated with transferred risk exposure of the motor vehicles can, for example, at least comprise transferred risk exposure related to liability risk-transfers for damages and/or losses and/or delay in delivery, wherein the occurred loss is automatically covered by the first risk-transfer system based on the first risk transfer parameters and correlated first payment transfer parameters (if a requested risk-transfer is not rejected by the system at this time). The exteroceptive sensors or measuring devices can, for example, comprise at least radar devices for monitoring surrounding of the motor vehicle and/or LIDAR devices for monitoring surrounding of the motor vehicle and/or global positioning systems or vehicle tracking devices for measuring positioning parameters of the motor vehicle and/or odometrical devices for complementing and improving the positioning parameters measured by the global positioning systems or vehicle tracking devices and/or computer vision devices or video cameras for monitoring the surrounding of the motor vehicle and/or ultrasonic sensors for measuring the position of objects close to the motor vehicle. To provide the wireless connection, the mobile telecommunications apparatus can, for example, act as wireless node within a corresponding data transmission network by means of antenna connections of the mobile telecommunication apparatus, in particular mobile telecommunication networks such as 3G, 4G, 5G LTE (Long-Term Evolution) networks or mobile WiMAX or other GSM/EDGE and UMTS/HSPA based network technologies etc., and more particular with appropriate identification means as SIM (Subscriber Identity Module) etc.. The mobile telecommunication apparatus and the monitoring cellular mobile node application can for example be connected to an on-board diagnostic system and/or an in-car interactive device, wherein the mobile telecommunications apparatus capture usage-based and/or user-based automotive data of the motor vehicle and/or user. The mobile telecommunications apparatus can for example provide the one or more wireless connections by means radio data systems (RDS) modules and/or positioning system including a satellite receiving module and/or a mobile cellular phone module including a digital radio service module and/or a language unit in communication the radio data system or the positioning system or the cellular telephone module. The satellite receiving module can for example comprise a Global Positioning System (GPS) circuit and/or the digital radio service module comprises at least a Global System for Mobile Communications (GSM) unit. The plurality of interfaces of the mobile telecommunication apparatus for connection with at least one of a motor vehicle's data transmission bus can for example comprise at least on interface for connection with a motor vehicle's Controller Area Network (CAN) bus, for example in connection with on-board diagnostics (OBD) port, or other connection for example for battery installed devices, or also OEM (Original Equipment Manufacturer) installed systems getting information access to on-board sensors or entertainment systems (as e.g. Apple Carplay etc.) providing the necessary vehicle sensor information. The central automotive circuit can further comprise an aggregation module providing the risk exposure for one or a plurality of the pooled risk exposed motor vehicles based on the captured risk-related automotive data, wherein the first and second risk transfer parameters and the correlated first and second payment transfer parameters are dynamically generated based on the likelihood of the occurrence of the predefined risk events of the pooled motor vehicles. In addition, the occurred and triggered losses can be automatically aggregated by means of captured loss parameters of the measured occurrence of risk events over all risk exposed motor vehicles within a predefined time period by incrementing an associated stored aggregated loss parameter and for automatically aggregating the received and stored first payment parameters over all risk exposed vehicles within the predefined time period by incrementing an associated stored, aggregated payment parameter, and wherein the variable first and second risk transfer parameters and the correlated first and second payment transfer parameters are generated dynamically based on the ratio of the aggregated loss parameter and the aggregated payment parameter. The first and second risk-transfer system can for example be fully automatically steered, triggered, signaled, and mutually activated by means of the central automotive circuit, wherein the steering, triggering, signaling and activating is based on the dynamically adaptable first and second risk transfer parameters and the correlated first and second payment transfer parameters, providing a self-sufficient risk protection for the variable number of motor vehicles associated with the mobile telecommunication apparatus by means of the coupled first and second insurance system. In the context of the first-and second risk-transfer tier, the first risk-transfer system (insurance system) can e.g. comprise an automated first resource pooling system and the second risk-transfer system comprises a automated second resource pooling system (reinsurance system), wherein the risk exposed motor vehicles are connected to the first resource pooling system by means of a plurality of payment transfer modules configured to receive and store first payments from the risk exposed motor vehicles for the pooling of their risk exposures, wherein the first risk-transfer system provides automated risk protection for each of the connected risk exposed motor vehicles based on received and stored first payment parameters, wherein the first risk-transfer system is connected to the second resource pooling system by means of second payment transfer modules configured to receive and store second payment parameters from the first insurance system for adopting of a portion of the risk exposures accumulated by the first risk-transfer system, and wherein if one of defined risk events occurs, the occurred loss is automatically covered by the expert-system based automotive car system.

One of the advantages of the present system is to provide a technical and comprehensive solution that scores individual drivers based on telematics data. Based on the score and other relevant telematics data visible to consumers and insurers (if the consumer agrees), insurers are able to provide a quote. Furthermore, the present invention provides a completely transparent application of complex risk-transfer assessments, where a mobile telematics application, i.e. a cellular mobile node application, being executed on the mobile phone dynamically collects data when people drive. Users can easily download the mobile node application from an appropriate app store on the network. The present invention makes it possible to provide a system that is not linked to risk-transfer systems or associated insurance companies, as e.g. telematics based added value services. The present invention does not have to be restricted to cellular mobile node applications, but could also be an aftermarket telematics device or an OEM embedded device. Aftermarket devices can for example comprise a Windscreen device, Black box, OBD dongle, CLA device (cigarette lighter adaptor), eCall OBU, and/or navigation system as a standalone unit or with a link to the inventive cellular phone node application. Smartphone projection standards to allow mobile devices running a certain operating system to be operated in automobiles through the dashboard's head unit. Examples include Apple Carplay, Mirrorlink, Android Auto, and/or Onboard navigation systems. Other aggregator devices can allow for example be an embedded OEM device and/or infotainment system and/or dashboard’s head unit and/or car’s touchscreen (e.g. in cars like Tesla) etc. The data can e.g. be analyzed by a third party to provide a scoring of the driving style and then transferred to primary insurer partners, who can give a quote based on the obtained score. It may include other relevant data that insurers can use to differentiate and steer their portfolio. Thus, the inventive system allows a provider/aggregator to bring new telematics consumers to insurers, where the consumers can dynamically select an insurance provider based on these quotes. The telematics-vehicle data makes it possible to dynamically capture a vast number of risk-factors, in addition to risk-factors, as considered by prior art systems. Such risk factor can for example comprise time-dependent speed measuring, hard breaking, acceleration, cornering, distance, mileage (PAYD), short journey, time of day, road and terrain type, mobile phone usage (while driving), weather/driving conditions, location, temperature, blind spot, local driving, sun angle and dazzling sun information (sun shining in drivers' face), seatbelt status, rush hour, fatigue, driver confidence, throttle position, lane changing, fuel consumption, VIN (vehicle identification number), slalom, excessive RPM (Revolutions Per Minute), off-roading, G forces, brake pedal position, driver alertness, CAN (Controller Area Network) bus (vehicle's bus) parameters including fuel level, distance from other vehicles, distance from obstacles, driver alertness, activation/usage of automated features, activation/usage of Advanced Driver Assistance Systems, traction control data, usage of headlights and other lights, usage of blinkers, vehicle weight, number of vehicle passengers, traffic sign information, junctions crossed, running of orange and red traffic lights, alcohol level detection devices, drug detection devices, sensors for driver distraction, driver aggressiveness, driver mental and emotional condition, dazzling headlights from other vehicles, vehicle door status (open/closed), visibility through windscreens, lane position, lane choice, vehicle safety, driver mood, and/or passengers' mood. Up-to-now, no prior art system has been able to process such a variety of dynamically monitored, risk-relevant data. The present system is completely flexible with regard to the risk-exposed motor vehicle or the insured. For example, the present system may provide a 1 or 2 months free risk-transfer or a trial period for a motor vehicle and/or consumer. Afterwards, the consumer can select an insurance provider based on these quotes. Based on its flexibility, the applicability of the present invention is not restricted to risk-transfer in the context of motor vehicle, but can also be applied to other fields of risk-transfer. The invention allows providing an automated and telematics-based risk-transfer platform (that allows almost fully automated risk-transfer, incl. policy issuing, claims handling etc.). As mentioned, the second risk-transfer system and/or its associated first risk-transfer system may offer a free trial period (e.g. 1-2 months) to potential customers (potential policyholder), creating advantages for all parties. Thus, the invention allows to enable features as TBYB (Try Before You Buy) features, which is not possible for competing risk-transfers by prior art systems. Furthermore, the inventive system and platform provides end customer the choice to freely select a risk-transfer provider and product (e.g. PHYD (Pay how you Drive) or PAYD (Pay as you Drive)) based on these quotes. In PHYD, the risk-transfer systems may e.g. discount based on the personal driving behavior (how a person breaks, accelerates, turns). The discounts are based on telematics devices installed in the motor vehicle and the corresponding captured telematics data that measure behavior and location over time. In PAYD, the risk-transfer systems may for example discount based on mileage (how much a person drives) and not where or how. The advantage of the generated score parameters mirrors the captured sensory data in that the data components of the score can even for example comprise: customer policy details, individual driving data, crash forensics data, credit scores, statistical driving data, historic claims data, market databases, driving license points, statistical claims data, context data for weather or road type or surroundings. This broad monitoring capability further allows for providing a technical solution using optimized coupling of two automated risk-transfer systems with a better and more effective technical implementations, thereby making it possible to share and minimize the required automotive resources and to provide a unified, optimized multi-tier risk-transfer approach by sharing expert and development means for generating minimized conditions for the resource-pooling that is necessarily required(e.g. pooled premiums). The present invention provides a holistic technical solution that covers the whole range risk-transfer structures from collecting sensor and ADAS (advanced driver assistance systems, or active safety) data to accurate risk analysis for automated risk-transfer systems/coverage and value added services (e.g. stolen vehicle recovery, post-accident services, crash reporting, driver coaching, eCall/bCall, reward, driver scoring, real time traffic information, fuel consumption, social networking, last mile features, car sharing solutions), which is not possible with the prior art systems. Further possible added value services, as also realizable by the present invention, are, for example, stolen vehicle recovery, stolen vehicle tracking, post-accident services, crash reporting, driver coaching/training, eCall/bCall, reward, real-time feedback, driver scoring, driver Safety training, real time traffic information, remote diagnostics, fuel consumption, POS service, social networking, scheduling and dispatch, Geo-fencing, repair costs calculation, fleet management and tracking, map specific services (e.g. preferred restaurants nearby), AV/ADAS, and shared mobility services e.g. ride hailing, car sharing. The present invention provides an automated risk-transfer system for all kinds of risk-transfer schemes, as e.g. motor or product liability (re-)insurance systems and/or risk-transfer systems related to or depending on partially or fully automated vehicles. Also, the present invention provides a holistic and unified, automated technical approach for to motor vehicle coverage in all different structures of risk-transfer, such as product liability for car and/or technology manufacturers, driver liability coverage. Furthermore, the present invention also provides a holistic technical solution that covers the whole range from automotive control circuits and/or telematics devices and/or app installations to the automated and accurate risk measurement, analysis and management. Finally, it is able to provide a dynamic, expert system-based or machine learning-based scoring system based on real-time scoring and measurements, and further provides a technically scalable solution based on scoring algorithms and data processing making it possible to adapt the signaling to other fields of automated risk-transfer. The present invention, which is enhanced by contextual data, is able to provide the best and highest optimized technical solution to the real-time adapted multi-tier risk-transfer system. It makes it possible to capture and control the driver's score behavior, and compare that behavior within the technical operation and context. It makes it possible to automatically capture risk's scores according to location or trip, and to automatically analyze and react on data related to the need of value added services, such as accident notifications and/or feedback to the driver and/or automated fleet risk reporting and/or automated and dynamically optimized underwriting etc.). As an alternative embodiment variant, the score driving module can for example automatically capture risk scores according to a measured maintenance (e.g., maintenance failure by owner) and surveillance factor extracted from the automotive data associated with the motor vehicle or the use of active safety features. The telematics-based feedback means of the system may e.g. comprise a dynamic alert feed via a data link to the motor vehicle's automotive control circuit, wherein the central automotive circuit's heads-up device alerts drivers immediately to a number of performance measures including for example high RPM, i.e. high revolutions per minute as a measure of the frequency of the motor rotation of the motor vehicle's engine, unsteady drive, unnecessary engine power, harsh acceleration, road anticipation, and/or ECO drive. The automotive car system provides the opportunities for risk-adaption and improvement dynamically and in real-time, i.e. as and when they happen, related to the motor vehicle's risk patterns (e.g., location, speed, etc.). Providing instant feedback to drivers through heads-up training aids and obtaining information sent straight to the mobile telematics device, ensures a two-pronged approach to correcting risky (and often expensive) driving habits. Thus, the automotive car system not only allows mutually optimization of the operational parameters of the first and second risk transfer system, but also optimize the risk and/or risk behavior on the level of the risk-exposed motor vehicles. No prior art system allows such an integral, real-time optimization. As another value-added service, the automotive car system can for example dynamically generated claim notifications or fleet risk reports of selected motor vehicles. Such fleet reports, automatically generated by the automotive car system, provide a new approach to share and compare vehicles' statistics. The proposed invention with for example prefunding automotive enabled risk-transfer ((re)insurance) means will stimulate the carriers (first-tier risk-transfer systems) to provide their automotive data and claims' histories to the second-tier risk-transfer system in order to continually improve its scoring service, which in turn benefits the carrier by helping reduce costs and combined ratio. Finally, the present invention has a great flexibility compared to classical prior art systems. For example, a classic aggregator system typically includes a fee. Instead of a fee, the present system could be realized based on a second risk-transfer system's agreement with the concerned first risk-transfer system, instead.

In one alternative embodiment, the central, expert system-based circuit comprises a table with stored categorization trigger parameters for triggering a predefined level of scores, wherein the first and second risk transfer parameters and the correlated first and/or second payment transfer parameters are dynamically adapted and/or accumulated by means of the central, expert-system based circuit based on the triggered categorization of the driving motor vehicles during usage and based up the usage-based and/or user-based and/or operational automotive data captured from the plurality of driving motor vehicles. This embodiment has, inter alia, the advantage that it makes it possible to provide new and unified approach for automated risk-transfer for risk associated with risk-exposed motor vehicles, considering dynamically measured, usage-based parameters, allowing a new optimization at the level of the risk-exposed vehicle as well as at the level of the operational pooling of risk-exposure of the first and/or second risk-transfer system.

In one alternative embodiment, the driving score module triggers and automatically selects score driving parameters based on defined score driving behavior pattern by comparing captured automotive data with the defined score driving behavior pattern. The score driving module can further for example automatically capture risk scores according to the measured location or trip of the motor vehicle based on the captured automotive data of the mobile telematics devices associated with the motor vehicles. This alternative embodiment has, inter alia, the advantage that it makes it possible to provide a real-time adapted multi-tier risk-transfer system. Furthermore, it makes it possible to capture and/or control the score driving behavior (also in the sense of location, time, road etc. where the driving takes place), and compare its behavior within the technical operation and context. It makes it possible to automatically capture scored risks according to location or trip, and to automatically analyze and react to data related to the need of added services, such as accident notifications.

In one alternative embodiment, the mobile telematics application and/or the central automotive circuit comprises additional triggers triggering accident notification and/or other added services based on the captured automotive data of the mobile telecommunication apparatus for motor vehicle associated with the motor vehicles. This alternative embodiment has, inter alia, the advantage that the system is capable of providing additional benefit to the customer based on additionally generated signaling.

In another alternative embodiment, the switching device comprises capturing means for capturing a transfer of payment from the first insurance system to the second payment-transfer module, wherein the second layer trigger structure of the system is activatable by triggering a payment transfer matching a predefined activation threshold parameter. In another alternative embodiment, in the case of triggering the occurrence of a loss associated with the occurrence of the defined risk events, a predefined defined portion of the occurred loss covered by the second insurance system based on the second risk transfer parameters and correlated second payment transfer parameters is triggered. Thus, the present invention can be carried out with a proportional or a non-proportional risk-transfer as coupling mechanism between the first and second risk-transfer systems, wherein under proportional risk-transfer coupling, the second risk-transfer system is activated by means of the switching device by a fixed percentage share of each risk transferred to the first risk-transfer system respectively each loss transferred to the risk-transfer system. Accordingly, the second risk-transfer system receives that fixed payment transfer from the first risk-transfer system by means of the second payment parameters. Under non-proportional risk-transfer coupling, if an excess of a defined activation threshold parameter associated with the occurrence of the defined risk events is triggered, the occurred loss is at least partly covered by the second insurance system based on the second risk transfer parameters and correlated second payment transfer parameters. The activation threshold can be associated with each single loss having occurred or with the accumulated loss measured by means of the aggregated loss parameter. Thus, the non-proportional coupling can be realized in an excess of loss or stop loss risk-transfer structure, wherein the excess of loss structure can for example be based on a Per Risk XL (Working XL), Per Occurrence / Per Event XL (Catastrophe or Cat XL), or Aggregate XL structure. As a more particular alternative embodiment, a periodic payment transfer from the risk exposure components to the resource pooling system via a plurality of payment receiving modules is requested by means of a monitoring module of the resource-pooling system, wherein the risk transfer or protection for the risk exposure components is interrupted by the monitoring module, when the periodic transfer is no longer detectable via the monitoring module. As an alternative, the periodic payment transfer request can be interrupted automatically or waived by the monitoring module, when the occurrence of indicators for a risk event is triggered in the data flow pathway of a risk exposure component. These alternative embodiments have, inter alia, the advantage that the system allows for further automation of the monitoring operation, especially of its operation with regard to the pooled resources.

In another alternative embodiment, an independent verification risk event trigger of the first and/or second resource pooling system is activated in cases when the occurrence of indicators for a risk event is triggered in the data flow pathway of the mobile telecommunication apparatus or the central automotive circuit by means of the risk event triggers, and wherein the independent verification risk event trigger additionally issues a trigger in the event of the occurrence of indicators regarding risk events in an alternative data flow pathway with independent measuring parameters from the primary data flow pathway, for example of alternative telematics devices, in order to verify the occurrence of the risk events at the risk-exposed automotive motor vehicles. In this alternative, the transfer of payments is only assigned to the corresponding risk exposed motor vehicle if the occurrence of the risk event at the risk exposure component is verified by the independent verification risk event trigger. These alternative embodiments have, *inter alia*, the advantage that the operational and financial stability of the system can thus be improved. In addition, the system is rendered less vulnerable to fraud and counterfeit.

In general, the system can for example comprise capturing means that capture a payment transfer assigned to one of the two risk transfer systems, e.g. also from the first insurance system to the second payment transfer module, wherein the assigned insurance system is activated, and wherein the risk exposure of the first insurance system associated with the assigned risk transfer layer is transferred to the second insurance system. This alternative embodiment has, *inter alia*, the additional advantage that the second insurance system can be activated separately, allowing a controlled and discrete risk transfer and risk cover from the first to the second resource pooling system.

In another alternative embodiment, the first insurance system comprises an interface module for accessing and adapting the assigned operational parameters prior to the transfer of the payment parameters from the first resource pooling system to the second resource pooling system. This alternative embodiment has, inter alia, the advantage that the risk transfer structure can be dynamically adjusted and, moreover, selected and/or additionally optimized directly by the first insurance system or the second insurance system.

In still another alternative embodiment, the central automotive circuit comprises means for processing risk-related motor vehicle driving data and providing data regarding the likelihood of said risk exposure for one or a plurality of the pooled risk-exposed motor vehicle, in particular, based on the risk-related motor vehicle data, and wherein the receipt and preconditioned storage of payments from the risk exposed motor vehicles for the pooling of their risks can be determined dynamically based on the total risk and/or the likelihood of risk exposure of the pooled risk-exposed motor vehicles. This alternative embodiment has, inter alia, the advantage that the operation of the first and/or second resource pooling system can be adjusted dynamically to changing conditions in relation to the pooled risk, such as a change of the environmental conditions or risk distribution, or the like, of the pooled motor vehicles. A further advantage is that the system does not require any manual adjustments, when it is operated in different environments, places or countries, because the size of the payments of the risk-exposed motor vehicles is directly related to the total pooled risk. However, it is important to note, that the present invention does not necessarily have to lead to adjusted pricing or premiums. For example, it could also automatically provide coupons to automated motor vehicles driving in low risk regions, or could provide that nothing changes, but that the system uses the automotive data to decide automatically whether the risk-transfer will be continued the next year. The present invention can also be used exclusively for automatically providing and activating adapted and/or specifically selected value-added services, such as claim notifications and/or accident notifications and/or feedback to the motor vehicle or driver and/or automated fleet risk reporting and/or automated and dynamically optimized underwriting etc. Thus, the present invention allows an adaption of the risk of the first risk-transfer tier or system as well as risk at the level of the insured motor vehicles (e.g. by risk-based driver feedback in real-time) and/or the second risk-transfer tier or system. There is no prior art system, allowing such an optimization and/or adaption. The feedback can for example be generated by comparing the motor vehicle's profile and pattern with other motor vehicles' profiles or pattern at the same location and/or under comparable conditions.

In one alternative embodiment, the system comprises means for processing risk-related component data and providing information regarding the likelihood of said risk exposure for one or a plurality of the pooled risk exposed motor vehicles, in particular, based on risk-related motor vehicles' data, and wherein the receipt and preconditioned storage of payments from the first resource pooling system to the second resource pooling system for the transfer of its risk can be dynamically determined based on the total risk and/or the likelihood of risk exposure of the pooled risk exposure components. This alternative embodiment has, inter alia, the advantage that the operation of the first and/or second resource pooling system can be dynamically adjusted to changing conditions of the pooled risk, such as changes of the environmental conditions or risk distribution, or the like, of the pooled risk components. A further advantage is the fact that the system does not require any manual adjustments, when it is operated in different environments, places or countries, because the size of the payments of the risk exposure components is directly related to the total pooled risk.

In one alternative embodiment, the number of pooled motor vehicles is dynamically adjusted via the first risk-transfer system to a range where non-covariant, occurring risks covered by the risk-transfer system affect only a relatively small proportion of the total pooled risk exposure components at any given time. Analogously, the second risk-transfer system can for example dynamically adjust the number of pooled risk shares transferred from first risk-transfer systems to a range where non-covariant, occurring risks covered by the second risk-transfer system affect only a relatively small proportion of the total pooled risk transfers from first risk-transfer systems at any given time. This alternative variant has, *inter alia*, the advantage that the operational and financial stability of the system can be improved.

In one alternative embodiment, the risk event triggers are dynamically adjusted by means of an operating module based on time-correlated incidence data for one or a plurality of the predefined risk events. This alternative embodiment has, inter alia, the advantage that improvements in capturing risk events or avoiding the occurrence of such events, for example by improved forecasting systems, etc., can be dynamically captured by the system and dynamically affect the overall operation of the system based on the total risk of the pooled risk exposure components.

In another alternative embodiment, upon each triggering of an occurrence, where parameters indicating a predefined risk event are measured, by means of at least one risk event trigger, a total parametric payment is allocated with the triggering, and the total allocated payment is transferrable upon a triggering of the occurrence. The predefined total payments can for example be leveled to any appropriate defined total sum, such as a predefined value, or any other sum related to the total transferred risk and the amount of the periodic payments of the risk exposed motor vehicle. This alternative has, inter alia, the advantage that the parametric payments or the payments of predefined amounts can be relied on fixed amounts. Further, the parametric payment may allow for an adjusted payment of the total sum that can for example depend on the stage of the occurrence of a risk event, as triggered by the system.

Brief Description of the Drawings

The present invention will be explained in more detail, by way of example, with reference to the drawings in which:

Figure 1 shows a block diagram schematically illustrating operational flow and processing steps according to an embodiment of the present invention for example according to figure 2. The illustrated operation flow and processing steps be central automotive circuit 11or mobile telematics application 101 realized on the mobile telecommunication apparatus 10. The later may have the advantage to be faster to realize.

Figure 2 shows a block diagram schematically illustrating an exemplary mobile automotive system 1 with mobile telecommunications apparatuses 10 associated with a plurality of motor vehicles 41,…,45 capturing measuring parameters in real-time and dynamically adapting its operational parameters. In particular, it shows a mobile automotive system 1 with mobile telecommunication apparatus 10 comprising one or more wireless connections 105 and a plurality of interfaces for connection with at least one of a vehicle's data transmission bus and/or with sensors and/or measuring devices 102 and/or speakers 1021 and/or microphones 1022. The mobile telecommunication apparatus is connected to an on-board diagnostic system 431,…,435 and/or an in-car interactive device 441,…,445 and/or automotive telematics devices 451,…,455, wherein the mobile telecommunications apparatuses 10 capture usage-based 31 and/or user-based 32 telematics data 3 of the motor vehicle 41,…,45 and/or user 321, 322, 323, and transmit them via the data transmission network 2 to the central automotive circuit 11.

Figure 3 shows a block diagram schematically illustrating an exemplary dynamically adaptable automotive system 1 with the mobile telecommunications apparatuses 10 assigned to a plurality of risk-exposed motor vehicles 41,…,45, according to an alternative embodiment of the invention. The mobile telecommunications apparatuses 10 capture by means of the mobile telematics application101 usage-based 31 and/or user-based 32 telematics data 3 of the motor vehicle 41,…,45 and/or user 321, 322, 323, and transmit them via the data transmission network 2 to the central automotive circuit 11. The system 1 is capable of capturing different kinds of telematics data 3, such as driving behavior from the user and/or whether the motor vehicle 41,…,45 is driving itself (auto piloting) and/or the motor vehicle 41,…,45 is intervening with its automated or safety features. The latter is possible, if the mobile telecommunications apparatuses 10 capture data 3 from the motor vehicle 41,…,45 itself. The mobile telecommunication apparatus 10 or the mobile telematics applications 101 can generate data 3 themselves by means of their own sensors, and/or of sensors of the motor vehicle's systems, e.g. provided by an on-board diagnostic system. As seen from fig 3, the central automotive circuit 11 is realized as a separate part of the mobile automotive car system 1, or as a part of the second risk-transfer system 13, wherein in the latter case, the mobile telematics application 101 can be provided by the second risk-transfer system 13 to the first risk-transfer system 12 and/or the risk-exposed motor vehicles 41,…,45, in exchange for having access to the captured telematics data 3 and/or captured claim or loss data 711,…,715/721,…,725/731,…,735. As also illustrated by fig. 3, the mobile automotive car system 1 may comprise one first risk-transfer system 10 or a plurality of first risk-transfer systems 10a-10d, all associated with the same second risk-transfer system 12.

Figure 4 shows another block diagram schematically illustrating an exemplary dynamically adaptable automotive car system 1 with mobile telecommunications apparatuses 10 associated with a plurality of risk-exposed motor vehicles 41,…,45, according an alternative embodiment of the invention. In particular, it shows a central automotive circuit 11. The mobile telecommunications apparatuses 10 capture usage-based 31 and/or user-based 32 telematics data 3 of the motor vehicle 41,…,45 and/or user 321, 322, 323, and transmit them via the data transmission network 2 to the central automotive circuit 11, which cooperates with the coupled first and second risk-transfer systems 12/13.

Figure 5 shows a block diagram schematically illustrating an exemplary mobile telematics application 101 and real-time telematics data capturing.

Detailed Description of the Preferred Embodiments

Figure 1 schematically illustrates an architecture for a possible implementation of an embodiment of the automotive, dynamically triggered car system and multi-tier risk-transfer/prediction system 1, in particularly providing a dynamic, telematics-based connection search engine and telematics data aggregator by means of a mobile telecommunication apparatus 10 executing a mobile telematics application 101 and a central automotive circuit 11. The mobile automotive car system 1 reacts in real-time, dynamically, and self-adaptive on captured environmental or operational parameters 3, in particular on monitored and captured automotive parameters 3 of motor vehicles 41,…,45 during operation. The present invention further is able to provide a telematics based automated and dynamic risk-measurements, risk-transfer, alert and real-time notification systems for motor vehicles 41,…,45 and wireless technology used in the context of telematics. Finally, the present system 1 also provides to telematics-based real-time expert systems. Thus, the inventive system 1 provides a structure for the use of telematics together with real-time risk-measurement, risk-monitoring, automated risk-transfer systems based on captured and measured usage-based and/or user-based telematics data 3.

To provide the dynamic, telematics-based connection search engine and telematics data aggregator, the mobile automotive system 1 captures and categorizes risk-transfer profiles 124 in a results list 118, wherein the results list 118 is provided for display to and selection by a user of a mobile telecommunication apparatus 10 by means of a mobile telematics application 101 of the mobile telecommunications apparatuses 10. For the purpose of the present application, the term "search engine" refers to a system for active or passive searching or providing information (e.g., accessible risk-transfer profiles) and/or facilitating one or more transactions, e.g. risk-transfers, associated with the information. This is, the result list 118 with risk-transfer profiles 124 generated by the first risk-transfer systems 12 and appropriate first payment transfer parameters 1221,...,1225 and e.g. its pricing, based on the driving behavior and the scores driving parameters 1111,...,1117, for example, collected in a predefined trial period. Furthermore, for the purpose of the present application, the term "real time" refers to an essentially instantaneous or interactive process (as opposed to a process which occurs relatively slowly, as in a "batch" or non-interactive manner)

The mobile telecommunication apparatus 10 comprises one or more data transmission connection to integrated sensors 102,...,109 of the mobile telecommunication apparatus 10 and/or an on-board diagnostic system 431,...,435 and/or an in-car interactive device 441,...,445 and/or automotive telematics devices 451,...,455 of a motor vehicle 41,...,45. The integrated sensors 102,...,109 of the mobile telecommunication apparatus 10 and/or the on-board diagnostic system 431,...,435 and/or the in-car interactive device 441,...,445 and/or the automotive telematics devices 451,...,455 comprise proprioceptive sensors 4021 for sensing operating parameters 40121 of the motor vehicle 41,...,45 and/or exteroceptive sensors 4011 for sensing environmental parameters 40111 during operation of the motor vehicle 41,...,45. The exteroceptive sensors or measuring devices 4011 can, for example, comprise at least radar devices 40117 for monitoring the surrounding of the motor vehicle 41,...,45 and/or LIDAR devices 40115 for monitoring the surrounding of the motor vehicle 41,...,45 and/or global positioning systems 40122 or vehicle tracking devices for measuring positioning parameters of the motor vehicle 41,...,45 and/or odometrical devices 40114 for complementing and improving the positioning parameters measured by the global positioning systems 40112 or vehicle tracking devices and/or computer vision devices 40116 or video cameras for monitoring the surrounding of the motor vehicle 41,...,45 and/or ultrasonic sensors 40113 for measuring the position of objects close to the motor vehicle 41,...,45. The proprioceptive sensors or measuring devices 4012 for sensing operating parameters 40121 of the motor vehicles 41,...,45 can at least comprise a motor speed and/or wheel load and/or heading and/or battery status of the motor vehicles 41,...,45. The one or more wireless connections 105 or wired connections of the mobile telecommunication apparatus 10 can for example comprise Bluetooth as wireless connection for exchanging data using short-wavelength UHF (Ultra high frequency) radio waves in the ISM (industrial, scientific and medical) radio band from 2.4 to 2.485 GHz by building a personal area networks (PAN) with the on-board Bluetooth capabilities and/or 3G and/or 4G and/or GPS and/or Bluetooth LE (Low Energy) and/or BT based on the Wi-Fi 802.11 standard, and/or a contactless or contact smart card, and/or a SD card (Secure Digital Memory Card) or another interchangeable non-volatile memory card.

For providing the wireless connection 105, the mobile telecommunication apparatus 10 can for example act as a wireless node within a corresponding data transmission network by means of antenna connections of the mobile telecommunications apparatuses 10, in particular, as mentioned, mobile telecommunication networks such as 3G, 4G, 5G LTE (Long-Term Evolution) networks or mobile WiMAX or other GSM/EDGE- and UMTS/HSPA-based network technologies etc., and more particularly with appropriate identification means as SIM (Subscriber Identity Module) etc.. The mobile telecommunications apparatuses 10 and the monitoring cellular mobile node application 101 can e.g. be connected to an on-board diagnostic system 431, …, 435 and/or an in-car interactive device 441, …, 445, wherein the mobile telecommunications apparatuses 10 capture usage-based 31 and/or user-based 32 automotive data 3 of the motor vehicle 41,…,45 and/or user. The mobile telecommunications apparatuses 10 can for example provide the one or more wireless connections 1024 by means of radio data systems (RDS) modules 10241 and/or positioning system 10242 including a satellite receiving module and/or a mobile cellular phone module 10243 including a digital radio service module and/or a language unit 10244 in communication with the radio data system 10241 or the positioning system 10242 or the cellular telephone module 10243. The satellite receiving module 10242 can for example comprise a Global Positioning System (GPS) circuit and/or the digital radio service module comprises at least a Global System for Mobile Communications (GSM) unit. The plurality of interfaces of the mobile telecommunications apparatuses 10 for connection with at least one of a motor vehicle's data transmission bus can for example comprise at least on interface for connection with a motor vehicle's Controller Area Network (CAN) bus, e.g. in connection with an on-board diagnostics (OBD) port, or another connection for example for battery installed devices, or also OEM (Original Equipment Manufacturer) installed systems obtaining information access to on-board sensors or entertainment systems (such as Apple Carplay etc.) providing the necessary vehicle sensor information. The measured operating parameters 40121 and/or environmental parameters 40111 are denoted as telematics automotive data 3 comprising the usage-based automotive data 31 with the usage-based automotive data 311,…,313 of the vehicles 41,…,45, and the user-based automotive data 32 with the user-based automotive data 321,…,323 of the vehicles 41,…,45, and the operational automotive data 33 with the operational data 331,…,333 of the control system 461,…, 465. The measured operating parameters 40121 and/or environmental parameters 40111 during operation of the motor vehicle 41,…,45 can for example comprise time-dependent speed measuring, hard braking, acceleration, cornering, distance, mileage (PAYD), short journey, time of day, road and terrain type, mobile phone usage (while driving), weather/driving conditions, location, temperature, blind spot, local driving, sun angle and dazzling sun information (sun shining in drivers' face), seatbelt status, rush hour, fatigue, driver confidence, throttle position, lane changing, fuel consumption, VIN (vehicle identification number), slalom, excessive RPM (Revolutions Per Minute), off-roading, G forces, brake pedal position, driver alertness, CAN (Controller Area Network) bus (vehicle's bus) parameters including fuel level, distance to other vehicles, distance from obstacles, driver alertness, activation/usage of automated features, activation/usage of Advanced Driver Assistance Systems, traction control data, usage of headlights and other lights, usage of blinkers, vehicle weight, number of vehicle passengers, traffic sign information, junctions crossed, running of orange and red traffic lights, alcohol level detection devices, drug detection devices, driver distraction sensors, driver aggressiveness, driver mental and emotional condition, dazzling headlights from other vehicles, vehicle door status (open/closed), visibility through windscreens, lane position, lane choice, vehicle safety, driver mood, and/or passengers' mood. Up-to-now, no prior art system has been able to process such a variety of dynamically monitored, risk-related data. The advantage of the generated score parameters mirrors the captured sensory data in that the data components of the score can even for example comprise: customer policy details, individual driving data, crash forensics data, credit scores, statistical driving data, historic claims data, market databases, driving license points, statistical claims data, context data of weather or road type or surrounding.

As mentioned, a data link 21 is set by means of the wireless connection 105 of the mobile telecommunication apparatus 10 over the mobile telecommunication network 2 between the mobile telematics application 101 as client and an intelligent central automotive circuit 11, wherein the mobile telecommunication apparatus 10 acts as wireless node 221, …, 225 within said mobile telecommunication network 2, and wherein the operating parameters 40121 and the environmental parameters 40111 are measured and collected in dataflow pathway 103 as automotive telematics data 3 during operation of the motor vehicle 41,…,45 via the mobile telecommunication apparatus 10 by means of a mobile telematics application 101 and transmitted to the central automotive circuit 11. The intelligent central automotive circuit 11 comprises a telematics-driven core aggregator 110 with a plurality of dynamically applied telematics data-based triggers 1012 triggering, capturing, and monitoring said operating parameters 40121 and/or environmental parameters 40111 during operation of the motor vehicle 41,…,45 in the dataflow pathway 103 by means of a mobile telematics application 101 of the mobile telecommunication apparatus 10. Alternatively, the mobile telematics application 10 can comprise the vehicle telematics-driven core aggregator 1011 with telematics data-based triggers 1012 triggering, capturing, and monitoring said operating parameters 40121 and/or environmental parameters 40111 during operation of the motor vehicle 41,…,45 in the dataflow pathway 103 of the integrated sensors and/or the on-board diagnostic system 431,…,435 and/or the in-car interactive device 441,…,445 and/or the automotive telematics device 451,…,455 and/or the OEM devices 411,…,415 of the motor vehicle 41,…,45. In an alternative embodiment or additionally, the mobile telecommunication apparatus 10, such as smart phone devices, can for example comprise as integrated device components all proprioceptive sensors and/or measuring devices 4021 for sensing the operating parameters 40121 of the motor vehicle 41,…,45 and/or exteroceptive sensors and/or measuring devices 4011 for sensing the environmental parameters 40111 during operation of the motor vehicle 41,…,45. The mobile telecommunication apparatus can for example comprise at least a GPS module (Global Positioning System) and/or geological compass module based on a 3-axis teslameter and a 3-axis accelerometer, and/or gyrosensor or gyrometer, and/or a MEMS accelerometer sensor comprising a cantilever beam with the seismic mass as a proof mass measuring the proper or g-force acceleration, and/or a MEMS magnetometer or a magnetoresistive permalloy sensor or another three-axis magnetometers.

The intelligent central automotive circuit 11 comprises a driving score generator 111 measuring and/or generating a single or compound of variable scoring parameters 1111,…,1117 providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45 based on the triggered, captured, and monitored operating parameters 40121 and/or environmental parameters 40111. Alternatively, the mobile telematics application 101 comprises the driving score module 1013 measuring and/or generating a single or a compound set of variable scoring parameters 10131 profiling the use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45 based on the triggered, captured, and monitored operating parameters 40111 or environmental parameters 40121. Thus, the system 1 scores individual drivers based on the monitored operating parameters 40111 or environmental parameters 40121. Based on the score and/or other relevant telematics data visible to consumers and the risk-transfer provider (insurers) (if the consumer agrees), the supply systems 12 are able to quote. The single or compound set of variable scoring parameters 10131/1111,…,1117 profile the use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45. The single or compound set of variable scoring parameters 10131/1111,…,1117 generated by means of the driving score module 111 can at least comprise variable scoring parameters 10131/1111,…,1117 measuring a driving score 1111 and/or a contextual score 1112 and/or a vehicle safety score 1113 and/or a cyber risk score 1114 and/or a software certification/testing risk score 1115 and/or a NHTSA (National Highway Traffic Safety Administration) level risk score 1116 and/or a usage/operation of autonomous driving aids 1117. The variable driving score parameter 1111 can e.g. be at least based upon a measure of driver behavior parameters comprising speed and/or acceleration and/or braking and/or cornering and/or jerking, and/or a measure of distraction parameters comprising mobile phone usage while driving and/or a measure of fatigue parameters and/or drug use parameters. The variable contextual score parameter 1112 can e.g. be at least based upon measured trip score parameters based on road type and/or number of intersection and/or tunnels and/or elevation, and/or measured time of travel parameters, and/or measured weather parameters and/or measured location parameters, and/or measured distance driven parameters. The variable vehicle safety score parameter 1113 can e.g. be at least based upon measured ADAS feature activation parameters and/or measured vehicle crash test rating parameters and/or measured level of automation parameters of the motor vehicle 41,…,45 and/or measured software risk scores parameters. A data link 21 is set by means of the wireless connection 105 of the mobile telecommunications apparatus 10 over a mobile telecommunication network 2 between the mobile telematics application 101 as client and a central automotive circuit 11. The mobile telecommunication apparatus 10 acts as wireless node 221, …, 225 within said mobile telecommunication network 2. The central automotive circuit 11 automatically collects said single or compound set of variable scoring parameters 10131 of the driving score module 1013 or generates said single or set compound of variable scoring parameters 1111,…,1117, by means of the driving score module 111, based on the triggered and aggregated automotive data 3. In the latter case, the automotive data 3 are triggered and aggregated by means of the central automotive circuit 11 and the vehicle-operation driven core aggregator 110.

The central automotive circuit 11 can e.g. further comprise a real-time measuring system 1119 detecting risk measuring pattern 1121,…,1123. By means of pattern recognition, the detected risk measuring pattern 1121,…,1123 are compared to stored sample risk measuring pattern 1131,…,1133 of the pattern database 1118. In case of triggering specific risk measuring pattern 1131,…,1133, the single or compound of variable scoring parameters 1111,…,1117/10131 are dynamically adapted by the intelligent, self-adaptive mobile automotive system 1 providing a continuous monitoring of the physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45 based on the triggered, captured, and monitored operating parameters 40121 and/or environmental parameters 40111. The real-time measuring system 1119 is enabled to detect continuous and non-continuous pattern of a risk measuring pattern 1121,…,1123, detecting fragmented stored sample risk measuring pattern 1131,…,1133 of the pattern database 1118 at least partially by non-continuous, pattern-comprehensive recognition. The real-time measuring system 1119 can e.g. be arranged to generate a control signal on the basis of said measured and detected risk measuring pattern 1121,…,1123. Said control signal is provided and transferred to adjusting means for adjusting and dynamically adapting said single or compound of variable scoring parameters 1111,…,1117/10131 providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45 based on the triggered, captured, and monitored operating parameters 40121 and/or environmental parameters 40111. The real-time measuring system 1119 can e.g.

further comprise an optical image conversion device 11191 generating an optical, multi-dimensional representation pattern of the measured risk measuring pattern 1121,…,1123, and further comprise an optical image detection device 11192 for optical pattern recognition of the measured risk measuring pattern 1121,…,1123 based on the optical, multi-dimensional representation pattern and the stored sample risk measuring pattern 1131,…,1133 of the pattern database 1118. The optical image conversion device 11191 can e.g. be realized as a line scan converter and said optical, multi-dimensional representation pattern consists of a plurality of pixels arranged in one or more lines, each of said plurality of pixels representing an area of the surface being imaged and having a pixel value corresponding to physical characteristics of said area. The single or compound of variable scoring parameters 1111,…,1117/10131 can e.g. be dynamically adapted until no or a specified maximal deviation is detected between antecedent measurements of the single or compound of variable scoring parameters 1111,…,1117/10131 and subsequent measurements of the single or compound of variable scoring parameters 1111,…,1117/10131 by the intelligent, self-adaptive mobile automotive system 1 within a given time-frame. Finally, the stored sample risk measuring pattern 1131,…,1133 of the pattern database 1118 can e.g. be dynamically adapted by means of a self-learning structure of the real-time measuring system 1119. The self-learning structure can e.g. be based on supervised or unsupervised learning structures. However, the learning structures can also comprise learning classification processes as e.g. clustering, if no training data can be involved, by grouping the input data into clusters based on some inherent similarity measure (e.g. the distance between the voxels (see below), e.g. considered as vectors in a multi-dimensional vector space), rather than assigning each input instance into one of a set of pre-defined classes. If training samples are available, the machine learning structure, if realized as supervised learning, if applied to the voxel structures, will correctly determine the class labels for unknown instances classification of the risks. For the present invention, probabilistic machine learning structures for pattern recognition worked well. However, also unsupervised structures as e.g. Hebbian machine learning structures etc. can be successfully applied to the voxels and/or risk measurements/classifications. By triggering newly occurring or identified risk measuring pattern 1131,…,1133, the single or compound of variable scoring parameters 1111,…,1117/10131 can e.g. be dynamically adapted by the intelligent, self-adaptive mobile automotive system 1 feeding historical single or compound of variable scoring parameters 1111,…,1117/10131 and actual single or compound of variable scoring parameters 1111,…,1117/10131 to the self-learning structure of the real-time measuring system 1119. In case of adaption, the newly occurring or identified risk measuring pattern 1131,…,1133 can e.g. be added to the stored sample risk measuring pattern 1131,…,1133 of the pattern database 1118, and wherein the application of the telematics data-based triggers 1012 of the telematics-driven core aggregator 110/1011 is dynamically adapted and optimized based on the newly occurring or identified risk measuring pattern 1131,…,1133 and the stored sample risk measuring pattern 1131,…,1133 of the pattern database 1118 providing a continuous, and dynamically adapted monitoring of the physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45 based on the triggered, captured, and monitored operating parameters 40121 and/or environmental parameters 40111.

Though, the adaption and optimization process works well for most of the applications, a further optimization can be achieved by means of multi-dimensional operational parameter optimization. For example, the system 1 can comprise a discretized voxels structures in from of a polyhedral meshwork structure, wherein a combination of measured risk measuring pattern 1121,…,1123 and/or captured operating parameters 40121 and/or environmental parameters 40111 are mapped onto the discretized voxels of the polyhedral meshwork structure. The polyhedral meshwork structure is defined in an adaptable number of dimensions, each representing an individual risk states of the motor vehicle 41,…,45 during operation, when mapped onto each face or an edge or a vertex of the meshwork polyhedron. Said individual risk states of the motor vehicle 41,…,45 during operation can e.g. be represented by means of risk attribute functional coefficients, e.g. by means of floating point risk attribute functional coefficients, when mapped onto each face or an edge or a vertex of a meshwork polyhedron. Said individual material can e.g. also be represented by means of integer functional coefficients, or by means of short word functional coefficients, when mapped onto each face or an edge or a vertex of a meshwork polyhedron 18, or by means of byte type functional coefficients, when mapped onto each face or an edge or a vertex of a meshwork polyhedron. For said combination, all risk attributes from simulated or actually measured risk states can e.g. be stored by means of the voxels, described above, wherein the system 1 is optimizing by varying over all operational or risk values represented by the voxels in the regular grid of this multi-dimensional parameters space. However, other approaches of process optimization and automated decision-making structures can be used as well, if they are suitable to adjust the risk measuring process so as to optimize the above-specified set of parameters without violating the corresponding constraint. Optimizing the detectable and measurable risk-pattern, the most important goals can be achieved, as e.g. minimizing processing-time and cost and maximizing risk measurement efficiency and accuracy. When optimizing the present process, for example, the goal can be achieved by maximizing one or more of the pattern parameter specifications, while keeping all others within their constraints. The system 1 can e.g. comprise appropriate control loops. Each control loop is responsible for controlling one part of the recognition process. If the control loop is properly designed and tuned, the process runs in its optimum, otherwise below or above its optimum. Outside the ideal operation of the system 1, process will less accurate and efficient, or even technically unusable. For each control loop to run optimally, the identification of the herein described sensors is essential. The present inter-machine control system 1 allows to provide a risk-measuring process of continuously and dynamically, to changing operational or environmental condition adapted monitoring, in particular an automated performance supervision with self-optimized, self-adapted and automated risk-transfer.

A shadow request 119 is transmitted to a plurality of automated risk-transfer supplier systems 12, decentrally connected to the central automotive circuit 11 over a data transmission network. The shadow request 119 comprises at least risk-relevant or risk-related parameters based upon the measured and/or generated single or compound set of variable scoring parameters 10131. In response to the emitted shadow request 119, the central automotive circuit 11 receives a plurality of individualized risk-transfer profiles 124 based upon the dynamically collected single or compound set of variable scoring parameters 10131. The risk-related parameters of the shadow request 119 comprise at least usage-based 31 and/or user-based 32 and/or operating 33 automotive data 3 generated by the mobile telematics application 101 of the mobile telecommunications apparatus 10 based upon the triggered, captured, and monitored operating parameters 40111 or environmental parameters 40121, and the generated single or compound set of variable scoring parameters. The shadow requests 119 can for example be periodically transmitted to the plurality of automated risk-transfer supplier systems 12 based on the dynamically generated single or compound set of variable scoring parameters 10131 and/or the triggered, captured, and monitored operating parameters 40111 or environmental parameters 40121, and wherein the result list 118 is dynamically adapted in real-time and displayed to the user for selection. However, the shadow requests 119 can also be generated and transmitted to the plurality of automated risk-transfer supplier systems 12 based on the dynamically generated single or compound set of variable scoring parameters 10131 and/or the triggered, captured, and monitored operating parameters 40111 or environmental parameters 40121, if the mobile telematics application101 triggers an alternation of the dynamically generated single or compound set of variable scoring parameters 10131 and/or the triggered, captured, and monitored operating parameters 40111 or environmental parameters 40121, and wherein the result list 118 is dynamically adapted in real-time and displayed to the user for selection. As an alternative embodiment, a combination of the two before mentioned shadow request generations may also be applied.

The central automotive circuit 11 dynamically captures and categorizes the received plurality of individualized risk-transfer profiles 124 of the automated risk-transfer supplier systems 12. The results list 118 is dynamically updated and provided for display and selection to the user of the mobile telecommunication apparatus 10 by means of the mobile telematics application 101 based on the triggered, captured, and monitored operating parameters 40121 or environmental parameters 40111 during operation of the motor vehicle 41,…,45. Therefore, the plurality of individualized risk-transfer profiles 124, provided by the automated risk-transfer supplier systems 12, time-dependently vary based on the generated single or compound set of variable scoring parameters 10131 measuring the time-dependent use and/or style and/or environmental condition of driving during operation of the motor vehicle 41,…,45. The mobile automotive system 1 can for example automatically alert the user, if a more preferable risk-transfer profile 124 is triggered in relation to a previously selected risk-transfer profile 124. Furthermore, the mobile automotive system 1 can also automatically adapt a risk-transfer associated with a user or mobile telecommunications apparatus 10, if a more preferable risk-transfer profile 124 is triggered in relation to a selected risk-transfer profile 124. The result list 118 can be adapted dynamically in real-time and displayed to the user for selection based upon definable categorization criteria as for example first payment parameters 1221,…,1225 and/or duration and/or risk-transfer structure.

List of reference signs

- 1 Mobile automotive car system
  - 10 Mobile telecommunications apparatus
    - 101 Mobile telematics application (cellular mobile node application)
      - 1011 Telematics-driven core aggregator
      - 1012 Telematics data-driven triggers
      - 1013 Driving Score Generator
        - 10131 Compound set of variable scoring parameters
      - 1014 Additional trigger triggering accident notification
      - 1015 Additional trigger triggering added services
    - 102 Integrated Sensors of the mobile node
      - 1020 MEMS magnetometer
      - 1021 Speakers
      - 1022 Microphones
      - 1023 Device alerts drivers
      - 1024 Wireless connections
        - 10241 Radio data systems (RDS) modules
        - 10242 Positioning system modules
        - 10243 Mobile cellular telephone interface
        - 10244 Language unit
        - 10245 Satellite receiving module
      - 1025 Accelerometer
      - 1026 Gyroscope
      - 1027 Cameras
      - 1028 Touchscreen
      - 1029 MEMS compass module
    - 103 Dataflow pathway
    - 105 Wireless connections
      - 1051 GPS
      - 1052 WLAN
      - 1053 Bluetooth
  - 11 Central automotive circuit

- 110 Telematics-driven core aggregator
- 111 Driving score generator
  - 1111,…,1117 Compound set of variable scoring parameters
    - 1111 Driving score
    - 1112 Contextual score
    - 1113 Vehicle safety score
    - 1114 Cyber risk score
    - 1115 Software certification/testing risk score
    - 1116 NHTSA level risk score
    - 1117 Usage/operation of autonomous driving aids
  - 1121,…,1123 Measured risk measuring driving pattern
  - 1131,…,1133 Stored risk measuring driving pattern
  - 1118 Pattern database
  - 1119 Real-time measuring system
    - 11191 Optical image conversion device
    - 11192 Optical image recognition device
- 112 Additional trigger triggering accident notification
- 113 Additional trigger triggering added services
- 114 Aggregation module
  - 1141 Predefined time period
- 115 Database with historical data
- 116 Automated database with location-dependent data
- 117 Switching device
- 118 Dynamic result listing
- 119 Shadow request

12 Automated risk-transfer supplier systems

- 121 Automated resource pooling system
- 122 First data store
  - 1221,…,1225 First payment parameters
- 123 First payment transfer modules
- 124 Generated risk transfer profiles

13 Second risk-transfer system

- 131 Automated resource pooling system
- 132 Second data store

1321,…,1325 Second payment parameters
133 Second payment transfer modules
1331 Control device
1332 Activation control parameter
134 Activation threshold parameter
135 Predefined loss covering portion
2 Data transmission network
20 Cellular network grid
201, …, 203 Network cell / Basic service area
211, …, 213 Base (transceiver) station
2111,…,2131 Cell Global Identity (CGI)
221, …, 225 Mobile network nodes
21 Uni- or bidirectional data link
3 Telematics automotive data
31 Usage-based automotive data
311,…,313 Usage-based automotive data of the vehicles 41,…,45
32 User-based automotive data
321,…,323 User-based automotive data of the vehicles 41,…,45
33 Operational automotive data
331,…,333 Operational data of the control system 461,…, 465
41,…,45 Motor vehicles
401, …, 405 On-board sensors and measuring devices
4011 Exteroceptive sensors or measuring devices
40111 Sensory data of the exteroceptive sensors
40112 Global Positioning System (GPS)
40113 Ultrasonic sensors
40114 Odometry sensors
40115 LIDAR (light detection and ranging)
40116 Video cameras
40117 Radar Sensors
4012 Proprioceptive sensors or measuring devices
40121 Sensory data of the proprioceptive sensors
411,…,415 OEM (Original Equipment Manufacturer) devices
421, …, 425 Data transmission bus interface
431, …, 435 On-board diagnostic system

441, …, 445 In-car interactive device
451,…,455 Automotive telematics devices
5 Aggregated risk exposure
51, …, 55 Transferred risk exposures of the motor vehicles
501, …, 505 First risk transfer parameters
511, …, 515 Second risk transfer parameters
6 Predefined risk events
61 Predefined risk events related to liability coverage for damages
611,…,613 Parameters measuring the occurrence of events 61
62 Predefined risk events related to liability coverage for losses
621,…,623 Parameters measuring the occurrence of events 62
63 Predefined risk events related to liability coverage for delay in delivery
631,…,633 Parameters measuring the occurrence of events 63
71,…, 75 Occurred loss associated with the motor vehicles 41,…,45
711,…,715 Captured loss parameters of measured predefined event 1
721,…,725 Captured loss parameters of measured predefined event 2
731,…,735 Captured loss parameters of measured predefined event 3
80 Aggregated loss parameter
81 Aggregated payment parameter
82 Variable loss ratio parameter
821 Loss ratio threshold value
901 Triggering Sensory Data
902 Extracting Scoring Parameter Compound
903 Transmitting Scoring Compound To CAC (Central automotive circuit)
904 Generating Shadow Request
905 Selecting Supplier Systems
906 Transmitting shadow Request to Selected Supplier Systems/First Risk-Transfer Systems
907 Filtering Responses from Supplier Systems/ First Risk-Transfer Systems
908 Transmitting Results List To MTA (Mobile telematics application) for User or Automated Selection

Claims

1. Intelligent, self-adaptive mobile automotive system (1) with a dynamic, telematics-based connection search engine and telematics data aggregator for real-time risk-monitoring based on captured and measured usage-based (31) and/or user-based (32) and/or operational (33) automotive telematics data, wherein risk-transfer profiles (124) are captured and categorized in a dynamic adapted result list (118), and wherein the result list (118) is provided for display and selection by means of a mobile telematics application (101) of a mobile telecommunication apparatus (10), characterized,

in that the mobile telecommunication apparatus (10) comprises one or more data transmission connection to integrated sensors (102,…,109) of the mobile telecommunication apparatus (10) and/or an on-board diagnostic system (431,…,435) or automotive telematics devices (451,…,455) of a motor vehicle (41,…,45), wherein the integrated sensors (102,…,109) of the mobile telecommunication apparatus (10) and/or the on-board diagnostic system (431,…,435) or the automotive telematics devices (451,…,455) comprise proprioceptive sensors (4021) for sensing operating parameters (40121) of the motor vehicle (41,…,45) and exteroceptive sensors (4011) for sensing environmental parameters (40111),

in that a data link (21) is set by means of the wireless connection (105) of the mobile telecommunication apparatus (10) over a mobile telecommunication network (2) between the mobile telematics application (101) as client and an intelligent central automotive circuit (11), wherein the mobile telecommunication apparatus (10) acts as wireless node (221, …, 225) within said mobile telecommunication network (2), and wherein the operating parameters (40121) and the environmental parameters (40111) are measured and collected in dataflow pathway (103) as automotive telematics data (3) during operation of the motor vehicle (41,…,45) via the mobile telecommunication apparatus (10) by means of a mobile telematics application (101) and transmitted to the central automotive circuit (11),

in that the intelligent central automotive circuit (11) comprises a telematics-driven core aggregator (110/1011) with a plurality of dynamically applied telematics data-based triggers (1012) triggering, capturing, and monitoring said operating parameters (40121) and/or environmental parameters (40111) during operation of the motor vehicle (41,…,45) in the dataflow pathway (103) by means of a mobile telematics application (101) of the mobile telecommunication apparatus (10),

in that the intelligent central automotive circuit (11) comprises a driving score generator (111/1013) measuring and/or generating a single or compound of variable scoring parameters (1111,…,1117/10131) providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle (41,…,45) based on the triggered, captured, and monitored operating parameters (40121) and/or environmental parameters (40111),

in that a shadow request (119) is transmitted to a plurality of automated risk-transfer supplier systems (12), decentrally connected to the central automotive circuit (11) over a data transmission network, wherein the shadow request (119) comprises at least risk-related parameters based upon the measured and/or generated single or compound set of variable scoring parameters (10131), wherein a plurality of individualized risk-transfer profiles (124) are provided by the automated risk-transfer supplier systems (12) varying time-dependently based on the generated single or compound set of variable scoring parameters (10131) measuring the time-dependent use and style and environmental condition of driving during operation of the motor vehicle (41,…,45), and wherein in response to the emitted shadow request (119), the central automotive circuit (11) receives a plurality of individualized risk-transfer profiles (124) based upon the dynamically collected single or compound set of variable scoring parameters (10131), and

in that the central automotive circuit (11) dynamically captures and categorizes the received plurality of individualized risk-transfer profiles (124) of the automated risk-transfer supplier systems (12), wherein the shadow requests (119) are periodically transmitted to the plurality of automated risk-transfer supplier systems (12) at least based on the dynamically-generated single or compound set of variable scoring parameters (10131), wherein the results list (118) is dynamically adapted and provided for display and/or selection to the mobile telecommunication apparatus (10) by means of the mobile telematics application (101) based on the triggered, captured, and monitored operating parameters (40121) or environmental parameters (40111) during operation of the motor vehicle (41,…,45), and wherein the mobile automotive system (1) automatically adapts a risk-transfer of a user, if a more preferable risk-transfer profile (124) is triggered in relation to a selected risk-transfer profile (124).

2. The mobile automotive system (1) according to claim 1, characterized, in that the central automotive circuit (11) comprises a real-time measuring system (1119) detecting risk measuring pattern (1121,…,1123), wherein by means of pattern recognition the detected risk measuring pattern (1121,…,1123) are compared to stored sample risk measuring pattern (1131,…,1133) of the pattern database (1118), wherein in case of triggering specific risk measuring pattern (1131,…,1133), the single or compound of variable scoring parameters (1111,…,1117/10131) are dynamically adapted by the intelligent, self-adaptive mobile automotive system (1) providing a continuous monitoring of the physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle (41,…,45) based on the triggered, captured, and monitored operating parameters (40121) and/or environmental parameters (40111).

3. The mobile automotive system (1) according to claim 2, characterized, in that the real-time measuring system (1119) detects continuous and non-continuous pattern of a risk measuring pattern (1121,…,1123), wherein fragmented stored sample risk measuring pattern (1131,…,1133) of the pattern database (1118) are at least partially detectable by non-continuous, pattern- comprehensive recognition.

4. The mobile automotive system (1) according to one of the claims 2 or 3, characterized, in that the real-time measuring system (1119) is arranged to generate a control signal on the basis of said measured and detected risk measuring pattern (1121,…,1123), and to provide said control signal to adjusting means for adjusting and dynamically adapting said single or compound of variable scoring parameters (1111,…,1117/10131) providing physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle (41,…,45) based on the triggered, captured, and monitored operating parameters (40121) and/or environmental parameters (40111).

5. The mobile automotive system (1) according to one of the claims 2 to 4, characterized, in that the real-time measuring system (1119) comprises an optical image conversion device (11191) generating an optical, multi-dimensional

representation pattern of the measured risk measuring pattern (1121,…,1123), and that the real-time measuring system (1119) comprises an optical image detection device (11192) for optical pattern recognition of the measured risk measuring pattern (1121,…,1123) based on the optical, multi-dimensional representation pattern and the stored sample risk measuring pattern (1131,…,1133) of the pattern database (1118).

6. The mobile automotive system (1) according to claim 5, characterized, in that, wherein the optical image conversion device (11191) is a line scan converter and said optical, multi-dimensional representation pattern consists of a plurality of pixels arranged in one or more lines, each of said plurality of pixels representing an area of the surface being imaged and having a pixel value corresponding to physical characteristics of said area.

7. The mobile automotive system (1) according to one of the claims 2 to 6, characterized, in that the single or compound of variable scoring parameters (1111,…,1117/10131) are dynamically adapted until no or a specified maximal deviation is detected between antecedent measurements of the single or compound of variable scoring parameters (1111,…,1117/10131) and subsequent measurements of the single or compound of variable scoring parameters (1111,…,1117/10131) by the intelligent, self-adaptive mobile automotive system (1) within a given time-frame.

8. The mobile automotive system (1) according to one of the claims 2 to 7, characterized, in that the optical, multi-dimensional representation pattern comprise a discretized voxels structure in from of a polyhedral meshwork structure, wherein a combination of measured risk measuring pattern (1121,…,1123) are mapped onto the discretized voxels of the polyhedral meshwork structure.

9. The mobile automotive system (1) according to one of the claims 2 to 8, characterized, in that the stored sample risk measuring pattern (1131,…,1133) of the pattern database (1118) are dynamically adapted by means of a self-learning structure of the real-time measuring system (1119), wherein by triggering newly occurring or identified risk measuring pattern (1131,…,1133), the single or compound of variable scoring parameters (1111,…,1117/10131) are dynamically adapted by the intelligent, self-adaptive mobile automotive system (1) feeding historical single or compound of variable scoring parameters (1111,…,1117/10131) and actual single or compound of

variable scoring parameters (1111,...,1117/10131) to the self-learning structure of the real-time measuring system (1119), wherein in case of adaption, the newly occurring or identified risk measuring pattern (1131,...,1133) are added to the stored sample risk measuring pattern (1131,...,1133) of the pattern database (1118), and wherein the application of the telematics data-based triggers (1012) of the telematics-driven core aggregator (110/1011) is dynamically adapted and optimized based on the newly occurring or identified risk measuring pattern (1131,...,1133) and the stored sample risk measuring pattern (1131,...,1133) of the pattern database (1118) providing a continuous, and dynamically adapted monitoring of the physical risk measures of use and/or style and/or environmental condition of driving during operation of the motor vehicle (41,...,45) based on the triggered, captured, and monitored operating parameters (40121) and/or environmental parameters (40111).

10. The mobile automotive system (1) according to one of the claims 1 to 9, characterized, in that the single or compound set of variable scoring parameters (10131/1111,...,1117) profiling the use and/or style and/or environmental condition of driving during operation of the motor vehicle (41,...,45) and generated by means of the driving score module (111) at least comprise scoring parameters measuring a driving score (1111) and/or a contextual score (1112) and/or a vehicle safety score (1113) and/or a cyber risk score (1114) and/or a software certification/testing risk score (1115) and/or a NHTSA level risk score (1116) and/or a usage/operation of autonomous driving aids (1117).

11. The mobile automotive system (1) according to one of the claims 1 to 10, characterized, in that the variable driving score parameter (1111) is at least based upon a measure of driver behavior parameters comprising speed and/or acceleration and/or braking and/or cornering and/or jerking, and/or a measure of distraction parameters comprising mobile phone usage while driving and/or a measure of fatigue parameters and/or drug use parameters.

12. The mobile automotive system (1) according to one of claims 1 or 11, characterized, in that the variable contextual score parameter (1112) is at least based upon measured trip score parameters based on road type and/or number of intersection and/or tunnels and/or elevation, and/or measured time of travel

parameters, and/or measured weather parameters and/or measured location parameters, and/or measured distance driven parameters.

13. The mobile automotive system (1) according to one of claims 1 to 12, characterized, in that the variable vehicle safety score parameter (1113) is at least based upon measured ADAS feature activation parameters and/or measured vehicle crash test rating parameters and/or measured level of automation parameters of the motor vehicle (41,…,45) and/or measured software risk scores parameters.

14. The mobile automotive system (1) according to one of claims 1 to 13, characterized, in that the automated risk-transfer supplier system (12) is realized as automated first risk-transfer systems (12) to provide a first risk-transfer based on first risk transfer parameters (501, …, 505) from the motor vehicle (41,…,45) to the respective first risk-transfer system (10), wherein the first risk-transfer system (12) comprises a plurality of payment transfer modules (103) configured to receive and store (102) first payment parameters (1021,…,1025) associated with the risk-transfer of risk exposures (5) of said motor vehicles (41,…,45) for pooling of their risks (51,…,55).

15. The mobile automotive system (1) according to one of claims 1 to 14, characterized, in that the risk-related parameters of the shadow request (119) comprise at least usage-based (31) and/or user-based (32) and/or operating (33) automotive data (3) generated by the mobile telematics application (101) of the mobile telecommunications apparatus (10) based on the triggered, captured, and monitored operating parameters (40111) or environmental parameters (40121), and the generated single or compound set of variable scoring parameters.

16. The mobile automotive system (1) according to one of claims 1 to 15, characterized, in that the one or more wireless connections (105) or wired connections of the mobile telecommunications apparatus (10) comprise Bluetooth as wireless connection for exchanging data using short-wavelength UHF (Ultra high frequency) radio waves in the ISM (industrial, scientific and medical) radio band from 2.4 to 2.485 GHz by building a personal area networks (PAN) with the on-board Bluetooth capabilities and/or 3G and/or 4G and/or GPS and/or Bluetooth LE (Low Energy) and/or BT based on Wi-Fi 802.11 standard, and/or a contactless or contact smart card, and/or

a SD card (Secure Digital Memory Card) or another interchangeable non-volatile memory card.

17. The mobile automotive system (1) according to one of claims 1 to 16, characterized, in that the mobile telecommunication apparatus (10), realized as a smart phone device, comprises as integrated device components all proprioceptive sensors and/or measuring devices (4021) for sensing the operating parameters (40121) of the motor vehicle (41,…,45) and/or exteroceptive sensors and/or measuring devices (4011) for sensing the environmental parameters (40111) during operation of the motor vehicle (41,…,45).

18. The mobile automotive system (1) according to claim 17, characterized, in that the mobile telecommunication apparatus (10) comprises at least a GPS module (10245, 1051) and/or geological compass module (1029) based on a 3-axis teslameter and a 3-axis accelerometer, and/or gyrosensor or gyrometer (1026), and/or a MEMS accelerometer sensor (1025) comprising a cantilever beam with the seismic mass as a proof mass measuring the proper or g-force acceleration, and/or a MEMS magnetometer or a magnetoresistive permalloy sensor or another three-axis magnetometer (1020).

19. The mobile automotive system (1) according to claim 17, characterized, in that the mobile telecommunications apparatus (10) comprises a three-axis MEMS-based gyroscopes (1026) or an appropriate MEMS-based inertial measurement units incorporating up to all nine axes of sensing in a single integrated circuit.

20. The mobile automotive system (1) according to one of claims 1 to 19, characterized, in that the exteroceptive sensors or measuring devices (4011) for sensing environmental parameters (40111) at least comprise distances from objects and/or the intensity of the ambient light and/or sound amplitude.

21. The mobile automotive system (1) according to one of claims 1 to 20, characterized, in that the proprioceptive sensors or measuring devices (4012) for sensing operating parameters (40121) of the motor vehicles (41,…,45) comprising at least motor speed and/or wheel load and/or heading and/or battery status of the motor vehicles (41,…,45).

22. The mobile automotive system (1) according to one of claims 1 to 21, characterized, in that the risk-transfer profiles are captured and categorized in the result list (118) by means of the mobile automotive system (1), wherein shadow requests (119) are generated and transmitted to the plurality of automated risk-transfer supplier systems (12) based on the dynamically generated single or compound set of variable scoring parameters (10131) and/or the triggered, captured, and monitored operating parameters (40111) or environmental parameters (40121), if the mobile telematics application(101) triggers an alternation of the dynamically generated single or compound set of variable scoring parameters (10131) and/or the triggered, captured, and monitored operating parameters (40111) or environmental parameters (40121), and wherein the result list (118) is dynamically adapted in real-time and displayed to the user for selection.

23. The mobile automotive system (1) according to one of claims 1 to 22, characterized, in that the mobile automotive system (1) automatically alerts the user, if a more preferable risk-transfer profile (124) is triggered in relation to a selected risk-transfer profile (124).

24. The mobile automotive system (1) according to one of claims 1 to 23, characterized, in that the result list (118) is dynamically adapted in real-time and displayed to the user for selection based on definable categorization criteria comprising first payment parameters (1221,…,1225) and/or duration and/or risk-transfer structure.

25. The mobile automotive system (1) according to one of claims 1 to 24, characterized, in that the transmitted shadow request (119) with the risk-related automotive data (3) is processed by means of the selected, automated risk-transfer supplier systems (12), wherein first risk transfer parameters (501,…,505) and correlated first payment transfer parameters (1221, …,1225) are generated by means of the automated risk-transfer supplier systems (12), and wherein, if the occurrence of one of the defined risk events (61,…, 63) associated with transferred risk exposure (51, …, 55) of the motor vehicles (41,…,45) is triggered, the occurred loss (71, …, 75) is automatically covered by the corresponding automated risk-transfer supplier system (12) or automated first risk-transfer system (12) based on the first risk transfer parameters (501, …, 505) and correlated first payment transfer parameters (1221,…,1225).

26. The mobile automotive system (1) according to one of claims 1 to 25, characterized, in that the mobile automotive car system (1) comprises a second risk-transfer system (13) to provide a second risk-transfer based on second risk-transfer parameters (511, …, 515) from the automated risk-transfer supplier systems (12) or automated first risk-transfer system (12) to the second risk-transfer system (13), wherein the second risk-transfer system (13) comprises second payment transfer modules (133) configured to receive and store (132) second payment parameters (1321,…,1325) for pooling of the risks of the first risk-transfer systems (12) associated with risk exposures transferred to the first risk-transfer systems (12).

27. The mobile automotive system (1) according to claim 26, characterized, in that second risk transfer parameters (511, …, 515) and correlated second payment transfer parameters (1321,…,1325) are generated by means of an expert-system based circuit of the second risk-transfer system (13), wherein the occurred loss (71,…, 75) is at least partly covered by the second insurance system (13) based on the second risk transfer parameters (511, …, 515) and correlated second payment transfer parameters (1321,…,1325).

28. The mobile automotive system (1) according to one of claims 27 or 28, characterized, in that the first and second risk transfer parameters (501, …, 505/511, …, 515) and the correlated first and second payment transfer parameters (1221,…,1225/1321,…,1325) are dynamically adapted and/or optimized by means of the mobile automotive system (1) based on the usage-based (31) and/or user-based (32) and/or operational (33) automotive data (3) captured from the motor vehicles (41, … , 45), based on the risk-transfer profile (124) selection of the user and based on the pooled risks (5) of the first risk transfer systems (12).

29. The mobile automotive system (1) according to one of claims 1 to 28, characterized, in that the transmitted automotive data (3) at least comprise simultaneous measured, time-dependent contextual and/or environmental data of the motor vehicle (41,…,45) comprising at least measured weather condition parameters and/or location coordinate parameters.

30. The mobile automotive system (1) according to one of claims 1 to 29, characterized, in that the exteroceptive sensors or measuring devices (4011) comprise

at least radar devices (40117) for monitoring surrounding of the motor vehicle (41,…,45) and/or LIDAR devices (40115) for monitoring surrounding of the motor vehicle (41,…,45) and/or global positioning systems (40122) or vehicle tracking devices for measuring positioning parameters of the motor vehicle (41,…,45) and/or odometrical devices (40114) for complementing and improving the positioning parameters measured by the global positioning systems (40112) or vehicle tracking devices and/or computer vision devices (40116) or video cameras for monitoring the surrounding of the motor vehicle (41,…,45) and/or ultrasonic sensors (40113) for measuring the position of objects close to the motor vehicle (41,…,45).

31. The mobile automotive system (1) according to one of claims 1 to 30, characterized, in that the mobile automotive system (1) comprises an aggregation module providing the risk exposure (51, …, 55) for one or a plurality of the pooled risk-exposed motor vehicles (41, … , 45) based on the captured risk-related automotive data (3), wherein the first and/or second risk transfer parameters (501, …, 505/511, …, 515) and the correlated first and second payment transfer parameters (1221,…,1225/1321,…,1325) are dynamically generated based on the likelihood of the occurrence of the predefined risk events (61,…,63) of the pooled driving motor vehicles (41, … , 45).

32. The mobile automotive system (1) according to one of claims 1 to 31, characterized, in that occurred and triggered losses (71,…, 75) are automatically aggregated by means of captured loss parameters (711,…,715/721,…,725/731,…,735) of the measured occurrence of risk events (61,…,63) over all risk exposed motor vehicles (41, … , 45) within a predefined time period (1141) by incrementing an associated stored aggregated loss parameter (80) and for automatically aggregating (81) the received and stored first payment parameters (1221,…,1225) over all risk exposed motor vehicles (41, … , 45) within the predefined time period (1141) by incrementing an associated stored, aggregated payment parameter (81), and wherein the variable first and/or second risk transfer parameters (501, …, 505/511, …, 515) and the correlated first and/or second payment transfer parameters (1221,…,1225/1321,…,1325) dynamically are generated based upon the ratio of the aggregated loss parameter (80) and the aggregated payment parameter (81).

33. The mobile automotive system (1) according to one of claims 1 to 32, characterized, in that the first risk-transfer system (12) comprises an automated first resource pooling system (121) and the second risk-transfer system (13) comprises an automated second resource pooling system (131), wherein the risk-exposed motor vehicles (41, … , 45) are connected to the first resource pooling system (121) by means of a plurality of payment transfer modules (123) configured to receive and store (122) first payments (1221,…,1225) from the risk-exposed motor vehicles (41, … , 45) for the pooling of their risk exposures (51, …, 55), wherein the first risk-transfer system (10) provides automated risk protection for each of the connected risk exposed motor vehicles (41, … , 45) based on received and stored first payment parameters (1221,…,1225), wherein the first risk-transfer system (12) is connected to the second resource pooling system (131) by means of second payment transfer modules (133) configured to receive and store (132) second payment parameters (1321,…,1325) from the first risk-transfer system (12) to adopt of a portion of the risk exposures (51, …, 55) accumulated by the first risk-transfer system (12), and wherein, in the case of the occurrence of one of defined risk events (61,…,63) the occurred loss is automatically covered by the automotive car system (1).

34. The mobile automotive system (1) according to one of claims 1 to 33, characterized, in that the mobile telematics application (101) of the mobile telecommunications apparatus (10) comprises additional triggers (1014/1015) triggering accident notification and/or other added services based on the captured automotive data (3) associated with the motor vehicles (41,…,45).

35. The mobile automotive system (1) according to one of claims 1 to 34, characterized, in that the mobile telecommunications apparatus (10) provides the one or more wireless connections (105) by means of radio data systems (RDS) modules (10241) and/or positioning system (10242) including a satellite receiving module (10245) and/or a mobile telephone interface (10243) including a digital radio service module and/or a language unit (10244) in communication the radio data system (10241) or the positioning system (10242) or the cellular telephone interface (10243).

36. The mobile automotive system (1) according to one of claims 1 to 35, characterized, in that the interfaces (421, …, 425) of the mobile telecommunication apparatus (10) for connection with at least one of a motor vehicle's data transmission

bus comprises an interface for connection with a motor vehicle's Controller Area Network (CAN) bus.

37. The mobile automotive system (1) according to one of claims 1 to 36, characterized, in that the mobile telecommunication apparatus (10) comprises secured means for saving processor-driving operation code and flash memory for reading and capturing of the automotive data (3).

38. The mobile automotive car system (1) according to one of claims 1 to 37, characterized, in that the mobile telecommunications apparatus (10) is connected to an on-board diagnostic (OBD) system (431, …, 435) monitoring the vehicle's systems and/or subsystems.

39. The mobile automotive car system (1) according to claim 38, characterized, in that the mobile telecommunications apparatus (2), connected to the on-board diagnostic (OBD) system (431, …, 435) of the motor vehicle (41, …, 45), is connected by plugging in a data transmission wire into an appropriate port of the on-board diagnostic system (431, …, 435).

40. The mobile automotive car system (1) according to one of claims 1 to 39, characterized, in that the mobile telecommunication apparatus (2) is connected to an in-car interactive device (441, …, 445), wherein the vehicle's speed and travel distances are monitored by a global positioning system (GPS) circuit (40111) and wherein the automotive data (3) are transmitted via the mobile telecommunication apparatus (10) to the central automotive circuit (11) by means of a cellular telecommunication connection.

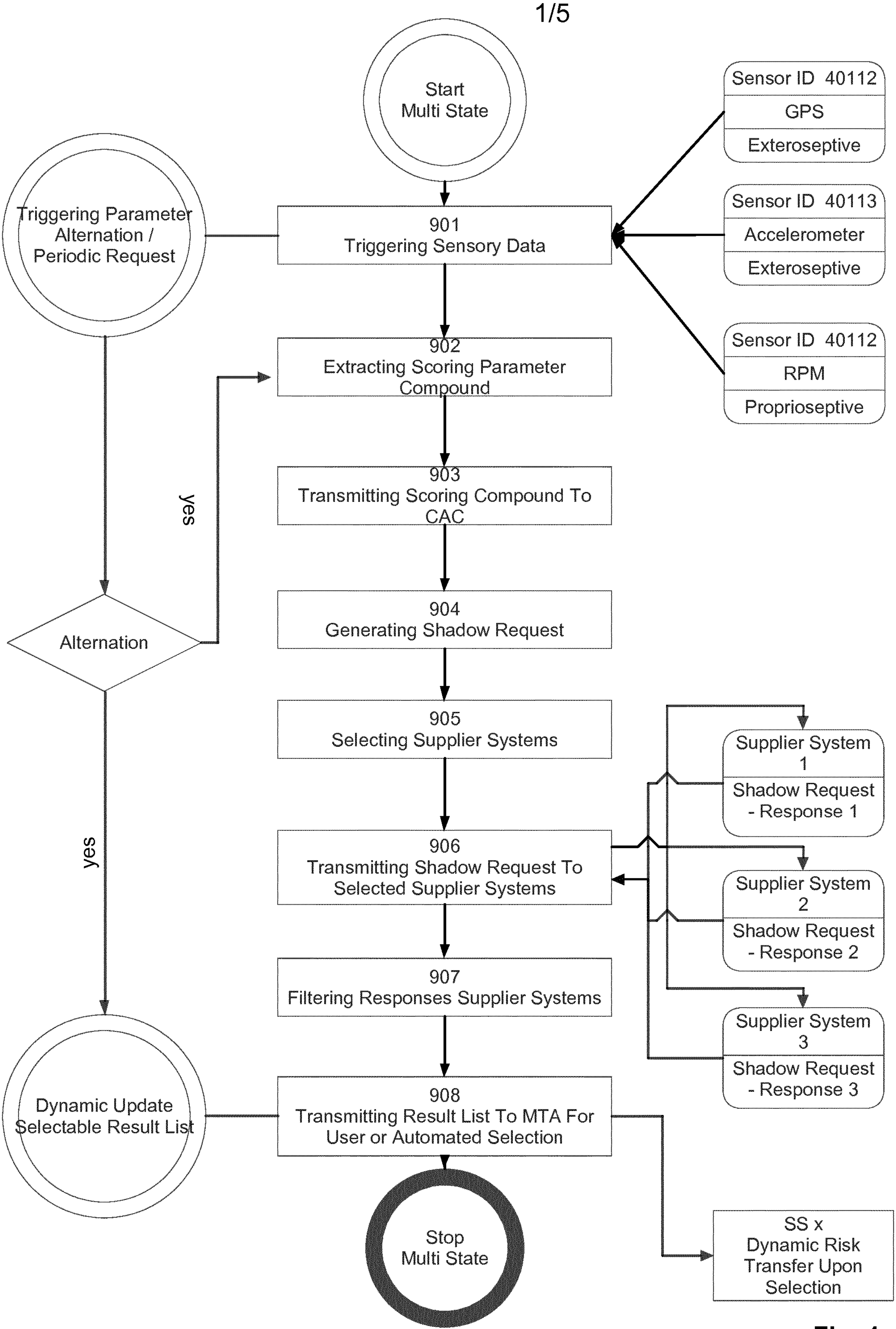
Start
Multi State
Triggering Parameter Alternation / Periodic Request
901
Triggering Sensory Data
Sensor ID 40112
GPS
Exteroseptive
Sensor ID 40113
Accelerometer
Exteroseptive
Sensor ID 40112
RPM
Proprioseptive
902
Extracting Scoring Parameter Compound
yes
903
Transmitting Scoring Compound To CAC
904
Generating Shadow Request
Alternation
905
Selecting Supplier Systems
Supplier System 1
Shadow Request - Response 1
yes
906
Transmitting Shadow Request To Selected Supplier Systems
Supplier System 2
Shadow Request - Response 2
907
Filtering Responses Supplier Systems
Supplier System 3
Shadow Request - Response 3
Dynamic Update Selectable Result List
908
Transmitting Result List To MTA For User or Automated Selection
Stop
Multi State
SS x
Dynamic Risk Transfer Upon Selection

Fig. 1

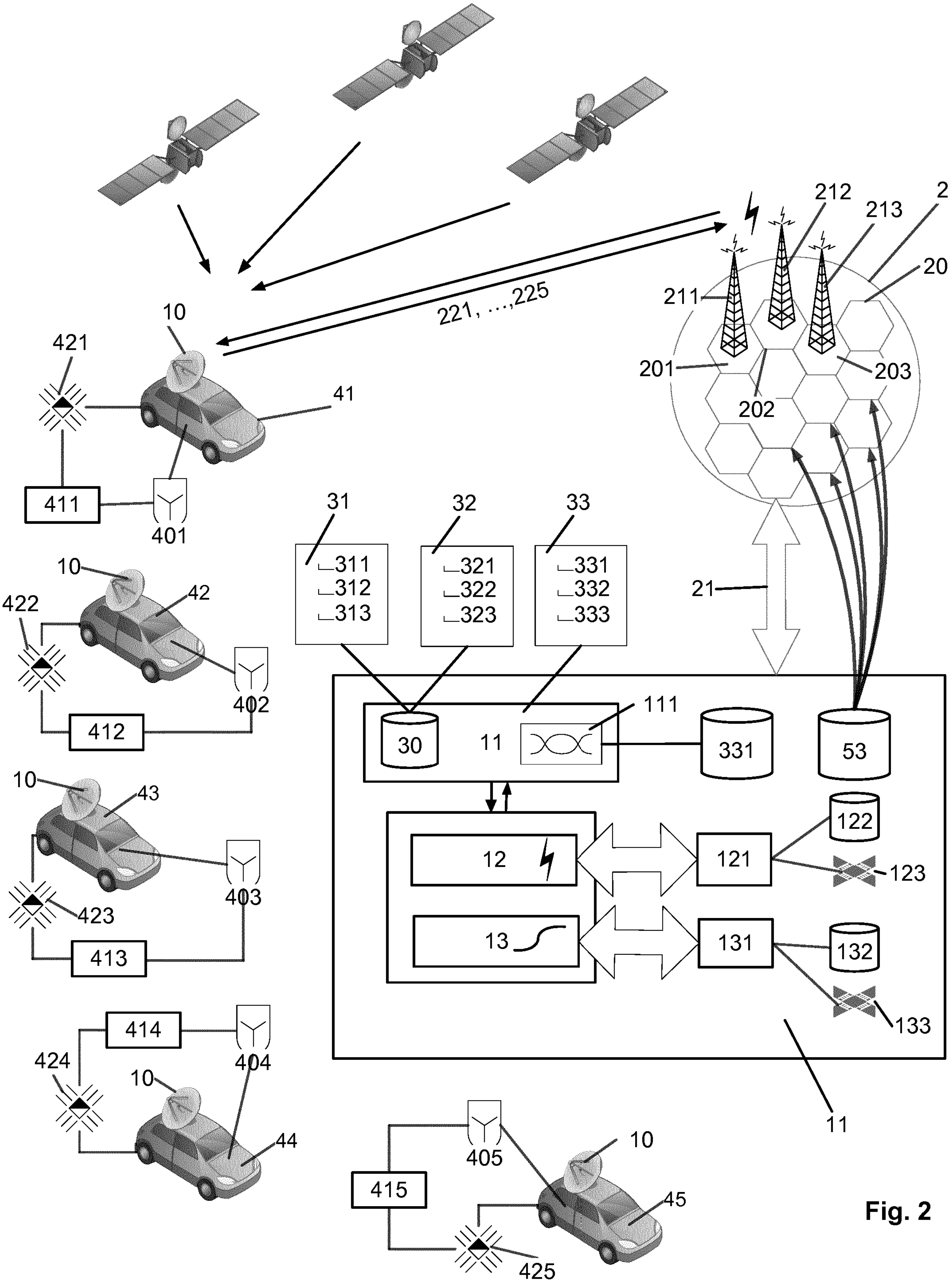
212
2
213
20
211
201
203
202
221, ...,225
10
421
41
411
401
31
311
312
313
32
321
322
323
33
331
332
333
21
10
42
422
402
412
30
11
111
331
53
10
43
12
121
122
123
423
403
413
13
131
132
133
414
404
424
10
44
11
10
405
415
45
425

Fig. 2

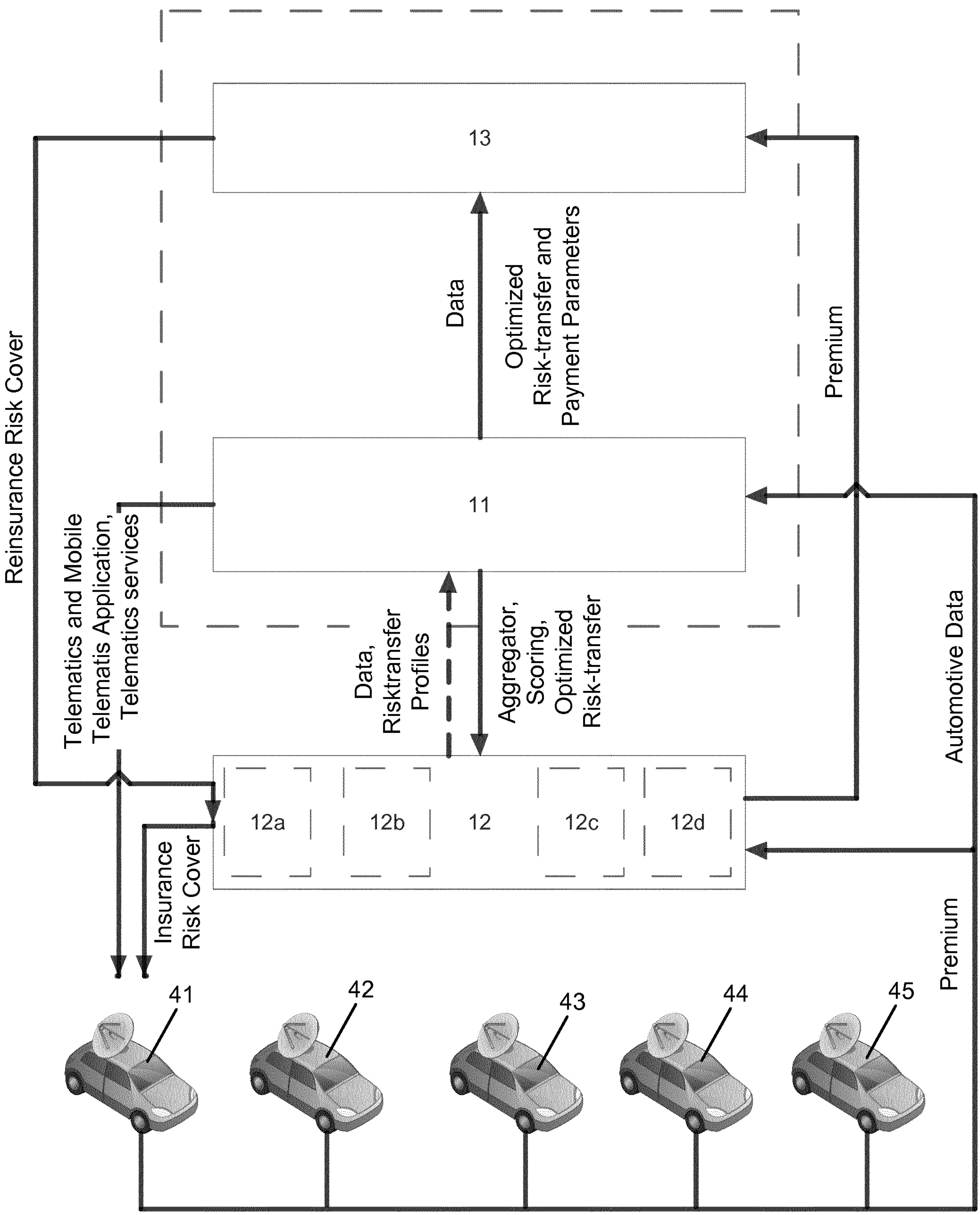
13
Data
Optimized Risk-transfer and Payment Parameters
Premium
Reinsurance Risk Cover
Telematics and Mobile Telematis Application, Telematics services
11
Data, Risktransfer Profiles
Aggregator, Scoring, Optimized Risk-transfer
Automotive Data
12a
12b
12
12c
12d
Insurance Risk Cover
Premium
41
42
43
44
45

Fig. 3

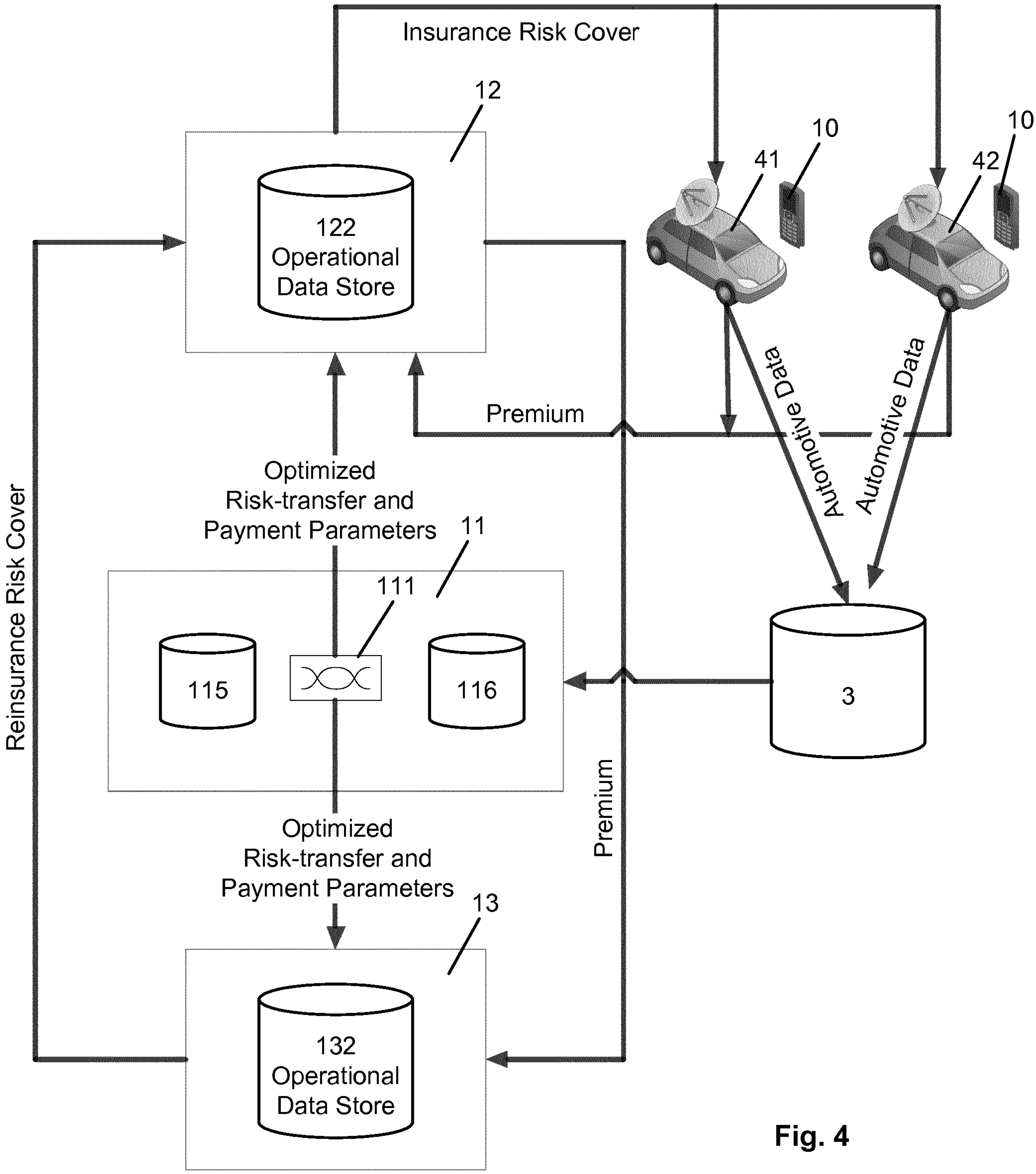
Insurance Risk Cover
12
10
41
10
42
122
Operational
Data Store
Premium
Automotive Data
Automotive Data
Reinsurance Risk Cover
Optimized
Risk-transfer and
Payment Parameters
11
111
115
116
3
Premium
Optimized
Risk-transfer and
Payment Parameters
13
132
Operational
Data Store

Fig. 4

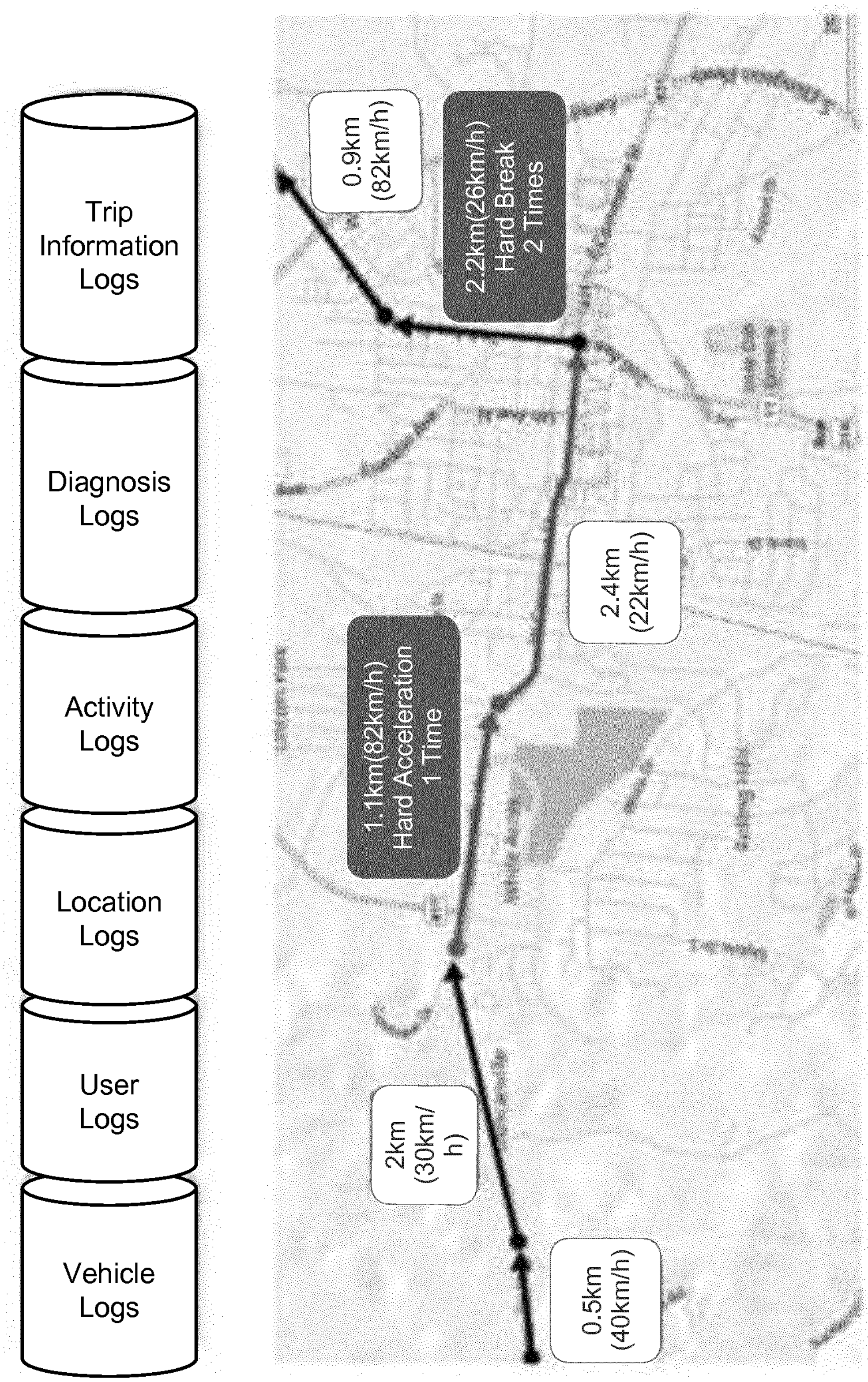
Trip Information Logs
Diagnosis Logs
Activity Logs
Location Logs
User Logs
Vehicle Logs
0.9km (82km/h)
2.2km(26km/h) Hard Break 2 Times
2.4km (22km/h)
1.1km(82km/h) Hard Acceleration 1 Time
2km (30km/h)
0.5km (40km/h)

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/068745

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q40/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2016/028228 A1 (AVENNETZ TECHNOLOGIES PTE LTD [SG]) 25 February 2016 (2016-02-25) the whole document -----	1-40
X	WO 2016/055085 A1 (SWISS REINSURANCE CO LTD [CH]) 14 April 2016 (2016-04-14) the whole document -----	1-40
X	US 2011/112870 A1 (BERG GREGORY H [US] ET AL) 12 May 2011 (2011-05-12) the whole document -----	1-40
X	US 2016/171521 A1 (RAMIREZ PHILIP PETER [US] ET AL) 16 June 2016 (2016-06-16) the whole document -----	1-40
	-/--	

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 August 2017	29/08/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Cîrstet, Andrei

1

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/068745

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/153367 A1 (AMIGO ANDREW J [US] ET AL) 23 June 2011 (2011-06-23) the whole document -----	1-40

1

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2017/068745

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2016028228 A1	25-02-2016	NONE	
WO 2016055085 A1	14-04-2016	AU 2014408538 A1	12-01-2017
		CN 106852177 A	13-06-2017
		EP 3204899 A1	16-08-2017
		WO 2016055085 A1	14-04-2016
US 2011112870 A1	12-05-2011	US 2011112870 A1	12-05-2011
		US 2012116824 A1	10-05-2012
		US 2013117050 A1	09-05-2013
		US 2016171624 A1	16-06-2016
US 2016171521 A1	16-06-2016	NONE	
US 2011153367 A1	23-06-2011	US 2011153367 A1	23-06-2011
		US 2014114696 A1	24-04-2014
		US 2015269791 A1	24-09-2015