

A SYSTEM AND METHOD FOR MANAGING VEHICULAR LOAN DELINQUENCY

Field of the Invention

- 5 The present invention relates to a system, and method for managing vehicular loan delinquency, specifically for two and three wheel vehicles.

Background

- 10 Two-wheel vehicle purchasers in developing economy markets typically purchase their vehicles with the aid of a loan, usually offered by a bank, financial lender or the like. It is typical that these loans are provided at interest rates (APR) which substantially exceed those typically offered in more developed economies. For example, in several South East Asian countries, the APR can be within the range of
15 30-50%. This substantially differs from typical APRs in developed economies that, particularly in a quantitative easing environment, are usually at single digit percentages.

- The lender in these developing economy markets usually ascribes the exorbitant APR
20 to a “high-risk” lending environment resultant from: 1) lack of a reliable and expansive credit-worthiness database, 2) incomplete and primitive know-your-client (KYC) processes, and 3) low-success-rate during repossession of vehicles subsequent to loan delinquency and/or theft. This situation is difficult to improve as the lender typically relies on manual and/or laborious procedures which are unreliable, non-
25 scalable, and does not aid in building up a credit rating database.

- Currently, there are challenges that prevent the lending environment in typical developing economy markets from reducing the risk to lenders. It is evident that a solution to the challenges would be advantageous for several aspects for both the
30 lenders and those seeking loans.

Summary

In a first aspect, there is provided a system for managing vehicular loan delinquency, the system including one or more data processors configured to:

- 5 transmit, from a vehicle unit, an ID of the vehicle unit;
- associate, at a central server, the ID of the vehicle unit to a loan identifier;
- transmit, from the vehicle unit, location data of the vehicle unit at periodically;
- determine, at the central server, if there has been non-payment of a loan quantum beyond a pre-determined period, the determination being for an indication of
- 10 the non-payment; and
- transmit, from the central server, instructions to the vehicle unit, the instructions being configured to adversely affect operability of a vehicle coupled to the vehicle unit.

In a second aspect, there is provided a data processor implemented method for managing vehicular loan delinquency, the method comprising:

- 15 transmitting, from a vehicle unit, an ID of the vehicle unit;
- associating, at a central server, the ID of the vehicle unit to a loan identifier;
- transmitting, from the vehicle unit, location data of the vehicle unit periodically;
- determining, at the central server, if there has been non-payment of a loan
- 20 quantum beyond a pre-determined period, the determination being for an indication of the non-payment; and
- transmitting, from the central server, instructions to the vehicle unit, the instructions being configured to adversely affect operability of a vehicle coupled to the vehicle unit.

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In a final aspect, there is provided a central server configured for managing vehicular loan delinquency, the central server including one or more data processors configured to:

- receive, from a vehicle unit, an ID of the vehicle unit;
- 30 associate, the ID of the vehicle unit to a loan identifier;
- receive, from the vehicle unit, location data of the vehicle unit periodically;

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determine, if there has been non-payment of a loan quantum beyond a pre-determined period, the determination being for an indication of the non-payment; and transmit, instructions to the vehicle unit, the instructions being configured to adversely affect operability of a vehicle coupled to the vehicle unit.

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It will be appreciated that the broad forms of the invention and their respective features can be used in conjunction, interchangeably and/or independently, and reference to separate broad forms is not intended to be limiting.

10 **Brief Description of the Drawings**

A non-limiting example of the present invention will now be described with reference to the accompanying drawings, in which:

15 FIG 1 is a flow chart of an example of a method for managing vehicular loan delinquency;

FIG 2 is a schematic diagram of an example of a system for managing vehicular loan delinquency;

FIG 3 is a schematic diagram showing components of an example user device of the system shown in FIG 2;

FIG 4 is a schematic diagram showing components of an example vehicular device of the system shown in FIG 2;

FIG 5 is a schematic diagram showing components of an example central server shown in FIG 2; and

25 FIG 6 is a flow chart of another example of a method for managing vehicular loan delinquency.

Detailed Description

30 The present invention provides a system and method for managing vehicular loan delinquency, specifically for two and three wheel vehicles. The system and method

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can be used particularly for developing economy markets, where instances of loan default is substantial, and re-possession of the vehicles is challenging.

For the purpose of illustration, it is assumed that the method can be performed at least
5 in part amongst one or more data processing devices such as, for example, a mobile phone, a tablet computer, a central server, or the like. Typically, the central server will be configured to carry out a majority of the processing tasks, with the mobile phone and the tablet computer being configured to display outputs from the central server.

10 An example of a broad overview of a method 100 for managing vehicular loan delinquency will now be described with reference to FIG 1. It should be appreciated that the term “loan provider” will be used to describe an entity providing a loan, while “customer” will be used to describe an entity taking a loan.

15 At step 105, once a customer has decided to purchase a vehicle with a vehicular loan, the customer enters into an agreement with a loan provider. The loan provider can be, for example, a bank, a money lender, and the like. When the customer enters into the agreement with the loan provider, the customer will need to consent to all terms and conditions of the agreement. The customer can enter into the agreement with a user
20 device, for example, a computer, a mobile phone or a tablet computer. The agreement is then transmitted to a central server for storage. The user device can be provided by the loan provider, or it can be any mobile device with an appropriate app/browser. The agreement is then allocated a loan identifier at the central server. Further details of the central server will be provided in a subsequent paragraph. The central server can
25 be administered by the loan provider, or a service provider engaged by the loan provider.

At step 110, a vehicle unit coupled to the vehicle being purchased transmits an ID of the vehicle unit to the central server. The vehicle unit can be configured to control
30 certain aspects of the vehicle, for example, a power management module for the vehicle, a throttle controller of the vehicle, a fuel supply of the vehicle, a power supply

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of the vehicle, and so forth. The vehicle unit can be integrated with the vehicle at the vehicle manufacturer's factory, or it can be installed consequent to purchase of the vehicle. Further details of the vehicle unit will be provided in a subsequent paragraph.

5 At step 115, the ID of the vehicle unit is associated with the loan identifier of the agreement. The association of the ID and the loan identifier allows the appropriate vehicle unit to be controlled when necessary, as will be evident in the subsequent paragraphs.

10 At step 117, location data from the vehicle unit is periodically transmitted from the vehicle unit at pre-defined times of a day. The location data can then be used to determine typical locations of the vehicle unit (ie the vehicle) on an ongoing basis at pre-defined times of a day. The location data can provide another set of information, like a movement pattern/location chart, that can be used to locate the vehicle in the
15 event of loan delinquency.

At step 120, there is a determination whether there has been non-repayment of a loan quantum beyond a pre-determined period, such as, for example, a grace period as per the terms and conditions of the agreement. For example, the grace period can be
20 two weeks or more. The determination of whether there has been non-repayment can be carried out at pre-defined junctures or on an on-demand basis. It should be appreciated that the determination can be carried out when an indication of non-repayment is provided either manually or via an external server, for example, a fintech server.

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If it is determined that there is no repayment delinquency, no action is taken at step 125 as no action is required if timely payment is made pursuant to the agreement.

If it is determined that there has been repayment delinquency beyond the pre-determined period (ie. grace period), instructions are transmitted via the central server
30 to the associated vehicle unit at step 130 in order to degrade performance or disable

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operability of a vehicle coupled to the associated vehicle unit. The purpose of adversely affecting the vehicle is to penalise the customer for not being able to make their loan repayments in a timely manner, and in some instances, preventing the customer from using the vehicle to evade re-possession and/or contact for breaching
5 the terms and conditions of the agreement.

At step 135, access to a “live” location of the vehicle unit (ie. the vehicle) allows ease of locating and subsequent re-possession in appropriate instances. Furthermore, the location data indicated at step 117 is also able to provide a movement pattern/location
10 chart that can be used for locating the vehicle.

It should be appreciated that the method 100 enables the gathering of data related to location and operational patterns for the loan provider to obtain insights relating to their customers. Over a period of time, the data can provide the loan provider with a
15 capability to better statistically forecast customer reliability for repayment and/or likelihood of default. This capability can be used to develop internal competencies for the loan provider to determine credit-worthiness of customers to lower the risk of lending, and reducing instances and associated costs to repossess vehicles.

20 In relation to the customer, the method 100 provides a substantial deterrent against making late loan repayments.

In relation to the loan provider, the method 100 provides a substantial incentive to minimise instances of customer loan delinquency, to increase a rate of repossession
25 recovery, and to develop an in-house credit-worthiness assessment capability. In some embodiments, the loan provider just needs a single mobile device app or a web portal and a plurality of vehicle units to enable the method 100, which indicates an ease of implementing the method 100, with a main investment directed at development of the mobile device app or web portal and subsequently, maintaining
30 cloud services to enable the method 100. Carrying out the method 100 requires

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minimal involvement of vehicle dealers other than secure coupling of the vehicle unit to the vehicles which are the subject of the loan agreements.

5 An example of a system 200 for managing vehicular loan delinquency will now be described with reference to FIG 2. The system 200 can be used for the method 100 as described earlier.

10 In this example, the system 200 includes one or more user devices 220, one or more vehicles 230, a vehicle unit 240 coupled to each of the vehicles 230, a communications network 250, and a central server 260. The one or more user devices 220 and the vehicle unit 240 communicate with the central server 260 via the communications network 250. The communications network 250 can be of any appropriate form, such as the Internet and/or a wireless network such as cellular, WI-FI, and the like. Further details of respective components of the system 200 will be provided in a following
15 portion of the description. It will be appreciated that the configuration shown in FIG 2 is not limiting and for the purpose of illustration only.

User Device 220

20 The user device 220 of any of the examples herein may be a handheld computer device such as a smart phone with a capability to download and operate mobile apps, and be connectable to the communications network 250. The user device 220 can be provided by the loan provider, or it can be any mobile device with an appropriate app/browser. The user device 220 can be configured to populate requisite fields of a
25 loan application agreement, and subsequently, finalise/transmit the agreement to the central server 260 for processing.

30 An exemplary embodiment of the user device 220 is shown in FIG 3. As shown, the user device 220 includes the following components in electronic communication via a bus 311:

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1. a display 302;
2. non-volatile memory 303;
3. random access memory ("RAM") 304;
4. data processor(s) 301;
- 5 5. a transceiver component 305 that includes a transceiver(s);
6. an image capture module 310; and
7. input controls 307.

In some embodiments, an app 309 stored in the non-volatile memory 303, is required
10 to enable the user device 220 to operate in a desired manner. For example, the app 309 can provide a user interface for filling out requisite fields of a loan agreement, and subsequently finalising and transmitting the agreement. In some instances, the app 309 can be a web browser.

15 Although the components depicted in FIG 3 represent physical components, FIG 3 is not intended to be a hardware diagram; thus many of the components depicted in FIG 3 may be realized by common constructs or distributed among additional physical components. Moreover, it is contemplated that other existing and yet-to-be developed physical components and architectures may be utilized to implement the functional
20 components described with reference to FIG 3.

Vehicle Unit 240

The vehicle unit 240 of any of the examples herein may be integrated with a vehicle
25 at the vehicle manufacturer's factory, or it can be installed consequent to purchase of the vehicle when a vehicular loan is obtained from a loan provider. The vehicle unit 240 can be connectable to the communications network 250. The vehicle unit 240 can be concealed and not visible when carrying out a cursory inspection of a vehicle 230. The vehicle unit 240 can be configured to control certain aspects of the vehicle 230,
30 for example, a power management module for the vehicle 230, a throttle controller of the vehicle 230, a fuel supply of the vehicle 230, a power supply of the vehicle 230,

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and so forth. The vehicle unit 240 can also be configured to provide location information. An exemplary embodiment of the vehicle unit 240 is shown in FIG 4.

As shown, the vehicle unit 240 includes the following components in electronic communication via a bus 411:

1. non-volatile memory 403;
2. random access memory ("RAM") 404;
3. data processor(s) 401;
- 10 4. a transceiver component 405 that includes a transceiver(s);
5. a location module 410; and
6. input controls 407.

In some embodiments, an app 409 stored in the non-volatile memory 403, is required to enable the vehicle unit 240 to operate in a desired manner. In other embodiments, the non-volatile memory 403 stores a series of instructions, for example in firmware, to enable the vehicle unit 240 to operate in a desired manner.

Although the components depicted in FIG 4 represent physical components, FIG 4 is not intended to be a hardware diagram; thus many of the components depicted in FIG 4 may be realized by common constructs or distributed among additional physical components. Moreover, it is contemplated that other existing and yet-to-be developed physical components and architectures may be utilized to implement the functional components described with reference to FIG 4.

Central Server 260

The central server 260 is a hardware and software suite comprised of pre-programmed logic, algorithms and other means of processing information coming in, in order to send out information which is useful to the objective of the system 200 in

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which the central server 260 resides. For the sake of illustration, hardware which can be used by the central server 260 will be described briefly herein.

5 The central server 260 can broadly comprise a database which stores pertinent information, and processes information packets from the user devices 220 and the vehicle units 240. In some embodiments, the central server 260 can be operated from a commercial hosted service such as Amazon Web Services (TM).

10 In one possible embodiment, the central server 260 can be represented in a form as shown in FIG 5.

The central server 260 is in communication with a communications network 250, as shown in FIG 5. The central server 260 is able to communicate with the user devices 220, the vehicle units 240, and/or other processing devices, as required, over the
15 communications network 250. In some instances, the user devices 220, the vehicle units 240 communicate via a direct communication channel (wireless network such as cellular or WIFI) with the central server 260.

20 The components of the central server 260 can be configured in a variety of ways. The components can be implemented entirely by software to be executed on standard computer server hardware, which may comprise one hardware unit or different computer hardware units distributed over various locations, some of which may require the communications network 250 for communication.

25 In the example shown in FIG 5, the central server 260 is a commercially available system, and the processes and/or methods executed or performed by the central server 260 are implemented in the form of programming instructions of one or more software components or modules 502 stored on non-volatile computer-readable storage 503 associated with the central server 260.

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The central server 260 includes at least one or more of the following standard, commercially available, computer components, all interconnected by a bus 505:

1. random access memory (RAM) 506; and
- 5 2. at least one central processing unit (CPU) 507.

Although the components depicted in FIG 5 represent physical components, FIG 5 is not intended to be a hardware diagram; thus many of the components depicted in FIG 5 may be realized by common constructs or distributed among additional physical
10 components. Moreover, it is contemplated that other existing and yet-to-be developed physical components and architectures may be utilized to implement the functional components described with reference to FIG 5.

It should be appreciated that the system 200 enables the gathering of data related to
15 location and operational patterns for the loan provider to obtain insights relating to their customers. Over a period of time, the data can provide the loan provider with a capability to better statistically forecast customer reliability for repayment and/or likelihood of default. This capability can be used to develop internal competencies for the loan provider to determine credit-worthiness of customers to lower the risk of
20 lending, and reducing instances and associated costs to repossess vehicles.

In relation to the customer, the system 200 provides a substantial deterrent against making late loan repayments.

25 In relation to the loan provider, the system 200 provides a substantial incentive to minimise instances of customer loan delinquency, to increase a rate of repossession recovery, and to develop an in-house credit-worthiness assessment capability. In some embodiments, the loan provider just needs a single mobile device app or a web portal and a plurality of vehicle units for the system 200, which indicates an ease of
30 implementing the system 200, with a main investment directed at development of the mobile device app or web portal and subsequently, maintaining cloud services for the

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system 200. The system 200 requires minimal involvement of vehicle dealers other than secure coupling of the vehicle unit 240 to the vehicles which are the subject of the loan agreements.

5 Referring to FIG 6, there is shown an example of a method for managing vehicular loan delinquency 600, particularly in relation to a process at the central server 260 in the system 200. Of course, the method 600 can also be carried out by other data processing devices.

10 At step 605, the central server 260 receives an executed loan agreement, and allocates a loan identifier.

At step 610, the central server 260 receives an ID of the vehicle unit 240 coupled to the vehicle 230 being purchased. The vehicle unit 240 can be configured to control
15 certain aspects of the vehicle 230, for example, a starter motor for the vehicle 230, a throttle controller of the vehicle 230, a fuel supply of the vehicle 230, and so forth. The vehicle unit 240 can be integrated with the vehicle 230 at the vehicle manufacturer's factory, or it can be installed consequent to purchase of the vehicle 230.

20 At step 615, the ID of the vehicle unit 240 is associated with the loan identifier of the agreement. The association of the ID and the loan identifier allows the appropriate vehicle unit 240 to be controlled when necessary.

At step 617, location data from the vehicle unit 240 is periodically received from the
25 vehicle unit at pre-defined times of a day. The location data can then be used to determine typical locations of the vehicle unit (ie the vehicle) on an ongoing basis at pre-defined times of a day. The location data can provide another set of information, like a movement pattern/location chart, that can be used to locate the vehicle in the event of loan delinquency.

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At step 620, there is a determination whether there has been non-repayment of a loan quantum beyond a pre-determined period, such as, for example, a grace period as per the terms and conditions of the agreement. For example, the grace period can be two weeks or more. The determination of whether there has been non-repayment can
5 be carried out at pre-defined junctures or on an on-demand basis. It should be appreciated that the determination can be carried out when an indication of non-repayment is provided either manually or via an external server, for example, a fintech server. If it is determined that there is no repayment delinquency, no action is taken at step 625 as no action is required if timely payment is made pursuant to the agreement.

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If it is determined that there has been repayment delinquency beyond the pre-determined period (eg. grace period), instructions are transmitted via the central server 260 to the associated vehicle unit 240 at step 630 in order to adversely affect operability of a vehicle 230 coupled to the associated vehicle unit 240. The purpose
15 of adversely affecting the operability of the vehicle 230 is to penalise the customer for not being able to make their loan repayments in a timely manner, and in some instances, preventing the customer from using the vehicle 230 to evade re-possession and/or contact for breaching the terms and conditions of the agreement.

20 At step 635, the central server 260 continuously receives location information of the vehicle unit 240 (and the coupled vehicle 230), such that a “live” location of the coupled vehicle is detectable. It should be appreciated that access to the “live” location of the coupled vehicle allows ease of re-possession in appropriate instances. Furthermore, the location data indicated at step 617 is also able to provide a movement
25 pattern/location chart that can be used for locating the vehicle.

Throughout this specification and claims which follow, unless the context requires otherwise, the word “comprise”, and variations such as “comprises” or “comprising”, will be understood to imply the inclusion of a stated integer or group of integers or
30 steps but not the exclusion of any other integer or group of integers.

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Persons skilled in the art will appreciate that numerous variations and modifications will become apparent. All such variations and modifications which become apparent to persons skilled in the art, should be considered to fall within the spirit and scope that the invention broadly appearing before described.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A system for managing vehicular loan delinquency, the system including one or more data processors configured to:
 - 5 transmit, from a vehicle unit, an ID of the vehicle unit;
 - associate, at a central server, the ID of the vehicle unit to a loan identifier;
 - transmit, from the vehicle unit, location data of the vehicle unit at periodically;
 - determine, at the central server, if there has been non-payment of a loan quantum beyond a pre-determined period, the determination being for an indication of
 - 10 the non-payment; and
 - transmit, from the central server, instructions to the vehicle unit, the instructions being configured to adversely affect operability of a vehicle coupled to the vehicle unit.
2. The system of claim 1, further including one or more data processors
 - 15 configured to: - receive, at the central server, loan agreement, the loan agreement being allocated the loan identifier; and
 - transmit, from the vehicle unit, real-time location information of the vehicle unit.
- 20 3. The system of either claim 1 or 2, wherein the location data of the vehicle unit obtained periodically allows a movement pattern/location chart of the vehicle unit to be generated.
4. The system of either claim 1 or 2, wherein the location data of the vehicle unit
 - 25 allows a "live" location of the vehicle unit to be obtained.
5. The system of any of claims 1 to 4, wherein the instructions to adversely affect operability of a vehicle coupled to the vehicle unit can be configured to degrade performance of the vehicle.

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6. The system of any of claims 1 to 4, wherein the instructions to adversely affect operability of a vehicle coupled to the vehicle unit can be configured to disable operability of the vehicle.

5 7. A data processor implemented method for managing vehicular loan delinquency, the method comprising:

transmitting, from a vehicle unit, an ID of the vehicle unit;

associating, at a central server, the ID of the vehicle unit to a loan identifier;

transmitting, from the vehicle unit, location data of the vehicle unit periodically;

10 determining, at the central server, if there has been non-payment of a loan quantum beyond a pre-determined period, the determination being for an indication of the non-payment; and

transmitting, from the central server, instructions to the vehicle unit, the instructions being configured to adversely affect operability of a vehicle coupled to the vehicle unit.

8. The method of claim 7, further including:

receiving, at the central server, loan agreement, the loan agreement being allocated the loan identifier; and

20 transmitting, from the vehicle unit, real-time location information of the vehicle unit.

9. The method of either claim 7 or 8, wherein the location data of the vehicle unit obtained periodically allows a movement pattern/location chart of the vehicle unit to be generated.

10. The method of either claim 7 or 8, wherein the location data of the vehicle unit allows a "live" location of the vehicle unit to be obtained.

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11. The method of any of claims 7 to 10, wherein the instructions to adversely affect operability of a vehicle coupled to the vehicle unit can be configured to degrade performance of the vehicle.

5 12. The method of any of claims 7 to 10, wherein the instructions to adversely affect operability of a vehicle coupled to the vehicle unit can be configured to disable operability of the vehicle.

13. A central server configured for managing vehicular loan delinquency, the
10 central server including one or more data processors configured to:
 receive, from a vehicle unit, an ID of the vehicle unit;
 associate, the ID of the vehicle unit to a loan identifier;
 receive, from the vehicle unit, location data of the vehicle unit periodically;
 determine, if there has been non-payment of a loan quantum beyond a pre-
15 determined period, the determination being for an indication of the non-payment; and
 transmit, instructions to the vehicle unit, the instructions being configured to
adversely affect operability of a vehicle coupled to the vehicle unit.

14. The server of claim 13, further including one or more data processors
20 configured to:
 receive, loan agreement, the loan agreement being allocated the loan identifier;
and
 receive, from the vehicle unit, real-time location information of the vehicle unit.

25 15. The server of either claim 13 or 14, wherein the location data of the vehicle unit obtained periodically allows a movement pattern/location chart of the vehicle unit to be generated.

16. The server of either claim 13 or 14, wherein the location data of the vehicle unit
30 allows a "live" location of the vehicle unit to be obtained.

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17. The server of any of claims 13 to 16, wherein the instructions to adversely affect operability of a vehicle coupled to the vehicle unit can be configured to degrade performance of the vehicle.

- 5 18. The server of any of claims 13 to 16, wherein the instructions to adversely affect operability of a vehicle coupled to the vehicle unit can be configured to disable operability of the vehicle.