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(54) **SYSTEMS AND METHODS FOR GENERATING VIRTUAL MAPS IN VIRTUAL GAMES**

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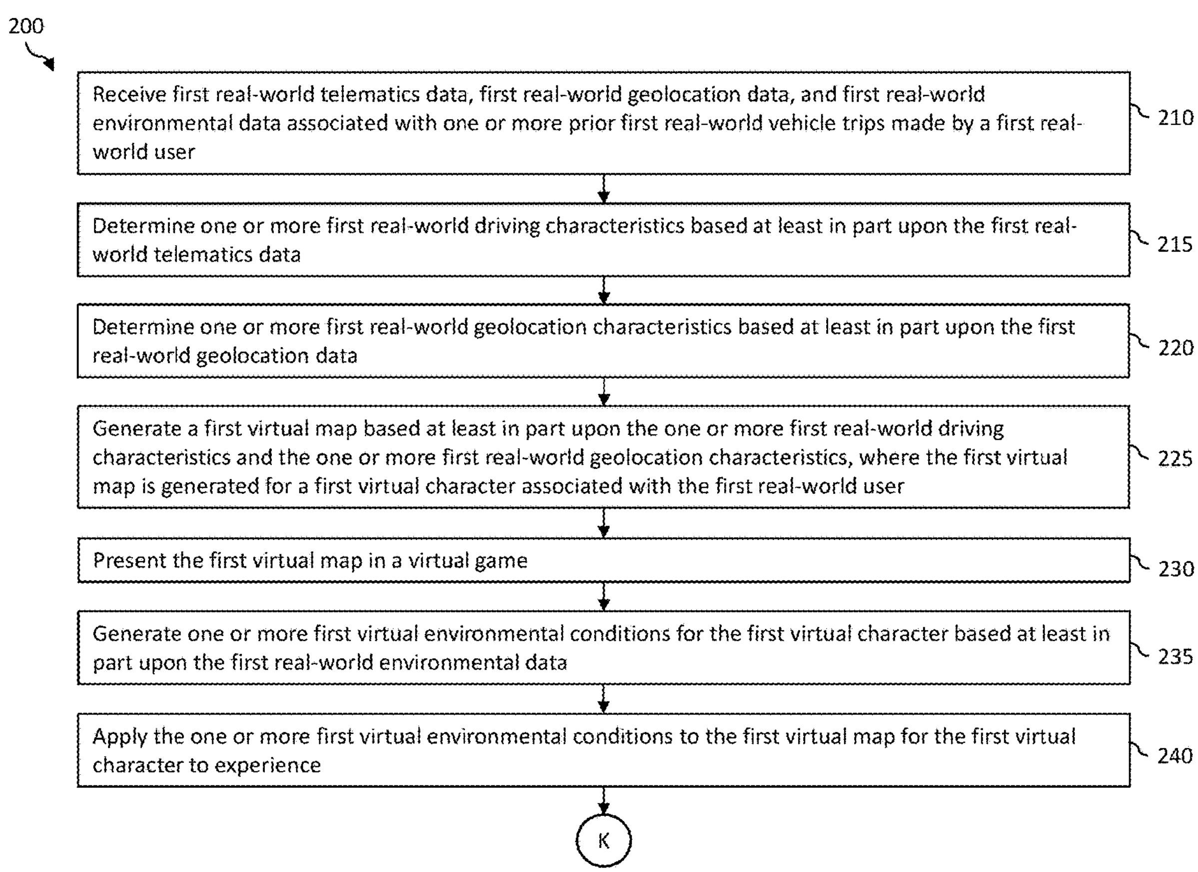
(57) **ABSTRACT**

A computer-implemented method including obtaining, by a computing device, first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user. The method also can include determining, by the computing device, one or more first real-world geolocation characteristics based at least on the first real-world geolocation data. The method additionally can include generating, by the computing device, a first virtual map based at least on the one or more first real-world geolocation characteristics. The method further can include obtaining, by the computing device, second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user. The method additionally can include determining, by the computing device, one or more second real-world geolocation characteristics based at least on the second real-world geolocation data. The method further can include generating, by the computing device, a second virtual map based at least on the one or more second real-world geolocation characteristics. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics. Other embodiments are described.



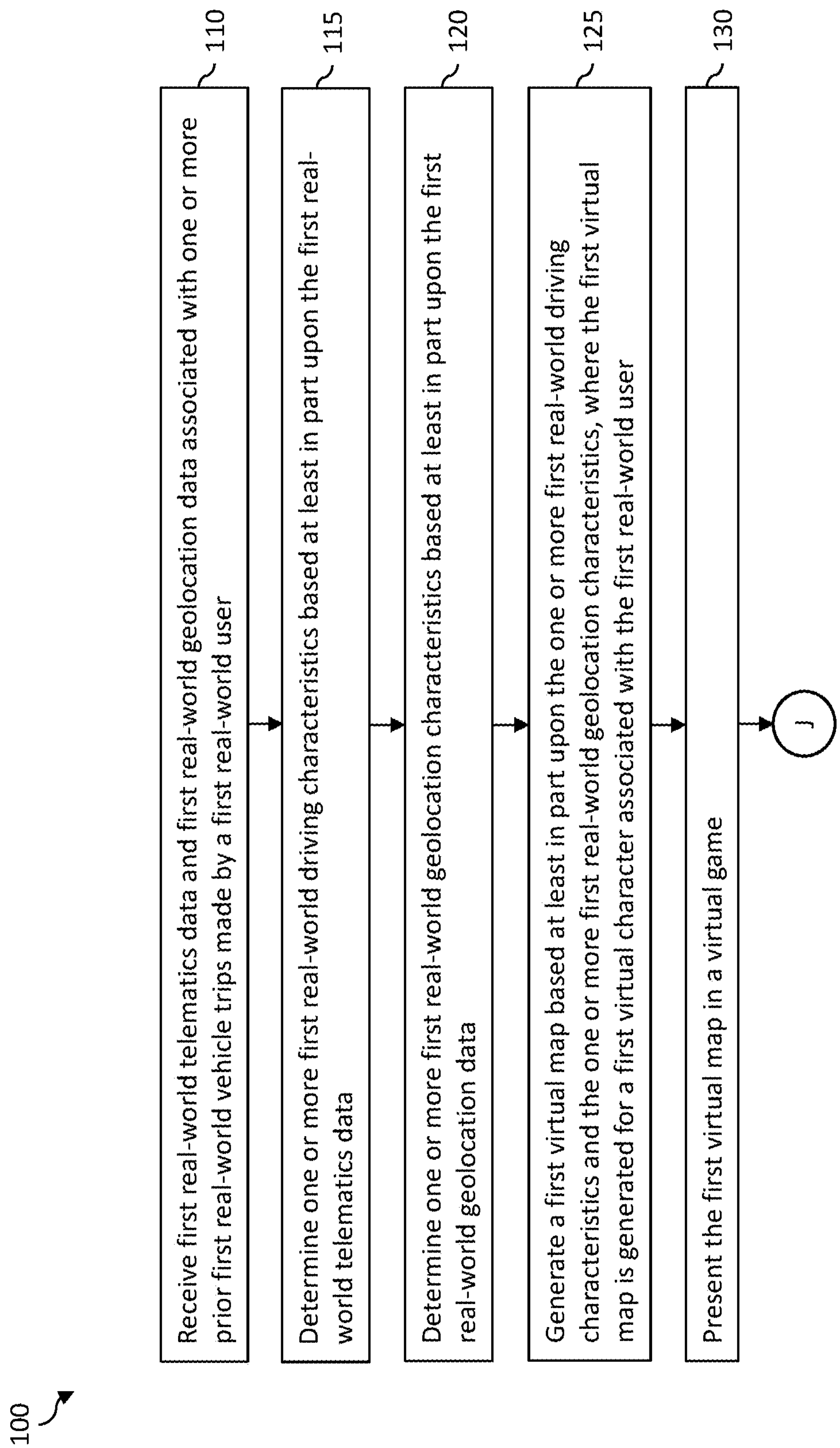

100
Receive first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user
110
Determine one or more first real-world driving characteristics based at least in part upon the first real-world telematics data
115
Determine one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data
120
Generate a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user
125
Present the first virtual map in a virtual game
130
J

Figure 1A

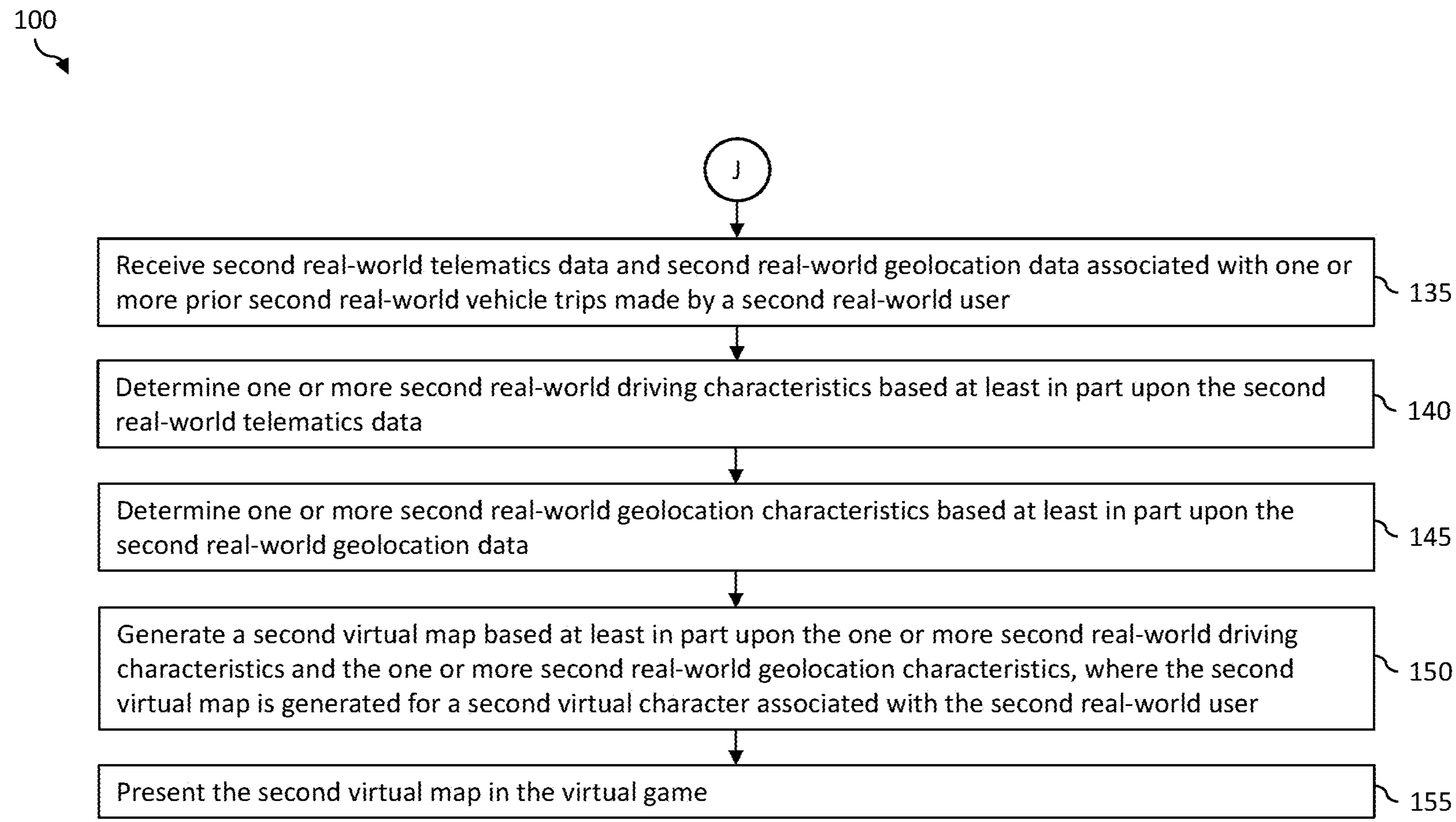

100
J
Receive second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user
135
Determine one or more second real-world driving characteristics based at least in part upon the second real-world telematics data
140
Determine one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data
145
Generate a second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics, where the second virtual map is generated for a second virtual character associated with the second real-world user
150
Present the second virtual map in the virtual game
155

Figure 1B

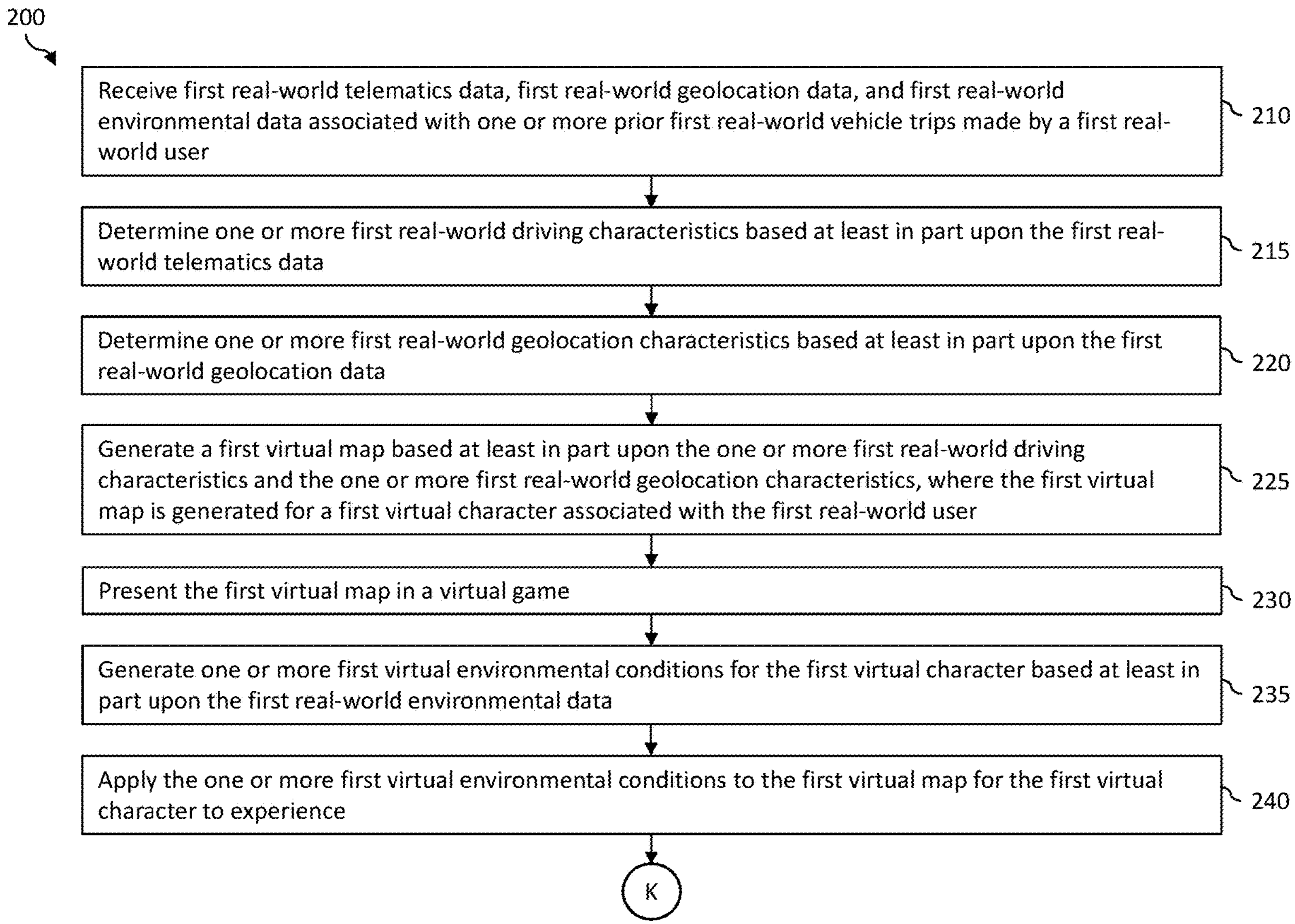

200
Receive first real-world telematics data, first real-world geolocation data, and first real-world environmental data associated with one or more prior first real-world vehicle trips made by a first real-world user
210
Determine one or more first real-world driving characteristics based at least in part upon the first real-world telematics data
215
Determine one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data
220
Generate a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user
225
Present the first virtual map in a virtual game
230
Generate one or more first virtual environmental conditions for the first virtual character based at least in part upon the first real-world environmental data
235
Apply the one or more first virtual environmental conditions to the first virtual map for the first virtual character to experience
240
K

Figure 2A

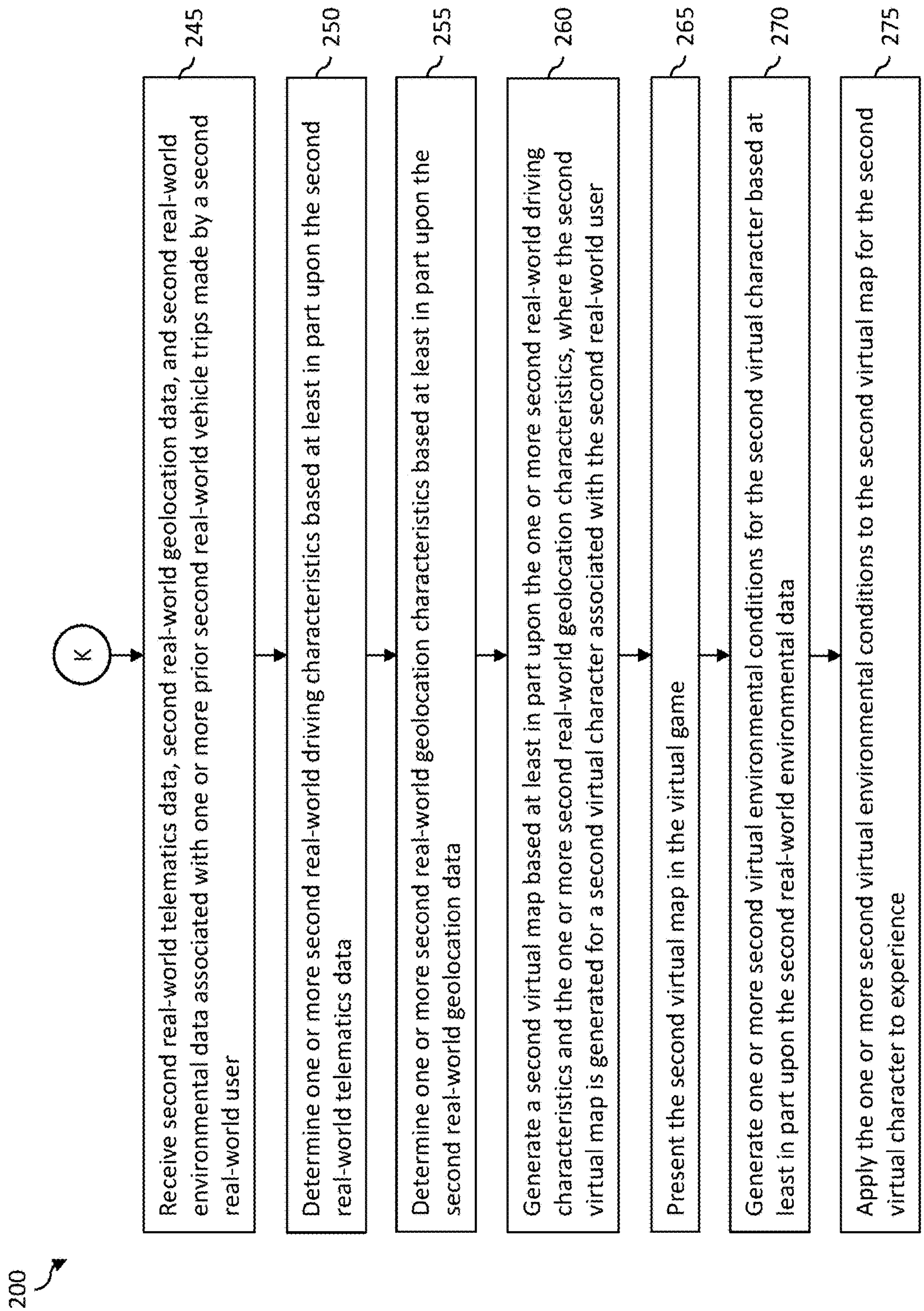

200
K
Receive second real-world telematics data, second real-world geolocation data, and second real-world environmental data associated with one or more prior second real-world vehicle trips made by a second real-world user
245
Determine one or more second real-world driving characteristics based at least in part upon the second real-world telematics data
250
Determine one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data
255
Generate a second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics, where the second virtual map is generated for a second virtual character associated with the second real-world user
260
Present the second virtual map in the virtual game
265
Generate one or more second virtual environmental conditions for the second virtual character based at least in part upon the second real-world environmental data
270
Apply the one or more second virtual environmental conditions to the second virtual map for the second virtual character to experience
275

Figure 2B

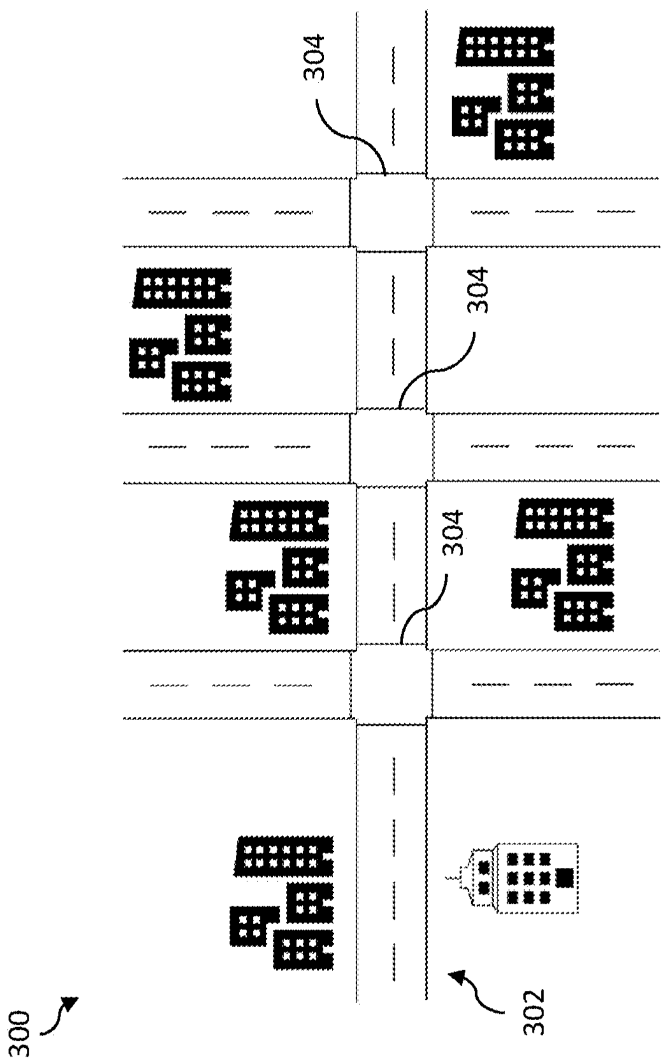


Figure 3

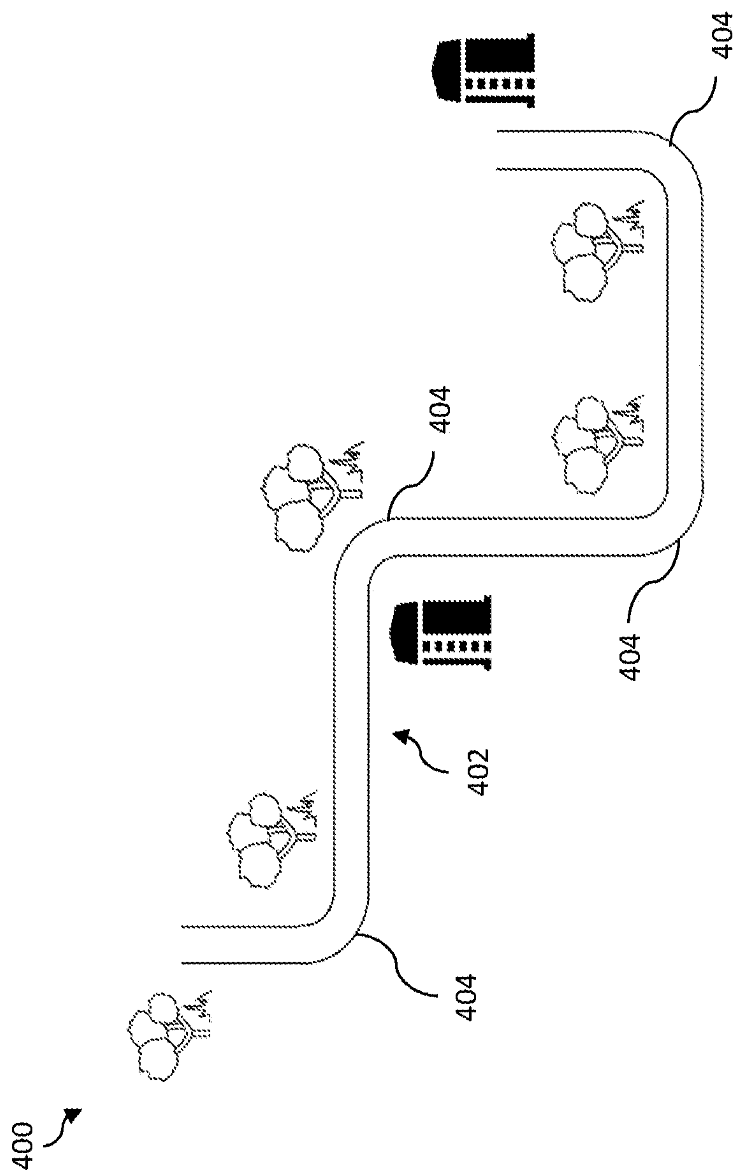


Figure 4

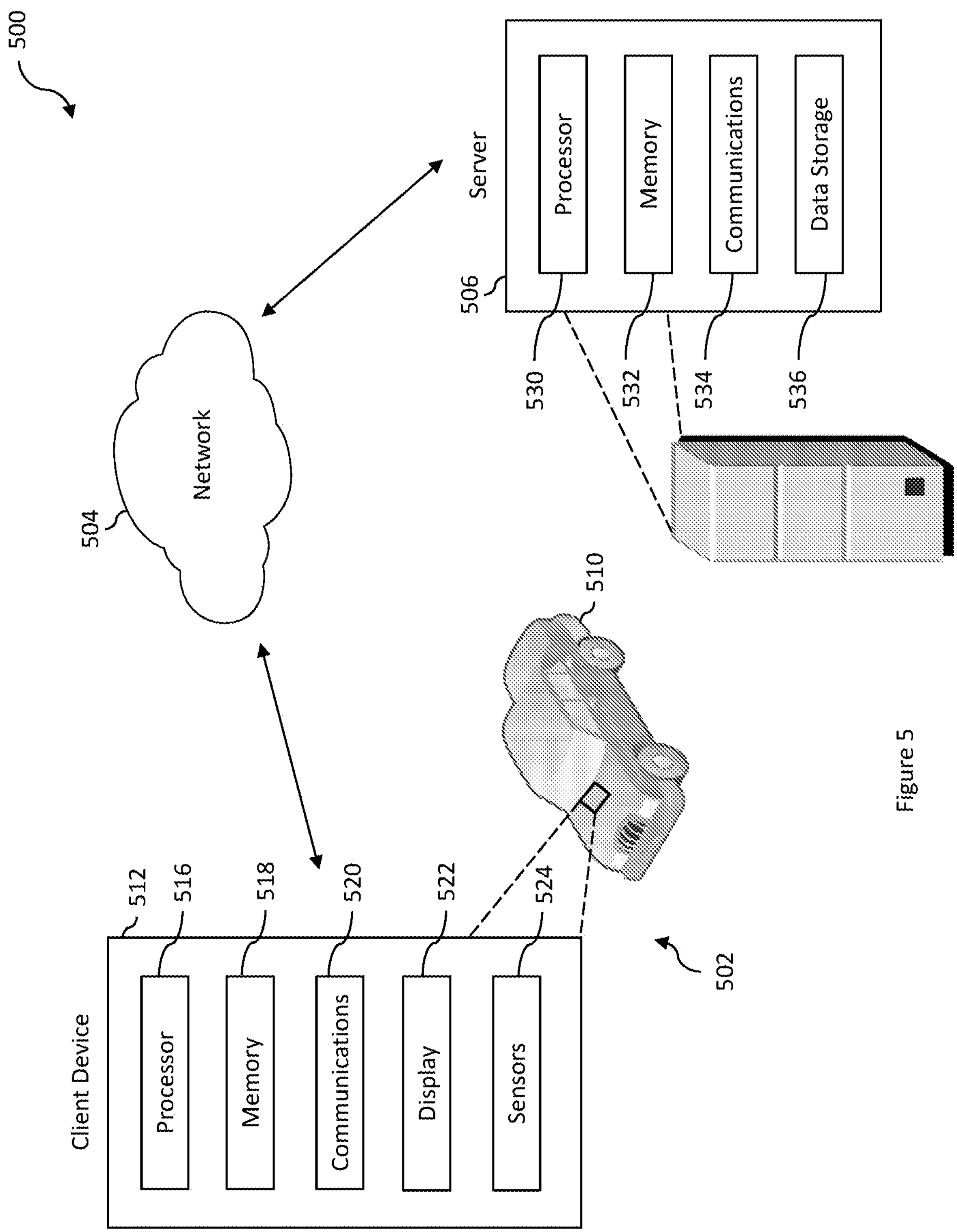

500
Network
504
Server
506
Processor
Memory
Communications
Data Storage
530
532
534
536
510
Client Device
512
Processor
516
Memory
518
Communications
520
Display
522
Sensors
524
502

Figure 5

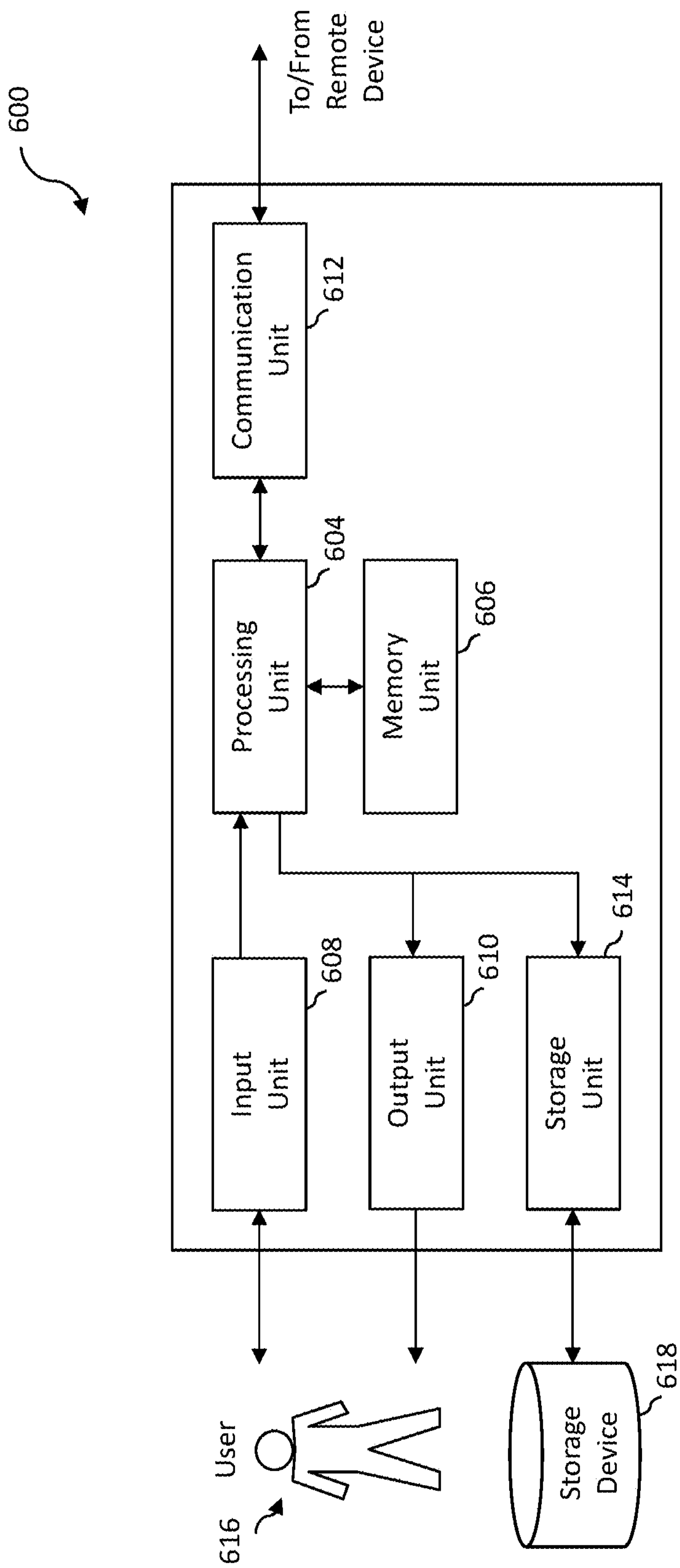

600
To/From Remote Device
Communication Unit
612
Processing Unit
604
Memory Unit
606
Input Unit
608
Output Unit
610
Storage Unit
614
User
616
Storage Device
618

Figure 6

SYSTEMS AND METHODS FOR GENERATING VIRTUAL MAPS IN VIRTUAL GAMES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 17/404,158, filed Aug. 17, 2021, which is incorporated herein by reference in its entirety. The following applications also are hereby incorporated by reference in their entirety: U.S. patent application Ser. No. 17/404,139, filed Aug. 17, 2021; U.S. patent application Ser. No. 17/404,144, filed Aug. 17, 2021; U.S. patent application Ser. No. 17/404,152, filed Aug. 17, 2021; U.S. patent application Ser. No. 17/404,164, filed Aug. 17, 2021; and U.S. patent application Ser. No. 17/404,172, filed Aug. 17, 2021.

FIELD OF THE DISCLOSURE

[0002] Some embodiments of the present disclosure are directed to generating virtual maps in a virtual game. More particularly, certain embodiments of the present disclosure provide methods and systems for generating the virtual maps using real-world telematics data and real-world geolocation data. Merely by way of example, the present disclosure has been applied to presenting the virtual maps for virtual characters in the virtual game. But it would be recognized that the present disclosure has much broader range of applicability

BACKGROUND OF THE DISCLOSURE

[0003] While individuals generally exercise care while operating vehicles, it is still challenging for many vehicle operators to fully appreciate the risks associated with vehicle operations. As such, many vehicle operators may not be readily mindful of reducing such risks. Hence, it is highly desirable to develop new technologies that can increase a vehicle operator's appreciation and awareness of the risks posed by vehicle operation

BRIEF SUMMARY OF THE DISCLOSURE

[0004] Some embodiments of the present disclosure are directed to generating virtual maps in a virtual game. More particularly, certain embodiments of the present disclosure provide methods and systems for generating the virtual maps using real-world telematics data and real-world geolocation data. Merely by way of example, the present disclosure has been applied to presenting the virtual maps for virtual characters in the virtual game. But it would be recognized that the present disclosure has much broader range of applicability.

[0005] According to certain embodiments, a method for generating one or more virtual maps in one or more virtual games includes receiving first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user. Also, the method includes determining one or more first real-world driving characteristics based at least in part upon the first real-world telematics data and determining one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data. Additionally, the method includes generating a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user. The method then includes presenting the first virtual map in a virtual game. Further, the method includes receiving second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user. Also, the method includes determining one or more second real-world driving characteristics based at least in part upon the second real-world telematics data and determining one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data. Additionally, the method includes generating a second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics, where the second virtual map is generated for a second virtual character associated with the second real-world user. The method then includes presenting the second virtual map in the virtual game. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics, the one or more second real-world driving characteristics, the one or more first real-world geolocation characteristics, and the one or more second real-world geolocation characteristics.

[0006] According to some embodiments, a computing device for generating one or more virtual maps in one or more virtual games includes one or more processors and a memory that stores instructions for execution by the one or more processors. The instructions, when executed, cause the one or more processors to receive first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user. Also, the instructions, when executed, cause the one or more processors to determine one or more first real-world driving characteristics based at least in part upon the first real-world telematics data and determine one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data. Additionally, the instructions, when executed, cause the one or more processors to generate a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user. The instructions, when executed, then cause the one or more processors to present the first virtual map in a virtual game. Further, the instructions, when executed, cause the one or more processors to receive second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user. Also, the instructions, when executed, cause the one or more processors to determine one or more second real-world driving characteristics based at least in part upon the second real-world telematics data and determine one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data. Additionally, the instructions, when executed, cause the one or more processors to generate a second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics, where the second virtual map is generated for a second virtual character associated with the second real-world user. The instructions, when executed, then cause the one or more processors to present the second virtual map in the virtual game. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics, the one or more second real-world driving characteristics, the one or more first real-world geolocation characteristics, and the one or more second real-world geolocation characteristics.

[0007] According to certain embodiments, a non-transitory computer-readable medium stores instructions for generating one or more virtual map in one or more virtual games. The instructions are executed by one or more processors of a computing device. The non-transitory computer-readable medium includes instructions to receive first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user. Also, the non-transitory computer-readable medium includes instructions to determine one or more first real-world driving characteristics based at least in part upon the first real-world telematics data and determine one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data. Additionally, the non-transitory computer-readable medium includes instructions to generate a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user. The non-transitory computer-readable medium then includes instructions to present the first virtual map in a virtual game. Further, the non-transitory computer-readable medium includes instructions to receive second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user. Also, the non-transitory computer-readable medium includes instructions to determine one or more second real-world driving characteristics based at least in part upon the second real-world telematics data and determine one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data.

[0008] According to certain embodiments, a computer-implemented method including obtaining, by a computing device, first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user. The method also can include determining, by the computing device, one or more first real-world geolocation characteristics based at least on the first real-world geolocation data. The method additionally can include generating, by the computing device, a first virtual map based at least on the one or more first real-world geolocation characteristics. The method further can include obtaining, by the computing device, second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user. The method additionally can include determining, by the computing device, one or more second real-world geolocation characteristics based at least on the second real-world geolocation data. The method further can include generating, by the computing device, a second virtual map based at least on the one or more second real-world geolocation characteristics. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

[0009] According to certain embodiments, a system comprising one or more processors and one or more non-transitory computer-readable media storing computing instructions that, when executed by the one or more processors, cause the one or more processors to perform certain operations. The operations can include obtaining, by a computing device, first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user. The operations also can include determining, by the computing device, one or more first real-world geolocation characteristics based at least on the first real-world geolocation data. The operations additionally can include generating, by the computing device, a first virtual map based at least on the one or more first real-world geolocation characteristics. The operations further can include obtaining, by the computing device, second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user. The operations additionally can include determining, by the computing device, one or more second real-world geolocation characteristics based at least on the second real-world geolocation data. The operations further can include generating, by the computing device, a second virtual map based at least on the one or more second real-world geolocation characteristics. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

[0010] According to certain embodiments, one or more non-transitory computer-readable media storing computing instructions that, when executed by one or more processors, cause the one or more processors to perform certain operations. The operations can include obtaining, by a computing device, first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user. The operations also can include determining, by the computing device, one or more first real-world geolocation characteristics based at least on the first real-world geolocation data. The operations additionally can include generating, by the computing device, a first virtual map based at least on the one or more first real-world geolocation characteristics. The operations further can include obtaining, by the computing device, second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user. The operations additionally can include determining, by the computing device, one or more second real-world geolocation characteristics based at least on the second real-world geolocation data. The operations further can include generating, by the computing device, a second virtual map based at least on the one or more second real-world geolocation characteristics. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

[0011] Depending upon the embodiment, one or more benefits may be achieved. These benefits and various additional objects, features and advantages of the present disclosure can be fully appreciated with reference to the detailed description and accompanying drawings that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1**A and FIG. **1**B show a simplified method for generating virtual maps in virtual games according to certain embodiments of the present disclosure.

[0013] FIG. **2**A and FIG. **2**B show a simplified method for generating virtual maps in virtual games according to some embodiments of the present disclosure.

[0014] FIG. **3** shows a simplified diagram illustrating a virtual map according to certain embodiments of the present disclosure.

[0015] FIG. **4** shows a simplified diagram illustrating a virtual map according to some embodiments of the present disclosure.

[0016] FIG. **5** shows a simplified computing device for generating virtual maps in virtual games according to certain embodiments of the present disclosure.

[0017] FIG. **6** shows a simplified system for generating virtual maps in virtual games according to certain embodiments of the present disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0018] Some embodiments of the present disclosure are directed to generating virtual maps in a virtual game. More particularly, certain embodiments of the present disclosure provide methods and systems for generating the virtual maps using real-world telematics data and real-world geolocation data. Merely by way of example, the present disclosure has been applied to presenting the virtual maps for virtual characters in the virtual game. But it would be recognized that the present disclosure has much broader range of applicability.

I. One or More Methods for Generating Virtual Maps in Virtual Games According to Certain Embodiments

[0019] FIG. **1**A and FIG. **1**B show a simplified method for generating virtual maps in virtual games according to certain embodiments of the present disclosure. The figures are merely examples, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications. The method **100** includes process **110** for receiving first real-world data from a first real-world user, process **115** for determining first real-world driving characteristics, process **120** for determining first real-world geolocation characteristics, process **125** for generating a first virtual map, process **130** for presenting the first virtual map, process **135** for receiving second real-world data from a second real-world user, process **140** for determining second real-world driving characteristics, process **145** for determining second real-world geolocation characteristics, process **150** for generating a second virtual map, and process **155** for presenting the second virtual map. Although the above has been shown using a selected group of processes for the method, there can be many alternatives, modifications, and variations. For example, some of the processes may be expanded and/or combined. Other processes may be inserted to those noted above. Depending upon the embodiment, the sequence of processes may be interchanged with others replaced. For example, some or all processes of the method are performed by a computing device or a processor directed by instructions stored in memory. As an example, some or all processes of the method are performed according to instructions stored in a non-transitory computer-readable medium.

[0020] At the process **110**, first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by the first real-world user are received according to some embodiments. In various embodiments, the first real-world user is a real-world driver of a first real-world vehicle. In certain embodiments, the one or more prior first real-world vehicle trips correspond to actual vehicle trips that the first real-world user has made in the past. For example, the one or more prior first real-world vehicle trips include actual vehicle trips made by the first real-world user for any personal and/or business reasons (e.g., commuting to work, grocery shopping, going to a bank, road trips, etc.).

[0021] In some embodiments, the first real-world telematics data and/or the first real-world geolocation data are collected from one or more sensors associated with the first real-world vehicle operated by the first real-world user. For example, the one or more sensors include any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors (e.g., GPS sensors), tilt sensors, yaw rate sensors, brake sensors, airbag deployment sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, etc. As an example, the first real-world telematics data include data collected by any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors, tilt sensors, yaw rate sensors, speedometers, brake sensors, airbag sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, etc. In certain embodiments, the one or more sensors are part of or located in the first real-world vehicle. For example, the one or more sensors communicate and store sensor data in an electronic control module (ECM) or an engine control unit (ECU) of the first real-world vehicle. In some embodiments, the one or more sensors are part of a computing device (e.g., a mobile device, a smart watch) that is connected to the first real-world vehicle. For example, the computing device is connected to the first real-world vehicle while the first real-world vehicle is in operation. As an example, the computing device is connected to the first real-world vehicle while the first real-world vehicle is stationary.

[0022] In certain embodiments, the first real-world telematics data indicate the operational state of the first real-world vehicle, such as speed, acceleration, braking event, etc. In some embodiments, the first real-world geolocation data indicate the physical locations of the first real-world vehicle. For example, the first real-world geolocation data include real-time GPS coordinates of the first real-world vehicle as the first real-world vehicle is in operation. As an example, the first real-world geolocation data include a first plurality of stopping points for the first real-world vehicle such as a starting location, an ending location, and one or more intermediate waypoint locations.

[0023] At the process **115**, one or more first real-world driving characteristics are determined based at least in part upon the first real-world telematics data according to certain embodiments. In various embodiments, the one or more first real-world driving characteristics indicate how the first real-world user drives, such as how frequently the first real-world user drives, type of maneuvers that the first real-world user makes while driving (e.g., hard cornering, hard braking, sudden acceleration, smooth acceleration, slowing before turning, etc.), types of dangerous driving events (e.g., eating while driving, falling asleep while driving, etc.), types of safe driving events (e.g., maintaining safe following distance, turning on headlights, observing traffic lights, yielding to pedestrians, etc.), etc.

[0024] In some embodiments, the one or more first real-world driving characteristics refer to one or more driving skills of the first real-world user. For example, the one or more first real-world driving characteristics include a first braking characteristic, a first steering characteristic, and/or a first speeding characteristic. As an example, the first braking characteristic corresponds to the first real-world user's ability to decelerate the first real-world vehicle upon encountering braking obstacles (e.g., T-junctions, stop signs, pedestrian crossings, etc.). For example, the first steering characteristic corresponds to the first real-world user's ability to steer the first real-world vehicle upon encountering steering obstacles (e.g., potholes, road kills, sharp turns, etc.). As an example, the first speeding characteristic corresponds to the first real-world user's ability to decelerate the first real-world vehicle upon encountering speeding obstacles (e.g., approaching a school zone, entering city limit, etc.).

[0025] At the process **120**, one or more first real-world geolocation characteristics are determined based at least in part upon the first real-world geolocation data according to certain embodiments. In various embodiments, the one or more first real-world geolocation characteristics indicate the type of area associated with the physical locations of the first real-world vehicle. For example, the first real-world vehicle may be traveling through a city, a suburb, a rural region, etc.

[0026] At the process **125**, the first virtual map is generated based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics according to some embodiments. In certain embodiments, the first virtual map is generated for a first virtual character associated with the first real-world user. In some embodiments, the first virtual map is a digital representation of the physical locations of the first real-world vehicle. In certain embodiments, the first virtual map includes landmarks that the first real-world user has visited while operating the first real-world vehicle. For example, the first virtual map may show virtual bridges corresponding to real-world bridges, virtual buildings corresponding to real-world buildings, virtual parks corresponding to real-world parks, etc.

[0027] In various embodiments, a first network of virtual roads are generated in the first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics. In certain embodiments, the one or more first real-world driving characteristics may include the first braking characteristic, the first steering characteristic, and/or the first speeding characteristic. For example, the first braking characteristic may indicate that the first real-world user brakes frequently while driving. As an example, the first network of virtual roads would include numerous virtual road intersections that correspond to the frequency of first real-world user's braking. For example, the first steering characteristic may indicate that the first real-world user makes sharp turns while driving. As an example, the first network of virtual roads would include virtual roads with a variety of curves/bends that correspond to the sharp turns made by the first real-world user. For example, the first speeding characteristic may indicate that the first real-world user often decelerates upon entering certain zones (e.g., a school zone). As an example, the first network of virtual roads would include appropriately spaced virtual traffic lights that correspond to the number of times that the first real-world user decelerates.

[0028] In some embodiments, the one or more first real-world geolocation characteristics may indicate that the first real-world user is operating the first real-world vehicle in an urban setting. For example, the first network of virtual roads would include various virtual city streets or highways that correspond to the urban setting.

[0029] At the process **130**, the first virtual map is presented in a virtual game according to certain embodiments. For example, the first virtual map is presented in a remote display (e.g., in a mobile device of the first real-world user). In various embodiments, the virtual game simulates a virtual driving environment in which the first virtual character operates a first virtual vehicle. In certain embodiments, the first virtual character exists in the virtual game as a playable character for the first real-world user to control. For example, the first real-world user can direct the first virtual character to operate the first virtual vehicle in traversing the first network of virtual roads in the first virtual map.

[0030] At the process **135**, second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by the second real-world user are received according to some embodiments. In various embodiments, the second real-world user is a real-world driver of a second real-world vehicle. In certain embodiments, the one or more prior second real-world vehicle trips correspond to actual vehicle trips that the second real-world user has made in the past. For example, the one or more prior second real-world vehicle trips include actual vehicle trips made by the second real-world user for any personal and/or business reasons.

[0031] In some embodiments, the second real-world telematics data and/or the second real-world geolocation data are collected from one or more sensors associated with the second real-world vehicle operated by the second real-world user. For example, the one or more sensors include any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors (e.g., GPS sensors), tilt sensors, yaw rate sensors, brake sensors, airbag deployment sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, etc. As an example, the second real-world telematics data include data collected by any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors, tilt sensors, yaw rate sensors, speedometers, brake sensors, airbag sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, etc. In certain embodiments, the one or more sensors are part of or located in the second real-world vehicle. For example, the one or more sensors communicate and store sensor data in an ECM or ECU of the second real-world vehicle. In some embodiments, the one or more sensors are part of a computing device that is connected to the second real-world vehicle. For example, the computing device is connected to the second real-world vehicle while the second real-world vehicle is in operation. As an example, the computing device is connected to the second real-world vehicle while the second real-world vehicle is stationary.

[0032] In certain embodiments, the second real-world telematics data indicate the operational state of the second real-world vehicle. In some embodiments, the second real-world geolocation data indicate the physical locations of the second real-world vehicle. For example, the second real-world geolocation data include real-time GPS coordinates of the second real-world vehicle as the second real-world vehicle is in operation. As an example, the second real-world geolocation data include a second plurality of stopping points for the second real-world vehicle such as a starting location, an ending location, and one or more intermediate waypoint locations.

[0033] At the process **140**, one or more second real-world driving characteristics are determined based at least in part upon the second real-world telematics data according to certain embodiments. In various embodiments, the one or more second real-world driving characteristics indicate how the second real-world user drives, such as how frequently the second real-world user drives, type of maneuvers that the second real-world user makes while driving, types of dangerous driving events, types of safe driving events, etc.

[0034] In some embodiments, the one or more second real-world driving characteristics refer to one or more driving skills of the second real-world user. For example, the one or more second real-world driving characteristics include a second braking characteristic, a second steering characteristic, and/or a second speeding characteristic. As an example, the second braking characteristic corresponds to the second real-world user's ability to decelerate the second real-world vehicle upon encountering braking obstacles. For example, the second steering characteristic corresponds to the second real-world user's ability to steer the second real-world vehicle upon encountering steering obstacles. As an example, the second speeding characteristic corresponds to the second real-world user's ability to decelerate the second real-world vehicle upon encountering speeding obstacles.

[0035] At the process **145**, one or more second real-world geolocation characteristics are determined based at least in part upon the second real-world geolocation data according to certain embodiments. In various embodiments, the one or more second real-world geolocation characteristics indicate the type of area associated with the physical locations of the second real-world vehicle such as a city, a suburb, a village, etc.

[0036] At the process **150**, the second virtual map is generated based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics according to some embodiments. In certain embodiments, the second virtual map is generated for a second virtual character associated with the second real-world user. In some embodiments, the second virtual map is a digital representation of the physical locations of the second real-world vehicle. In certain embodiments, the second virtual map includes landmarks that the second real-world user has visited while operating the second real-world vehicle. For example, the second virtual map may show virtual tunnels corresponding to real-world tunnels, virtual stadiums corresponding to real-world stadiums, virtual museums corresponding to real-world museums, etc.

[0037] In various embodiments, a second network of virtual roads are generated in the second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics. In certain embodiments, the one or more second real-world driving characteristics may include the second braking characteristic, the second steering characteristic, and/or the second speeding characteristic. For example, the second braking characteristic may indicate that the second real-world user brakes infrequently while driving. As an example, the second network of virtual roads would include very few virtual road intersections that correspond to the frequency of second real-world user's braking. For example, the second steering characteristic may indicate that the second real-world user makes smooth turns while driving. As an example, the second network of virtual roads would include virtual roads with little or no curves/bends that correspond to the smooth turns made by the second real-world user. For example, the second speeding characteristic may indicate the speed at which the second real-world user normally drives. As an example, the second network of virtual roads would include virtual speed limit signs that correspond to the speed that the second real-world user normally drives at.

[0038] In some embodiments, the one or more second real-world geolocation characteristics may indicate that the second real-world user is operating the second real-world vehicle in a rural setting. For example, the second network of virtual roads would include various virtual country roads that correspond to the rural setting.

[0039] In various embodiments, the first network of virtual roads in the first virtual map and the second network of virtual roads in the second virtual map are different due to differences between the one or more first real-world driving characteristics and the one or more second real-world driving characteristics, and/or differences between the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

[0040] At the process **155**, the second virtual map is presented in the virtual game according to certain embodiments. For example, the second virtual map is presented in a remote display (e.g., in a mobile device of the second real-world user). In various embodiments, the second virtual character operates a second virtual vehicle in the virtual game. In certain embodiments, the second virtual character exists in the virtual game as a playable character for the second real-world user to control. For example, the second real-world user can direct the second virtual character to operate the second virtual vehicle in traversing the second network of virtual roads in the second virtual map.

[0041] According to various embodiments, the first virtual map and the second virtual map are generated to be different in response to differences or similarities in the one or more first real-world driving characteristics and the one or more second real-world driving characteristics, and/or differences or similarities in the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

[0042] In some embodiments, the one or more first real-world driving characteristics and the one or more second real-world driving characteristics are different, and the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics are the same. In certain embodiments, the first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics and the one or more second real-world driving characteristics being different and the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics being the same. For example, both the first network of virtual roads in the first virtual map and the second network of virtual roads in the second virtual map may show virtual city streets, but the first network of virtual roads may include more curves/bends than the second network of virtual roads.

[0043] In some embodiments, the one or more first real-world driving characteristics and the one or more second real-world driving characteristics are the same, and the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics are different. In certain embodiments, the first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics and the one or more second real-world driving characteristics being the same and the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics being different. For example, the first network of virtual roads in the first virtual map may show virtual city streets and the second network of virtual roads in the second virtual map may show virtual country roads, but the first network of virtual roads may include the same number of intersections as the second network of virtual roads.

[0044] In some embodiments, the one or more first real-world driving characteristics and the one or more second real-world driving characteristics are different, and the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics are different. In certain embodiments, the first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics and the one or more second real-world driving characteristics being different and the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics being different. For example, the first network of virtual roads in the first virtual map may show virtual city streets with numerous curves/bends, while the second network of virtual roads in the second virtual map may show virtual country roads with little or no curves/bends.

[0045] In certain embodiments, the first virtual map is presented in the same virtual game as the second virtual map. In some embodiments, the first virtual map is presented in a different virtual game as the second virtual map. For example, the first virtual map is presented in a first virtual game played the first real-world user, while the second virtual map is presented in a second virtual game played by the second real-world user.

[0046] In certain embodiments, instead of the virtual driving environment, the virtual game simulates a virtual role-playing environment in which each of the first and second virtual characters accomplishes a quest. For example, virtual maps are presented in the virtual role-playing environment that depict virtual paths (e.g., virtual trails, virtual rivers, virtual mountain passes, etc.) based at least in part upon the one or more first real-world driving characteristics, the one or more first real-world geolocation characteristics, the one or more second real-world driving characteristics, and the one or more second real-world geolocation characteristics.

[0047] In some embodiments, instead of the virtual driving environment, the virtual game simulates a virtual battle environment in which each of the first and second virtual characters fights in a battle. For example, virtual maps are presented in the virtual battle environment that depict virtual battlefields based at least in part upon the one or more first real-world driving characteristics, the one or more first real-world geolocation characteristics, the one or more second real-world driving characteristics, and the one or more second real-world geolocation characteristics.

[0048] FIG. **2**A and FIG. **2**B show a simplified method for generating virtual maps in virtual games according to some embodiments of the present disclosure. The figures are merely examples, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications. The method **200** includes process **210** for receiving first real-world data from a first real-world user, process **215** for determining first real-world driving characteristics, process **220** for determining first real-world geolocation characteristics, process **225** for generating a first virtual map, process **230** for presenting the first virtual map, process **235** for generating first virtual environmental conditions, process **240** for applying the first virtual environmental conditions to the first virtual map, process **245** for receiving second real-world data from a second real-world user, process **250** for determining second real-world driving characteristics, process **255** for determining second real-world geolocation characteristics, process **260** for generating a second virtual map, process **265** for presenting the second virtual map, process **270** for generating second virtual environmental conditions, and process **275** for applying the second virtual environmental conditions to the second virtual map. Although the above has been shown using a selected group of processes for the method, there can be many alternatives, modifications, and variations. For example, some of the processes may be expanded and/or combined. Other processes may be inserted to those noted above. Depending upon the embodiment, the sequence of processes may be interchanged with others replaced. For example, some or all processes of the method are performed by a computing device or a processor directed by instructions stored in memory. As an example, some or all processes of the method are performed according to instructions stored in a non-transitory computer-readable medium.

[0049] At the process **210**, first real-world telematics data, first real-world geolocation data, and first real-world environmental data associated with one or more prior first real-world vehicle trips made by the first real-world user are received according to some embodiments. In various embodiments, the first real-world user is a real-world driver of a first real-world vehicle. In certain embodiments, the one or more prior first real-world vehicle trips correspond to actual vehicle trips that the first real-world user has made in the past. For example, the one or more prior first real-world vehicle trips include actual vehicle trips made by the first real-world user for any personal and/or business reasons.

[0050] In some embodiments, the first real-world telematics data, the first real-world geolocation data, and/or the first real-world environmental data are collected from one or more sensors associated with the first real-world vehicle operated by the first real-world user. For example, the one or more sensors include any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors (e.g., GPS sensors), tilt sensors, yaw rate sensors, brake sensors, airbag deployment sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, ambient light sensors, rain sensors, etc. As an example, the first real-world telematics data include data collected by any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors, tilt sensors, yaw rate sensors, speedometers, brake sensors, airbag sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, ambient light sensors, rain sensors, etc. In certain embodiments, the one or more sensors are part of or located in the first real-world vehicle. For example, the one or more sensors communicate and store sensor data in an ECM or ECU of the first real-world vehicle. In some embodiments, the one or more sensors are part of a computing device that is connected to the first real-world vehicle. For example, the computing device is connected to the first real-world vehicle while the first real-world vehicle is in operation. As an example, the computing device is connected to the first real-world vehicle while the first real-world vehicle is stationary.

[0051] In certain embodiments, the first real-world telematics data indicate the operational state of the first real-world vehicle, such as speed, acceleration, braking event, etc. In some embodiments, the first real-world geolocation data indicate the physical locations of the first real-world vehicle. For example, the first real-world geolocation data include real-time GPS coordinates of the first real-world vehicle as the first real-world vehicle is in operation. In certain embodiments, the first real-world environmental data indicate the external environmental conditions of the first real-world vehicle, such as weather conditions (e.g., fog, snowstorm, flood, etc.), traffic conditions (e.g., traffic congestions, detours, vehicle accidents, etc.), and/or road conditions (e.g., road grade, road closures, road constructions, etc.).

[0052] At the process **215**, one or more first real-world driving characteristics are determined based at least in part upon the first real-world telematics data according to certain embodiments. In various embodiments, the one or more first real-world driving characteristics indicate how the first real-world user drives, such as how frequently the first real-world user drives, type of maneuvers that the first real-world user makes while driving, types of dangerous driving events, types of safe driving events, etc. In some embodiments, the one or more first real-world driving characteristics refer to one or more driving skills of the first real-world user. For example, the one or more first real-world driving characteristics include a first braking characteristic, a first steering characteristic, and/or a first speeding characteristic.

[0053] At the process **220**, one or more first real-world geolocation characteristics are determined based at least in part upon the first real-world geolocation data according to certain embodiments. In various embodiments, the one or more first real-world geolocation characteristics indicate the type of area associated with the physical locations of the first real-world vehicle (e.g., cityscape, countryside, etc.).

[0054] At the process **225**, the first virtual map is generated based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics according to some embodiments. In certain embodiments, the first virtual map is generated for a first virtual character associated with the first real-world user.

[0055] In various embodiments, a first network of virtual roads are generated in the first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics. In certain embodiments, the one or more first real-world driving characteristics may include the first braking characteristic, the first steering characteristic, and/or the first speeding characteristic. For example, the first braking characteristic may indicate that the first real-world user brakes frequently while driving. As an example, the first network of virtual roads would include numerous virtual road intersections that correspond to the frequency of first real-world user's braking. In some embodiments, the one or more first real-world geolocation characteristics may indicate that the first real-world user is operating the first real-world vehicle in an urban area and the first network of virtual roads would include various virtual city streets.

[0056] At the process **230**, the first virtual map is presented in a virtual game according to certain embodiments. For example, the first virtual map is presented in a remote display (e.g., in a mobile device of the first real-world user). In various embodiments, the virtual game simulates a virtual driving environment in which the first virtual character operates a first virtual vehicle. In certain embodiments, the first virtual character exists in the virtual game as a playable character for the first real-world user to control. For example, the first real-world user can direct the first virtual character to operate the first virtual vehicle in traversing the first network of virtual roads in the first virtual map.

[0057] At the process **235**, one or more first virtual environmental conditions are generated based at least in part upon the first real-world environmental data according to some embodiments. In certain embodiments, the one or more first virtual environmental conditions include a first virtual weather condition, a first virtual traffic condition, and/or a first virtual road condition.

[0058] In some embodiments, the one or more first real-world environmental data may indicate a weather condition such as a snowstorm. For example, the first virtual weather condition simulates a virtual snowstorm in the first virtual map. In certain embodiments, the one or more first real-world environmental data may indicate a traffic condition such as a traffic jam. As an example, the first virtual traffic condition simulates a virtual traffic jam in the first virtual map. In some embodiments, the one or more first real-world environmental data may indicate a road condition such as a road construction. For example, the first virtual road condition simulates a virtual road construction in the first virtual map.

[0059] At the process **240**, the one or more first virtual environmental conditions are applied to the first virtual map for the first virtual character to experience according to some embodiments. In certain embodiments, the first virtual weather condition simulates the virtual snowstorm. For example, the first virtual character may experience the effects of the virtual snowstorm such as reduced visibility when operating the first virtual vehicle during the virtual snowstorm. In some embodiments, the first virtual traffic condition simulates the virtual traffic jam. As an example, the first virtual character may experience the effects of the virtual traffic jam such as increased vehicular queuing when operating the first virtual vehicle at the time of the virtual traffic jam. In certain embodiments, the first virtual road condition simulates the virtual road construction. For example, the first virtual character may experience the effects of the virtual road construction such as reduced speed when operating the first virtual vehicle around the virtual road construction.

[0060] At the process **245**, second real-world telematics data, second real-world geolocation data, and second real-world environmental data associated with one or more prior second real-world vehicle trips made by the second real-world user are received according to some embodiments. In various embodiments, the second real-world user is a real-world driver of a second real-world vehicle. In certain embodiments, the one or more prior second real-world vehicle trips correspond to actual vehicle trips that the second real-world user has made in the past. For example, the one or more prior second real-world vehicle trips include actual vehicle trips made by the second real-world user for any personal and/or business reasons.

[0061] In some embodiments, the second real-world telematics data, the second real-world geolocation data, and/or the second real-world environmental data are collected from one or more sensors associated with the second real-world vehicle operated by the second real-world user. For example, the one or more sensors include any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors (e.g., GPS sensors), tilt sensors, yaw rate sensors, brake sensors, airbag deployment sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, ambient light sensors, rain sensors, etc. As an example, the second real-world telematics data include data collected by any type and number of accelerometers, gyroscopes, magnetometers, barometers, location sensors, tilt sensors, yaw rate sensors, speedometers, brake sensors, airbag sensors, windshield wiper sensors, headlight sensors, steering angle sensors, gear position sensors, proximity detectors, throttle sensors, gas tank sensors, battery sensors, ambient light sensors, rain sensors, etc. In certain embodiments, the one or more sensors are part of or located in the second real-world vehicle. For example, the one or more sensors communicate and store sensor data in an ECM or ECU of the second real-world vehicle. In some embodiments, the one or more sensors are part of a computing device that is connected to the second real-world vehicle. For example, the computing device is connected to the second real-world vehicle while the second real-world vehicle is in operation. As an example, the computing device is connected to the second real-world vehicle while the second real-world vehicle is stationary.

[0062] In certain embodiments, the second real-world telematics data indicate the operational state of the second real-world vehicle. In some embodiments, the second real-world geolocation data indicate the physical locations of the second real-world vehicle. For example, the second real-world geolocation data include real-time GPS coordinates of the second real-world vehicle as the second real-world vehicle is in operation. In certain embodiments, the second real-world environmental data indicate the external environmental conditions of the second real-world vehicle, such as weather conditions, traffic conditions, and/or road conditions. In various embodiments, the second real-world environmental data (as well as the first real-world environment data) can be obtained from various databases that provide real-time information on weather, traffic, and/or road conditions.

[0063] At the process **250**, one or more second real-world driving characteristics are determined based at least in part upon the second real-world telematics data according to certain embodiments. In various embodiments, the one or more second real-world driving characteristics indicate how the second real-world user drives, such as how frequently the second real-world user drives, type of maneuvers that the second real-world user makes while driving, types of dangerous driving events, types of safe driving events, etc. In some embodiments, the one or more second real-world driving characteristics refer to one or more driving skills of the second real-world user. For example, the one or more second real-world driving characteristics include a second braking characteristic, a second steering characteristic, and/or a second speeding characteristic.

[0064] At the process **255**, one or more second real-world geolocation characteristics are determined based at least in part upon the second real-world geolocation data according to certain embodiments. In various embodiments, the one or more second real-world geolocation characteristics indicate the type of area associated with the physical locations of the second real-world vehicle (e.g., urban, rural, etc.).

[0065] At the process **260**, the second virtual map is generated based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics according to some embodiments. In certain embodiments, the second virtual map is generated for a second virtual character associated with the second real-world user.

[0066] In various embodiments, a second network of virtual roads are generated in the second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics. In certain embodiments, the one or more second real-world driving characteristics may include the second braking characteristic, the second steering characteristic, and/or the second speeding characteristic. For example, the second steering characteristic may indicate that the second real-world user makes smooth turns while driving. As an example, the second network of virtual roads would include virtual roads with little or no curves/bends that correspond to the smooth turns made by the second real-world user. In some embodiments, the one or more second real-world geolocation characteristics may indicate that the second real-world user is operating the second real-world vehicle in a rural area and the second network of virtual roads would include various virtual country roads.

[0067] At the process **265**, the second virtual map is presented in the virtual game according to certain embodiments. For example, the second virtual map is presented in a remote display (e.g., in a mobile device of the second real-world user). In various embodiments, the second virtual character operates a second virtual vehicle in the virtual game. In certain embodiments, the second virtual character exists in the virtual game as a playable character for the second real-world user to control. For example, the second real-world user can direct the second virtual character to operate the second virtual vehicle in traversing the second network of virtual roads in the second virtual map.

[0068] At the process **270**, one or more second virtual environmental conditions are generated based at least in part upon the second real-world environmental data according to some embodiments. In certain embodiments, the one or more second virtual environmental conditions include a second virtual weather condition, a second virtual traffic condition, and/or a second virtual road condition.

[0069] In some embodiments, the one or more second real-world environmental data may indicate a weather condition such as a flood. For example, the second virtual weather condition simulates a virtual flood in the second virtual map. In certain embodiments, the one or more second real-world environmental data may indicate a traffic condition such as a vehicle accident. As an example, the second virtual traffic condition simulates a virtual vehicle accident in the second virtual map. In some embodiments, the one or more second real-world environmental data may indicate a road condition such as a road closure. For example, the second virtual road condition simulates a virtual road closure in the second virtual map.

[0070] At the process **275**, the one or more second virtual environmental conditions are applied to the second virtual map for the second virtual character to experience according to some embodiments. In certain embodiments, the second virtual weather condition simulates the virtual flood. For example, the second virtual character may experience the effects of the virtual flood such as reduced maneuverability when operating the second virtual vehicle during the virtual flood. In some embodiments, the second virtual traffic condition simulates the virtual vehicle accident. As an example, the second virtual character may experience the effects of the virtual vehicle accident such as reduced speed when operating the second virtual vehicle at the time of the virtual vehicle accident. In certain embodiments, the second virtual road condition simulates the virtual road closure. For example, the second virtual character may experience the effects of the virtual road closure such as increased trip times when operating the second virtual vehicle around the virtual road closure.

[0071] In various embodiments, the one or more first virtual environmental conditions and the one or more second environmental conditions are different due to differences between the first real-world environmental data and the second real-world environmental data.

[0072] As discussed above and further emphasized here, FIG. **1**A, FIG. **1**B, FIG. **2**A and FIG. **2**B are merely examples, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications. In some examples, at the process **110** and/or the process **210**, data from video or photographic capturing devices are also received. For example, the video or photographic capturing devices may be utilized to capture images internally or externally to the first real-world vehicle to determine the one or more first real-world driving characteristics and/or conditions surrounding the first real-world vehicle. In certain examples, at the process **135** and/or the process **245**, data from video or photographic capturing devices are also received. For example, the video or photographic capturing devices may be utilized to capture images internally or externally to the second real-world vehicle to determine the one or more second real-world driving characteristics and/or conditions surrounding the second real-world vehicle.

[0073] FIG. **3** and FIG. **4** show simplified diagrams illustrating one or more virtual maps that are generated by the method **100** as shown in FIG. **1**A and FIG. **1**B, and/or the method **200** as shown in FIG. **2**A and FIG. **2**B according to certain embodiments of the present disclosure. The figures are merely examples, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications.

[0074] In some embodiments where the virtual driving environment is simulated in the virtual game, the first virtual map and the second virtual map that have been generated by the method **100** and/or the method **200** are represented by various virtual roads. In certain embodiments, FIG. **3** shows a virtual map **300** for the first real-world user. For example, based at least in part upon the one or more first real-world geolocation characteristics of the first real-world user, the virtual map **300** includes a network of virtual roads **302** in an urban setting (e.g., virtual city streets). As an example, based at least in part upon the one or more first real-world driving characteristics of the first real-world user, the network of virtual roads **302** includes one or more road intersections **304** that correspond to a frequency of braking by the first real-world user while operating the first real-world vehicle.

[0075] In some embodiments, FIG. **4** shows a virtual map **400** for the second real-world user. For example, based at least in part upon the one or more second real-world geolocation characteristics of the second real-world user, the virtual map **400** includes a network of virtual roads **402** in a rural setting (e.g., virtual country roads). As an example, based at least in part upon the one or more second real-world driving characteristics of the second real-world user, the network of virtual roads **402** includes one or more curves/bends **404** that correspond to sharp turns made by the second real-world user while operating the second real-world vehicle.

II. One or More Systems for Generating Virtual Maps in Virtual Games According to Certain Embodiments

[0076] FIG. **5** shows a simplified system for generating virtual maps in virtual games according to certain embodiments of the present disclosure. This figure is merely an example, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications. The system **500** includes a vehicle system **502**, a network **504**, and a server **506**. Although the above has been shown using a selected group of components for the system, there can be many alternatives, modifications, and variations. For example, some of the components may be expanded and/or combined. Other components may be inserted to those noted above. Depending upon the embodiment, the arrangement of components may be interchanged with others replaced.

[0077] In various embodiments, the system **500** is used to implement the method **100** and/or the method **200**. According to certain embodiments, the vehicle system **502** includes a vehicle **510** and a client device **512** associated with the vehicle **510**. For example, the client device **512** is an on-board computer embedded or located in the vehicle **510**. As an example, the client device **512** is a mobile device (e.g., a smartphone) that is connected (e.g., via wired or wireless links) to the vehicle **510**. As an example, the client device **512** includes a processor **516** (e.g., a central processing unit (CPU), a graphics processing unit (GPU)), a memory **518** (e.g., random-access memory (RAM), read-only memory (ROM), flash memory), a communications unit **520** (e.g., a network transceiver), a display unit **522** (e.g., a touch-screen), and one or more sensors **524** (e.g., an accelerometer, a gyroscope, a magnetometer, a barometer, a GPS sensor). In certain embodiments, the client device **512** represents the on-board computer in the vehicle **510** and the mobile device connected to the vehicle **510**. For example, the one or more sensors **524** may be in the vehicle **510** and in the mobile device connected to the vehicle **510**.

[0078] In some embodiments, the vehicle **510** is operated by a real-world user, such as the first real-world user and/or the second real-world user. In certain embodiments, multiple vehicles **510** exist in the system **500** which are operated by respective users. For example, the first real-world user operates the first real-world vehicle and the second real-world user operates the second real-world vehicle.

[0079] In various embodiments, during vehicle trips, the one or more sensors **524** monitor the vehicle **510** by collecting data associated with various operating parameters of the vehicle, such as speed, acceleration, braking, location, and other suitable parameters. In certain embodiments, the collected data include telematics data, geolocation data, and/or environmental data. According to some embodiments, the data are collected continuously, at predetermined time intervals, and/or based on a triggering event (e.g., when each sensor has acquired a threshold amount of sensor measurements). In various embodiments, the collected data represent the first real-world telematics data, the first real-world geolocation data, the first real-world environmental data, the second real-world telematics data, the second real-world geolocation data, and/or the second real-world environmental data in the method **100** and/or the method **200**.

[0080] According to certain embodiments, the collected data are stored in the memory **518** before being transmitted to the server **506** using the communications unit **520** via the network **504** (e.g., via a local area network (LAN), a wide area network (WAN), the Internet). In some embodiments, the collected data are transmitted directly to the server **506** via the network **504**. For example, the collected data are transmitted to the server **506** without being stored in the memory **518**. In certain embodiments, the collected data are transmitted to the server **506** via a third party. For example, a data monitoring system stores any and all data collected by the one or more sensors **524** and transmits those data to the server **506** via the network **504** or a different network.

[0081] According to some embodiments, the server **506** includes a processor **530** (e.g., a microprocessor, a micro-controller), a memory **532**, a communications unit **534** (e.g., a network transceiver), and a data storage **536** (e.g., one or more databases). In some embodiments, the server **506** is a single server, while in certain embodiments, the server **406** includes a plurality of servers with distributed processing. In FIG. **5**, the data storage **536** is shown to be part of the server **506**. In certain embodiments, the data storage **536** is a separate entity coupled to the server **506** via a network such as the network **504**. In some embodiments, the server **506** includes various software applications stored in the memory **532** and executable by the processor **530**. For example, these software applications include specific programs, routines, or scripts for performing functions associated with the method **100** and/or the method **200**. As an example, the software applications include general-purpose software applications for data processing, network communication, database management, web server operation, and/or other functions typically performed by a server.

[0082] According to various embodiments, the server **506** receives, via the network **504**, the data collected by the one or more sensors **524** using the communications unit **534** and stores the data in the data storage **536**. For example, the server **506** then processes the data to perform one or more processes of the method **100** and/or one or more processes of the method **200**.

[0083] According to certain embodiments, any related information determined or generated by the method **100** and/or the method **200** (e.g., real-world driving characteristics, real-world geolocation characteristics, virtual maps, etc.) are transmitted back to the client device **512**, via the network **504**, to be provided (e.g., displayed) to the user via the display unit **522**.

[0084] In some embodiments, one or more processes of the method **100** and/or one or more processes of the method **200** are performed by the client device **512**. For example, the processor **516** of the client device **512** processes the data collected by the one or more sensors **524** to perform one or more processes of the method **100** and/or one or more processes of the method **200**.

III. One or More Computing Devices for Generating Virtual Maps in Virtual Games According to Certain Embodiments

[0085] FIG. **6** shows a simplified computing device for generating virtual maps in virtual games according to certain embodiments of the present disclosure. This figure is merely an example, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications. The computing device **600** includes a processing unit **604**, a memory unit **606**, an input unit **608**, an output unit **610**, a communication unit **612**, and a storage unit **614**. In various embodiments, the computing device **600** is configured to be in communication with a user **616** and/or a storage device **618**. In certain embodiments, the computing device **600** includes the client device **512** and/or the server **506** of FIG. **5**. In some embodiments, the computing device **600** is configured to implement the method **100** of FIG. **1**A and/or FIG. **1**B, and/or the method **200** of FIG. **2**A and/or FIG. **2**B. Although the above has been shown using a selected group of components for the system, there can be many alternatives, modifications, and variations. For example, some of the components may be expanded and/or combined. Other components may be inserted to those noted above. Depending upon the embodiment, the arrangement of components may be interchanged with others replaced.

[0086] In various embodiments, the processing unit **604** is configured for executing instructions, such as instructions to implement the method **100** of FIG. **1**A and/or FIG. **1**B, and/or the method **200** of FIG. **2**A and/or FIG. **2**B. In some embodiments, the executable instructions are stored in the memory unit **606**. In certain embodiments, the processing unit **604** includes one or more processing units (e.g., in a multi-core configuration). In some embodiments, the processing unit **604** includes and/or is communicatively coupled to one or more modules for implementing the methods and systems described in the present disclosure. In certain embodiments, the processing unit **604** is configured to execute instructions within one or more operating systems. In some embodiments, upon initiation of a computer-implemented method, one or more instructions is executed during initialization. In certain embodiments, one or more operations is executed to perform one or more processes described herein. In some embodiments, an operation may be general or specific to a particular programming language (e.g., C, C++, Java, or other suitable programming languages, etc.).

[0087] In various embodiments, the memory unit **606** includes a device allowing information, such as executable instructions and/or other data to be stored and retrieved. In some embodiments, the memory unit **606** includes one or more computer readable media. In certain embodiments, the memory unit **606** includes computer readable instructions for providing a user interface, such as to the user **616**, via the output unit **610**. In some embodiments, a user interface includes a web browser and/or a client application. For example, a web browser enables the user **616** to interact with media and/or other information embedded on a web page and/or a website. In certain embodiments, the memory unit **606** includes computer readable instructions for receiving and processing an input via the input unit **608**. In some embodiments, the memory unit **606** includes RAM such as dynamic RAM (DRAM) or static RAM (SRAM), ROM, erasable programmable read-only memory (EPROM), electrically erasable programmable read-only memory (EEPROM), and/or non-volatile RAM (NVRAM).

[0088] In various embodiments, the input unit **608** is configured to receive input (e.g., from the user **616**). In some embodiments, the input unit **608** includes a keyboard, a pointing device, a mouse, a stylus, a touch sensitive panel (e.g., a touch pad or touch screen), a gyroscope, an accelerometer, a position sensor (e.g., GPS sensor), and/or an audio input device. In certain embodiments, the input unit **608** is configured to function as both an input unit and an output unit.

[0089] In various embodiments, the output unit **610** includes a media output unit configured to present information to the user **616**. In some embodiments, the output unit **610** includes any component capable of conveying information to the user **616**. In certain embodiments, the output unit **610** includes an output adapter such as a video adapter and/or an audio adapter. For example, the output unit **610** is operatively coupled to the processing unit **604** and/or a visual display device to present information to the user **616** (e.g., a liquid crystal display (LCD), a light emitting diode (LED) display, an organic light emitting diode (OLED) display, a cathode ray tube (CRT) display, a projected display, etc.). As an example, the output unit **610** is operatively coupled to the processing unit **604** and/or an audio display device to present information to the user **616** (e.g., a speaker arrangement or headphones).

[0090] In various embodiments, the communication unit **612** is configured to be communicatively coupled to a remote device. In some embodiments, the communication unit **612** includes a wired network adapter, a wireless network adapter, a wireless data transceiver for use with a mobile phone network (e.g., 3G, 4G, 5G, Bluetooth, near-field communication (NFC), etc.), and/or other mobile data networks. In certain embodiments, other types of short-range or long-range networks may be used. In some embodiments, the communication unit **612** is configured to provide email integration for communicating data between a server and one or more clients.

[0091] In various embodiments, the storage unit **614** is configured to enable communication between the computing device **600** and the storage device **618**. In some embodiments, the storage unit **614** is a storage interface. For example, the storage interface is any component capable of providing the processing unit **604** with access to the storage device **618**. In certain embodiments, the storage unit **614** includes an advanced technology attachment (ATA) adapter, a serial ATA (SATA) adapter, a small computer system interface (SCSI) adapter, a RAID controller, a SAN adapter, a network adapter, and/or any other component capable of providing the processing unit **604** with access to the storage device **618**.

[0092] In various embodiments, the storage device **618** includes any computer-operated hardware suitable for storing and/or retrieving data. In certain embodiments, the storage device **618** is integrated in the computing device **600**. In some embodiments, the storage device **618** includes a database such as a local database or a cloud database. In certain embodiments, the storage device **618** includes one or more hard disk drives. In some embodiments, the storage device **618** is external and is configured to be accessed by a plurality of server systems. In certain embodiments, the storage device **618** includes multiple storage units such as hard disks or solid state disks in a redundant array of inexpensive disks configuration. In some embodiments, the storage device **618** includes a storage area network and/or a network attached storage system.

IV. Examples of Certain Embodiments of the Present Disclosure

[0093] According to certain embodiments, a method for generating one or more virtual maps in one or more virtual games includes receiving first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user. Also, the method includes determining one or more first real-world driving characteristics based at least in part upon the first real-world telematics data and determining one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data. Additionally, the method includes generating a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user. The method then includes presenting the first virtual map in a virtual game. Further, the method includes receiving second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user. Also, the method includes determining one or more second real-world driving characteristics based at least in part upon the second real-world telematics data and determining one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data. Additionally, the method includes generating a second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics, where the second virtual map is generated for a second virtual character associated with the second real-world user. The method then includes presenting the second virtual map in the virtual game. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics, the one or more second real-world driving characteristics, the one or more first real-world geolocation characteristics, and the one or more second real-world geolocation characteristics. For example, the method is implemented according to at least FIG. **1**A, FIG. **1**B, FIG. **2**A, and/or FIG. **2**B.

[0094] According to some embodiments, a computing device for generating one or more virtual maps in one or more virtual games includes one or more processors and a memory that stores instructions for execution by the one or more processors. The instructions, when executed, cause the one or more processors to receive first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user. Also, the instructions, when executed, cause the one or more processors to determine one or more first real-world driving characteristics based at least in part upon the first real-world telematics data and determine one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data. Additionally, the instructions, when executed, cause the one or more processors to generate a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user. The instructions, when executed, then cause the one or more processors to present the first virtual map in a virtual game. Further, the instructions, when executed, cause the one or more processors to receive second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user. Also, the instructions, when executed, cause the one or more processors to determine one or more second real-world driving characteristics based at least in part upon the second real-world telematics data and determine one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data. Additionally, the instructions, when executed, cause the one or more processors to generate a second virtual map based at least in part upon the one or more second real-world driving characteristics and the one or more second real-world geolocation characteristics, where the second virtual map is generated for a second virtual character associated with the second real-world user. The instructions, when executed, then cause the one or more processors to present the second virtual map in the virtual game. The first virtual map and the second virtual map are generated to be different in response to the one or more first real-world driving characteristics, the one or more second real-world driving characteristics, the one or more first real-world geolocation characteristics, and the one or more second real-world geolocation characteristics. For example, the computing device is implemented according to at least FIG. **5** and/or FIG. **6**.

[0095] According to certain embodiments, a non-transitory computer-readable medium stores instructions for generating one or more virtual map in one or more virtual games. The instructions are executed by one or more processors of a computing device. The non-transitory computer-readable medium includes instructions to receive first real-world telematics data and first real-world geolocation data associated with one or more prior first real-world vehicle trips made by a first real-world user. Also, the non-transitory computer-readable medium includes instructions to determine one or more first real-world driving characteristics based at least in part upon the first real-world telematics data and determine one or more first real-world geolocation characteristics based at least in part upon the first real-world geolocation data. Additionally, the non-transitory computer-readable medium includes instructions to generate a first virtual map based at least in part upon the one or more first real-world driving characteristics and the one or more first real-world geolocation characteristics, where the first virtual map is generated for a first virtual character associated with the first real-world user. The non-transitory computer-readable medium then includes instructions to present the first virtual map in a virtual game. Further, the non-transitory computer-readable medium includes instructions to receive second real-world telematics data and second real-world geolocation data associated with one or more prior second real-world vehicle trips made by a second real-world user. Also, the non-transitory computer-readable medium includes instructions to determine one or more second real-world driving characteristics based at least in part upon the second real-world telematics data and determine one or more second real-world geolocation characteristics based at least in part upon the second real-world geolocation data. For example, the non-transitory computer-readable medium is implemented according to at least FIG. **1**A, FIG. **1**B, FIG. **2**A, FIG. **2**B, FIG. **5**, and/or FIG. **6**.

V. Examples of Machine Learning According to Certain Embodiments

[0096] According to some embodiments, a processor or a processing element may be trained using supervised machine learning and/or unsupervised machine learning, and the machine learning may employ an artificial neural network, which, for example, may be a convolutional neural network, a recurrent neural network, a deep learning neural network, a reinforcement learning module or program, or a combined learning module or program that learns in two or more fields or areas of interest. Machine learning may involve identifying and recognizing patterns in existing data in order to facilitate making predictions for subsequent data. Models may be created based upon example inputs in order to make valid and reliable predictions for novel inputs.

[0097] According to certain embodiments, machine learning programs may be trained by inputting sample data sets or certain data into the programs, such as images, object statistics and information, historical estimates, and/or actual repair costs. The machine learning programs may utilize deep learning algorithms that may be primarily focused on pattern recognition and may be trained after processing multiple examples. The machine learning programs may include Bayesian Program Learning (BPL), voice recognition and synthesis, image or object recognition, optical character recognition, and/or natural language processing. The machine learning programs may also include natural language processing, semantic analysis, automatic reasoning, and/or other types of machine learning.

[0098] According to some embodiments, supervised machine learning techniques and/or unsupervised machine learning techniques may be used. In supervised machine learning, a processing element may be provided with example inputs and their associated outputs and may seek to discover a general rule that maps inputs to outputs, so that when subsequent novel inputs are provided the processing element may, based upon the discovered rule, accurately predict the correct output. In unsupervised machine learning, the processing element may need to find its own structure in unlabeled example inputs.

VI. Additional Considerations According to Certain Embodiments

[0099] For example, some or all components of various embodiments of the present disclosure each are, individually and/or in combination with at least another component, implemented using one or more software components, one or more hardware components, and/or one or more combinations of software and hardware components. As an example, some or all components of various embodiments of the present disclosure each are, individually and/or in combination with at least another component, implemented in one or more circuits, such as one or more analog circuits and/or one or more digital circuits. For example, while the embodiments described above refer to particular features, the scope of the present disclosure also includes embodiments having different combinations of features and embodiments that do not include all of the described features. As an example, various embodiments and/or examples of the present disclosure can be combined.

[0100] Additionally, the methods and systems described herein may be implemented on many different types of processing devices by program code comprising program instructions that are executable by the device processing subsystem. The software program instructions may include source code, object code, machine code, or any other stored data that is operable to cause a processing system to perform the methods and operations described herein. Certain implementations may also be used, however, such as firmware or even appropriately designed hardware configured to perform the methods and systems described herein.

[0101] The systems' and methods' data (e.g., associations, mappings, data input, data output, intermediate data results, final data results) may be stored and implemented in one or more different types of computer-implemented data stores, such as different types of storage devices and programming constructs (e.g., RAM, ROM, EEPROM, Flash memory, flat files, databases, programming data structures, programming variables, IF-THEN (or similar type) statement constructs, application programming interface). It is noted that data structures describe formats for use in organizing and storing data in databases, programs, memory, or other computer-readable media for use by a computer program.

[0102] The systems and methods may be provided on many different types of computer-readable media including computer storage mechanisms (e.g., CD-ROM, diskette, RAM, flash memory, computer's hard drive, DVD) that contain instructions (e.g., software) for use in execution by a processor to perform the methods' operations and implement the systems described herein. The computer components, software modules, functions, data stores and data structures described herein may be connected directly or indirectly to each other in order to allow the flow of data needed for their operations. It is also noted that a module or processor includes a unit of code that performs a software operation, and can be implemented for example as a subroutine unit of code, or as a software function unit of code, or as an object (as in an object-oriented paradigm), or as an applet, or in a computer script language, or as another type of computer code. The software components and/or functionality may be located on a single computer or distributed across multiple computers depending upon the situation at hand.

[0103] The computing system can include client devices and servers. A client device and server are generally remote from each other and typically interact through a communication network. The relationship of client device and server arises by virtue of computer programs running on the respective computers and having a client device-server relationship to each other.

[0104] This specification contains many specifics for particular embodiments. Certain features that are described in this specification in the context of separate embodiments can also be implemented in combination in a single embodiment. Conversely, various features that are described in the context of a single embodiment can also be implemented in multiple embodiments separately or in any suitable subcombination. Moreover, although features may be described above as acting in certain combinations, one or more features from a combination can in some cases be removed from the combination, and a combination may, for example, be directed to a subcombination or variation of a subcombination.

[0105] Similarly, while operations are depicted in the drawings in a particular order, this should not be understood as requiring that such operations be performed in the particular order shown or in sequential order, or that all illustrated operations be performed, to achieve desirable results. In certain circumstances, multitasking and parallel processing may be advantageous. Moreover, the separation of various system components in the embodiments described above should not be understood as requiring such separation in all embodiments, and it should be understood that the described program components and systems can generally be integrated together in a single software product or packaged into multiple software products.

[0106] Although specific embodiments of the present disclosure have been described, it will be understood by those of skill in the art that there are other embodiments that are equivalent to the described embodiments. Accordingly, it is to be understood that the present disclosure is not to be limited by the specific illustrated embodiments.

What is claimed is:

1. A computer-implemented method comprising:

obtaining, by a computing device, first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user;

determining, by the computing device, one or more first real-world geolocation characteristics based at least on the first real-world geolocation data;

generating, by the computing device, a first virtual map based at least on the one or more first real-world geolocation characteristics;

obtaining, by the computing device, second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user;

determining, by the computing device, one or more second real-world geolocation characteristics based at least on the second real-world geolocation data; and

generating, by the computing device, a second virtual map based at least on the one or more second real-world geolocation characteristics,

wherein:

the first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

2. The computer-implemented method of claim **1** further comprising:

transmitting, by the computing device, the first virtual map for display on a first user interface of a first electronic device operated by the first user; and

transmitting, by the computing device, the second virtual map for display on a second user interface of a second electronic device operated by the second user.

3. The computer-implemented method of claim **1** further comprising:

obtaining, by the computing device, first real-world environmental data associated with the one or more historical first real-world vehicle trips made by the first user;

generating, by the computing device, one or more first virtual environmental conditions based at least on the first real-world environmental data; and

applying, by the computing device, the one or more first virtual environmental conditions to the first virtual map.

4. The computer-implemented method of claim **3** further comprising:

obtaining, by the computing device, second real-world environmental data associated with the one or more historical second real-world vehicle trips made by the second user;

generating, by the computing device, one or more second virtual environmental conditions based at least on the second real-world environmental data; and

applying, by the computing device, the one or more second virtual environmental conditions to the second virtual map.

5. The computer-implemented method of claim **1**, wherein generating the first virtual map further comprises:

generating a first network of virtual roads in the first virtual map based at least on the one or more first real-world geolocation characteristics.

6. The computer-implemented method of claim **5**, wherein generating the second virtual map further comprises:

generating a second network of virtual roads in the second virtual map based at least on the one or more second real-world geolocation characteristics.

7. The computer-implemented method of claim **6**, wherein the first network of virtual roads in the first virtual map and the second network of virtual roads in the second virtual map are different.

8. A system comprising one or more processors and one or more non-transitory computer-readable media storing computing instructions that, when executed by the one or more processors, cause the one or more processors to perform operations comprising:

obtaining first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user;

determining one or more first real-world geolocation characteristics based at least on the first real-world geolocation data;

generating a first virtual map based at least on the one or more first real-world geolocation characteristics;

obtaining second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user;

determining one or more second real-world geolocation characteristics based at least on the second real-world geolocation data; and

generating a second virtual map based at least on the one or more second real-world geolocation characteristics,

wherein:

the first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

9. The system of claim **8** further comprising:

transmitting the first virtual map for display on a first user interface of a first electronic device operated by the first user; and

transmitting the second virtual map for display on a second user interface of a second electronic device operated by the second user.

10. The system of claim **8** further comprising:

obtaining first real-world environmental data associated with the one or more historical first real-world vehicle trips made by the first user;

generating one or more first virtual environmental conditions based at least on the first real-world environmental data; and

applying the one or more first virtual environmental conditions to the first virtual map.

11. The system of claim **10** further comprising:

obtaining second real-world environmental data associated with the one or more historical second real-world vehicle trips made by the second user;

generating one or more second virtual environmental conditions based at least on the second real-world environmental data; and

applying the one or more second virtual environmental conditions to the second virtual map.

12. The system of claim **8**, wherein generating the first virtual map further comprises:

generating a first network of virtual roads in the first virtual map based at least on the one or more first real-world geolocation characteristics.

13. The system of claim **12**, wherein generating the second virtual map further comprises:

generating a second network of virtual roads in the second virtual map based at least on the one or more second real-world geolocation characteristics.

14. The system of claim **13**, wherein the first network of virtual roads in the first virtual map and the second network of virtual roads in the second virtual map are different.

15. One or more non-transitory computer-readable media storing computing instructions that, when executed by one or more processors, cause the one or more processors to perform operations comprising:

obtaining first real-world geolocation data associated with one or more historical first real-world vehicle trips made by a first user;

determining one or more first real-world geolocation characteristics based at least on the first real-world geolocation data;

generating a first virtual map based at least on the one or more first real-world geolocation characteristics;

obtaining second real-world geolocation data associated with one or more historical second real-world vehicle trips made by a second user;

determining one or more second real-world geolocation characteristics based at least on the second real-world geolocation data; and

generating a second virtual map based at least on the one or more second real-world geolocation characteristics, wherein:

the first virtual map and the second virtual map are generated to be different in response to the one or more first real-world geolocation characteristics and the one or more second real-world geolocation characteristics.

16. The one or more non-transitory computer-readable media of claim **15** further comprising:

transmitting the first virtual map for display on a first user interface of a first electronic device operated by the first user; and

transmitting the second virtual map for display on a second user interface of a second electronic device operated by the second user.

17. The one or more non-transitory computer-readable media of claim **15** further comprising:

obtaining first real-world environmental data associated with the one or more historical first real-world vehicle trips made by the first user;

generating one or more first virtual environmental conditions based at least on the first real-world environmental data; and

applying the one or more first virtual environmental conditions to the first virtual map.

18. The one or more non-transitory computer-readable media of claim **17** further comprising:

obtaining second real-world environmental data associated with the one or more historical second real-world vehicle trips made by the second user;

generating one or more second virtual environmental conditions based at least on the second real-world environmental data; and

applying the one or more second virtual environmental conditions to the second virtual map.

19. The one or more non-transitory computer-readable media of claim **15**, wherein generating the first virtual map further comprises:

generating a first network of virtual roads in the first virtual map based at least on the one or more first real-world geolocation characteristics.

20. The one or more non-transitory computer-readable media of claim **19**, wherein generating the second virtual map further comprises:

generating a second network of virtual roads in the second virtual map based at on the one or more second real-world geolocation characteristics, wherein the first network of virtual roads in the first virtual map and the second network of virtual roads in the second virtual map are different.

* * * * *