

# SYSTEM AND METHOD FOR FACILITATING SECURITY MANAGEMENT OF PREMISES

## Field of Invention

5 The present invention relates to a system and method for facilitating security management of premises.

## Background Art

10 The following discussion of the background to the invention is intended to facilitate an understanding of the present invention only. It may be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or part of the common general knowledge of the person skilled in the art in any jurisdiction as at the priority date of the invention.

15 Traditionally, when an unauthorised vehicle, for example a visitor's vehicle, enters premises which does not allow unregistered and unauthorised vehicle to enter, a security officer at an entry barrier will be required to check a driver's identifier with his licence plate manually, verify if the identifier has been registered by an authorised person, for example a resident, and then allow or disallow access of the vehicle into the premises. At the same time the security officer will record details of the vehicle, for example the identifier and licence plate, into a ledger.

20 With the advent of electronic communication devices, methods of security management for a vehicle have evolved in various ways. For example, an imaging device at the entry barrier can capture photographic video or images of the licence plate of the vehicle, through optical character recognition (OCR) technology, and thereafter the recognised licence plate can be recorded into a database. However, the security officer is still required to check the driver's identifier manually and verify if the identifier has been  
25 registered by an authorised person, to allow the vehicle to enter the premises via the entry barrier. In this regard, at least one security officer is required to be stationed outside the guard post just to check and verify the driver's identifier and record the details of the vehicle.

The increase of private hire vehicles providing ride-sharing services have increased. However, it is difficult for the security officer in the guard post distant from the entry barrier to distinguish between such private hire vehicles and other private vehicles. In this regard, the security officer may have to try checking and verifying the driver's identifier for such private hire vehicles as well as the private vehicles. This is typically time consuming and may create a long queue at the entry barrier.

In light of the above, there exists a need to seek a system and method for facilitating security management of premises that ameliorates or overcomes at least one of the above disadvantages.

## **Summary of the Invention**

The present invention seeks to provide a system and method that addresses the aforementioned need at least in part.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Furthermore, throughout the specification, unless the context requires otherwise, the word "include" or variations such as "includes" or "including", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Throughout the description, the term "vehicle type" refers to private hire vehicle, private vehicle, and public vehicle.

The invention or disclosure seeks to provide a system and method to reduce a security officer's manual and laborious work in check and verification of a driver's identifier.

The technical solution is provided in the form of a system and method for facilitating security management of premises. In particular, the system comprises an input module and a processor. The input module is operable to obtain a first dataset (or data) from the vehicle. The processor is operable to check whether the first dataset relates to at least

one vehicle type. The processor is operable to determine whether to verify an identifier of a user, for example a driver, accompanied with the vehicle, based on the check of the first dataset.

5 In this manner, the processor is operable to distinguish between private vehicles and private hire vehicles, by the obtained first dataset, and allow the security officer or the processor itself to check the driver's identifier for the private vehicles except the private hire vehicles.

10 In one aspect, there is a system for facilitating security management of premises comprising: an input module operable to obtain a first dataset from an unauthorised vehicle; and a processor operable to check whether the first dataset relates to at least one vehicle type, wherein the processor is operable to determine whether to verify an identifier of a user accompanied with the vehicle, based on the check of the first dataset.

In some embodiments, the processor is operable to determine whether the vehicle is a private vehicle or a private hire vehicle, based on the check of the first dataset.

15 In some embodiments, the first dataset relates to an identifier of the vehicle.

In some embodiments, the processor is operable to check whether the identifier of the vehicle is registered as the at least one vehicle type, to check whether the first dataset relates to the at least one vehicle type.

20 In some embodiments, the first dataset relates to a feature accompanied with the vehicle; and the processor is operable to check whether the first dataset contains at least one predetermined feature in relation to the vehicle type.

In some embodiments, the input module is operable to obtain a second dataset relating to an identifier of the vehicle.

25 In some embodiments, the input module comprises a first input module operable to obtain the first dataset and a second input module operable to obtain the second dataset.

In some embodiments, the second input module obtains the second dataset after the first input module obtains the first dataset.

In some embodiments, the at least one predetermined feature includes at least one of the following: an object, a sticker and a sign showing that the vehicle is the private hire vehicle.

5 In some embodiments, the processor is operable to decide whether to record the identifier of the vehicle with the identifier of the user into a database, based on the verification of the identifier of the user.

In some embodiments, if the processor determines that the vehicle is the private vehicle, the processor is operable to request the user to provide the identifier of the user.

In some embodiments, the processor is operable to verify the identifier of the user by checking whether the identifier of the user has been registered in the database.

10 In some embodiments, if the identifier of the user has been registered in the database, the processor is operable to record a date and/or time of an entry of the vehicle with the identifier of the user and the identifier of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises.

15 In some embodiments, if the identifier of the user has not been registered in the database, the processor is operable to contact an authorised person to verify an identity of the user.

In some embodiments, if the identity of the user is verified by the authorised person, the processor is operable to produce a new identifier of the user.

20 In some embodiments, if the identity of the user is verified by the authorised person, the processor is operable to record a date and/or time of an entry of the vehicle with the identity of the user and the identifier of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises.

25 In some embodiments, if the processor determines that the vehicle is the private hire vehicle, the processor is operable to record a date and/or time of an entry of the vehicle with the identifier of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises.

In some embodiments, the input module further comprises a third input module arranged before an exit barrier and operable to obtain a third dataset relating to the identifier of the vehicle.

In some embodiments, once the third input module obtains the third dataset from the vehicle, the processor is operable to record a date and/or time of an exit of the vehicle with the identifier of the vehicle into the database, and control the exit barrier to allow the vehicle to exit the premises.

- 5 In some embodiments, the identifier of the user has been provided to the user once an identity of the user has been registered, and wherein the identifier is in the form of at least one of the following: a QR code, barcode, data matrix, maxicode and biometric identifier data.

10 In another aspect, there is a method for facilitating security management of premises comprising: obtaining a first dataset from an unauthorised vehicle; checking whether the first dataset relates to at least one vehicle type; and determining whether to verify an identifier of a user accompanied with the vehicle, based on the check of the first dataset.

In some embodiments, the method further comprises a step of determining whether the vehicle is a private vehicle or a private hire vehicle, based on the check of the first dataset.

- 15 In some embodiments, the first dataset relates to an identifier of the vehicle.

In some embodiments, the step of checking whether the first dataset relates to at least one vehicle type includes a step of checking whether the identifier of the vehicle is registered as the at least one vehicle type.

- 20 In some embodiments, the first dataset relates to a feature accompanied with the vehicle; and the method further comprises a step of checking whether the first dataset contains at least one predetermined feature in relation to the vehicle type.

In some embodiments, the method further comprises a step of obtaining a second dataset relating to an identifier of the vehicle.

- 25 In some embodiments, the input module comprises a first input module operable to obtain the first dataset and a second input module operable to obtain the second dataset.

In some embodiments, the second input module obtains the second dataset after the first input module obtains the first dataset.

In some embodiments, the predetermined feature includes at least one of the following: an object, a sticker and a sign showing that the vehicle is the private hire vehicle.

5 In some embodiments, the method further comprises a step of deciding whether to record the identifier of the vehicle with the identifier of the user into a database, based on the verification of the identifier of the user.

In some embodiments, the method further comprises a step of requesting the user to provide the identifier of the user, if the processor determines that the vehicle is the private vehicle.

10 In some embodiments, the method further comprises a step of verifying the identifier of the user by checking whether the identifier of the user has been registered in the database.

In some embodiments, the method further comprises steps of recording a date and/or time of an entry of the vehicle with the identifier of the user and the identifier of the vehicle into the database and controlling an entry barrier to allow the vehicle to enter the premises, if the identifier of the user has been registered in the database.

15 In some embodiments, the method further comprises a step of contacting an authorised person to verify an identity of the user, if the identifier of the user has not been registered in the database.

20 In some embodiments, the method further comprises steps of recording a date and/or time of an entry of the vehicle with the identity of the user and the identifier of the vehicle into the database and controlling an entry barrier to allow the vehicle to enter the premises, if the identity of the user is verified by the authorised person.

25 In some embodiments, the method further comprises steps of recording a date and/or time of an entry of the vehicle with the identifier of the vehicle into the database and controlling an entry barrier to allow the vehicle to enter the premises, if the processor determines that the vehicle is the private hire vehicle.

In some embodiments, the input module further comprises a third input module arranged before an exit barrier and operable to obtain a third dataset relating to the identifier of the vehicle.

In some embodiments, the method further comprises steps of recording a date and/or time of an exit of the vehicle with the identifier of the vehicle into the database and controlling the exit barrier to allow the vehicle to exit the premises, once the third input module obtains the third dataset from the vehicle.

- 5 In some embodiments, the identifier of the user has been provided to the user once an identity of the user has been registered, and is in the form of at least one of the following: a QR code, barcode, data matrix, maxicode and biometric identifier data.

Other aspects of the invention will become apparent to those of ordinary skilled in the art upon review of the following description of specific embodiments of the invention in  
10 conjunction with the accompanying drawings.

### **Brief Description of the Drawings**

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 shows a block diagram in accordance with some embodiments of the present  
15 invention.

Fig. 2 shows a block diagram in accordance with some embodiments of the present invention.

Fig. 3 shows a flow diagram in accordance with some embodiments of the present invention.

20 Fig. 4 shows a flow diagram in accordance with some embodiments of the present invention.

Fig. 5 shows a flow diagram in accordance with some embodiments of the present invention.

Other arrangements of the invention are possible and, consequently, the accompanying  
25 drawings are not to be understood as superseding the generality of the preceding description of the invention.

## Description of Embodiments of the Invention

Fig. 1 shows a block diagram in accordance with some embodiments of the present invention.

5 In accordance with some embodiments of the invention, there is a system 100 comprising a processor 120, a database 130 and a communication module 150. It may be appreciated that in some embodiments, the communication module 150 and the processor 120 may be integrated.

10 The system 100 may relate to a security management platform (not shown) providing a user interface, such as a web page and/or an internet/web application for use on communication devices 200, 300. In some embodiments, the system 100 may relate to a security management platform for a predetermined premises.

15 The communication module 150 may comprise one or more modules or units which allow wired communications and/or wireless communications with communication devices 200, 300. For example, the communication module 150 transmits signals to at least one communication device 200, 300 and receives signals from at least one communication device 200, 300. The signals may include, but not be limited to, audio signal, video signal, text signal, multimedia signals, one or more combinations thereof. The signals may also include various formats of data.

20 The communication module 150 supports wireless internet access to the communication device 200, 300. Examples of such wireless internet access may include, but not be limited to, wireless LAN (WLAN) (for example, Wi-Fi), wireless broadband (Wi-bro), worldwide interoperability for microwave access (Wi-max) and high speed downlink packet access (HSDPA).

25 In this manner, the communication module 150 of the system 100 is operable to communicate with at least one authorised person, for example a resident of the premises. It may be appreciated that the communication module 150 of the system 100 may be operable to communicate with at least one unauthorised person, for example a visitor. The communication module 150 can communicate with the unauthorised person via the security management platform providing a web page and/or an application. In some other

embodiments, the communication module 150 can communicate with the unauthorised person via a message service, for example short message service (SMS), multimedia messaging service (MMS) and/or instant messaging service (IM).

The communication devices 200, 300 may include, but not be limited to, mobile computer devices, smart devices, desktop computer, laptop, tablet computer and wearable devices, in particular intelligent wearable devices such as smart watch, smart glasses or mobile virtual reality headset. The authorised person may use his communication device 200 to communicate with the communication module 150, and the unauthorised person may use his communication device 300 to communicate with the communication module 150.

It may be appreciated that the authorised person may include, but not be limited to, resident, host and member of the premises. The authorized person may control access of unregistered and unauthorised vehicle into the premises. The premises may include, but not be limited to, at least one of a condominium, apartment, townhouse, building, clubhouse and country club. The unauthorised person may include, but not be limited to, a visitor, a guest or a non-member, who wishes to enter the premises.

The processor 120 may include a computer processor unit (CPU), or an integrated circuit (IC) chip developed for the specific purpose. The control logic of the processor 120 for interacting with other modules may be implemented as hardwired codes and/or may include software logic. In some embodiments, at least one program implementing the logic for the processing and control of the processor 120 may be stored in the processor 120. In some other embodiments, the database 130 or any other database may store at least one program for the processing and control of the processor 120. The database 130 may temporarily store input and/or output data/dataset. The database 130 may include at least one internal memory of the system 100 and/or at least one external memory, for example, web storage.

In some embodiments, the unauthorised person who wishes to visit the premises may input an identifier of the unauthorised person. Such identifier includes name and contact number. The database 130 is then operable to store such information. It may be appreciated that such information may be used when the same unauthorised person visits another premises which is connected with and/or managed by the system 100.

In some embodiments, the authorised person may be able to invite the unauthorised person by inputting the unauthorised person's information such as name and contact number. The database 130 is then operable to store such information.

5 The system 100, operated by the security management platform, may provide a user interface, such as an internet/web application and/or web site to the authorised person. The authorised person may register himself to the application and/or web site. It may be appreciated that additionally the system 100 may provide the application and/or web site to the unauthorised person. For example, the authorised person may register the unauthorised person to the application and/or web site, or invite the unauthorised person  
10 to register to the application and/or web site.

Fig. 2 shows a block diagram in accordance with some embodiments of the present invention.

In accordance with some embodiments of the invention, there is a system 100 comprising an input module 110, a processor 120 and a database 130. The system 100 may further  
15 comprise a communication module 150. It may be appreciated that in some other embodiments, the communication module 150 and the processor 120 may be integrated.

The system 100 may further comprise a barrier 140. The barrier is operable to open or close to allow or deny a vehicle to enter or exit the premises. The barrier may include, but not be limited to, at least one entry barrier 141 and at least one exit barrier 142. It may be  
20 appreciated that in some embodiments, the entry barrier 141 and the exit barrier 142 may be integrated.

In some other embodiments, there may be a plurality of entry barriers 141 for different types of vehicles. For example, there may be a first entry barrier for the entry of the residents' vehicles, and a second entry barrier for the entry of the visitors' vehicles. As  
25 another example, there may be a first entry barrier for the entry of the residents' vehicles, a second entry barrier for the entry of the private vehicles, and a third entry barrier for the entry of the private hire vehicles. As another example, there may be a first entry barrier for the entry of the residents' vehicles and the private vehicles, and a second entry barrier

for the entry of the private hire vehicles. It may be appreciated that a plurality of input modules 110 may be arranged for each entry barrier.

In some embodiments, the input module 110 may include an imaging module that is used to capture photographic video or images of the vehicle. The imaging module may include, but not be limited to, an imaging sensor, camera and scanner such as QR code scanner or barcode scanner. The captured photographic video or images may be processed using one or more image processing technologies such as optical character recognition (OCR) technology by the processor 120.

In some other embodiments, the input module 110 may include a sensing module. The sensing module may include a sensor and obtain a dataset. For example, a tag, a card and/or a BLE (Bluetooth™ low energy) beacon relating to an identifier of the vehicle or driver may be attached to the vehicle and be used to identify whether the identifier of the vehicle relates to at least one vehicle type, for example a private hire vehicle. In this manner, the processor 120 may determine whether the vehicle is a private hire vehicle or a private vehicle. The sensing module may detect the tag, the card and/or the BLE beacon via a wireless communication such as RFID (Radio-Frequency Identification), NFC (Near-field Communication) or Bluetooth™, and obtain such dataset, and then the processor 120 can determine whether the vehicle is the private hire vehicle or the private vehicle. In some other embodiments, the sensing module may detect the licence plate of the vehicle via the wireless communication, and then the processor 120 can determine whether the vehicle is the private hire vehicle or the private vehicle.

The input module 110 may comprise a first input module, a second input module, a third input module, and any one or more combinations thereof. It may be appreciated that the first input module, the second input module and the third input module may include a first imaging module 111, a second imaging module 112 and a third imaging module 113 respectively.

The first imaging module 111 and the second imaging module 112 may be arranged near the entry barrier 141, for example before the entry barrier 141, to capture photographic video or images of the vehicle to allow or deny the vehicle to enter the premises. It may

be appreciated that in some embodiments, the first imaging module 111 and the second imaging module 112 may be integrated.

The third imaging module 113 may be arranged near the exit barrier 142 to capture photographic video or images of the vehicle to deny or allow the vehicle to exit the premises. In some other embodiments, the third imaging module 113 may capture photographic video or images of the vehicle to record the vehicle's exit information such as date and/or time, and to deny or allow the vehicle to exit the premises.

The first imaging module 111 is operable to obtain dataset from a vehicle which is going to enter the premises. The dataset obtained by the first imaging module 111 may be used to determine whether the vehicle is a private vehicle or a private hire vehicle.

In some embodiments, the dataset obtained by the first imaging module 111 may relate to an identifier of the vehicle. The identifier of the vehicle may include, but not be limited to, a licence plate, a car plate, a registration plate and a number plate of the vehicle. The first imaging module 111 is positioned in which it can capture photographic video or images of the identifier of the vehicle, for example the licence plate of the vehicle, and in this manner the first imaging module 111 may obtain an image of the licence plate as a raw dataset (referred to as a "first dataset").

The processor 120 may process the first dataset and identify a licence plate number of the vehicle using one or more image processing technologies. Thereafter, the processor 120 may check whether the identifier of the vehicle is registered as the at least one vehicle type, for example a private hire vehicle. For example, the processor 120 may compare the licence plate number of the vehicle and licence plate numbers registered as private hire vehicles in the server, for example a server authorised by the government.

As an example, if the licence plate number of the vehicle has been registered as the private hire vehicle, the processor 120 may determine that the vehicle is the private hire vehicle. As another example, if the licence plate number of the vehicle has not been registered as the private hire vehicle, the processor 120 may determine that the vehicle is the private vehicle.

It may be appreciated that the first dataset relating to the identifier of the vehicle may be used to record the licence plate number of the vehicle into the database 130. In this regard, the second imaging module 112 to be described may be integrated with the first imaging module 111 and/or may be omitted, in some embodiments.

- 5 In some other embodiments, the dataset obtained by the first imaging module 111 may relate to a feature accompanied with the vehicle. The first imaging module 111 is positioned in which it can capture photographic video or images of the feature accompanied with the vehicle. The feature may relate to at least one vehicle type, for example a private vehicle or a private hire vehicle, and be used to determine whether the  
10 unauthorised vehicle is a private vehicle or a private hire vehicle. In this manner, the processor 120 may check whether the first dataset contains at least one predetermined feature in relation to the vehicle type.

As an example, the first imaging module 111 may be positioned in which it can capture an image of a window of the vehicle. The first imaging module 111 may obtain an image  
15 of a sticker showing that the vehicle is a private hire vehicle which is attached on the window as a raw dataset (referred to as a “first dataset”).

As another example, the first imaging module 111 may be positioned in which it can capture an image of a roof of the vehicle, and in this manner the first imaging module 111 may obtain an image of a taxi sign mounted on the roof as a raw dataset (referred to as  
20 a “first dataset”).

In some embodiments, the second imaging module 112 is operable to obtain another dataset relating to an identifier of a vehicle. For example, the second imaging module 112 is positioned in which it can capture photographic video or images of the identifier of an unauthorised vehicle. The identifier of the vehicle may include, but not be limited to, a  
25 licence plate, a car plate, a registration plate and a number plate of the vehicle.

As an example, the second imaging module 112 may be positioned in which it can capture the licence plate of the vehicle, and in this manner the second imaging module 112 may obtain an image of the licence plate as a raw dataset (referred to as a “second dataset”).

In some embodiments, the third imaging module 113 is operable to obtain another dataset relating to an identifier of a vehicle. For example, the third imaging module 113 is positioned in which it can capture photographic video or images of the identifier of an unauthorised vehicle. The identifier of the vehicle may include, but not be limited to, a licence plate, a car plate, a registration plate and a number plate of the vehicle.

As an example, the third imaging module 113 may be positioned in which it can capture the licence plate of the vehicle, and in this manner the third imaging module 113 may obtain an image of the licence plate as a raw dataset (referred to as a “third dataset”).

It may be appreciated that in some embodiments, the second imaging module 112 may obtain the second dataset near the entry barrier 141, for example before the entry barrier 141, and the third imaging module 113 may obtain the third dataset near the exit barrier 142, for example before the exit barrier 142.

In some other embodiments, the entry barrier 141 and the exit barrier 142 may be integrated as a barrier 140, for example a single barrier, and the second imaging module 112 may be positioned near the single barrier to capture an image of the licence plate of the vehicle which is going to enter the premises, and the third imaging module 113 may be positioned near the single barrier to capture the licence plate of the vehicle which is going to exit the premises. In some other embodiments, the entry barrier 141 and the exit barrier 142 may be integrated as a barrier 140, for example a single barrier, and the second imaging module 112 and the third imaging module 113 may be integrated as an input module 110, for example a single input module, which can capture the licence plate of the vehicle which is going to enter and exit the premises.

It may be appreciated that in some embodiments, the second imaging module 112 may obtain the second dataset after the first imaging module 111 may obtain the first dataset.

In some other embodiments, the first imaging module 111 and the second imaging module 112 may obtain the first dataset and the second dataset respectively at the same time.

In some other embodiments, the first imaging module 111 and the second imaging module 112 may be integrated as an input module 110, for example a single input module,

and the input module 110 can obtain an image, for example a single image, containing the identifier of the vehicle, for example the licence plate of the vehicle, as described above. In some other embodiments, the first imaging module 111 and the second imaging module 112 may be integrated as an input module 110, for example a single input module, and the input module 110 can obtain a first image containing the feature as the first dataset and a second image containing the licence plate as the second dataset. In some other embodiments, the first imaging module 111 and the second imaging module 112 may be integrated as an input module 110, for example a single input module, and the input module 110 can obtain an image, for example a single image, containing the feature as the first dataset and the licence plate as the second dataset.

The input module 110, for example the first imaging module 111, the second imaging module 112 and/or the third imaging module 113, may transmit the raw dataset to the processor 120 via the communication module 150. In some embodiments, the processor 120 may receive the raw dataset from the input module 110, and process the raw dataset. For example, the processor 120 may process the raw dataset to obtain the respective image, and interpret the image using one or more image processing technologies such as the OCR technology for check and/or verification of the unauthorised vehicle.

Fig. 3 shows a flow diagram in accordance with some embodiments of the present invention.

The input module 110 is operable to obtain the first dataset from the vehicle (S210).

As described above, the input module 110 may comprise the first imaging module 111 positioned near the entry barrier 141, for example before the entry barrier 141, to capture photographic video or images of the vehicle.

As an example, the first imaging module 111 may obtain an identifier of the vehicle, for example a licence plate of the vehicle, as the first dataset, to check whether the licence plate number is registered as at least one vehicle type. As another example, the first imaging module 111 may obtain an image of a sticker showing that the vehicle is a private hire vehicle which is attached on the window as the first dataset. As another example, the

first imaging module 111 may obtain an image of a taxi sign mounted on the roof as the first dataset.

Next, the processor 120 is operable to check whether the first dataset relates to at least one vehicle type (S220).

- 5     The first imaging module 111 may transmit the first dataset to the processor 120 via the communication module 150. The processor 120 may then analyse the received first dataset. For example, the processor 120 may process the first dataset to obtain the captured image, and interpret the image using one or more image processing technologies such as the OCR technology.
- 10    In some embodiments, the processor 120 may check whether the licence plate number is registered as the at least one vehicle type, for example a private hire vehicle. In some other embodiments, the processor 120 may check whether the image contains at least one predetermined feature in relation to the at least one vehicle type. The predetermined feature may include, but not be limited to, at least one of the following: an object, a sticker
- 15    and a sign showing that the vehicle is the private hire vehicle. In this manner, the processor 120 may then determine whether the vehicle which is going to enter the premises is a private vehicle or a private hire vehicle.

- For example, if the licence plate number of the vehicle is registered as the private hire vehicle, the processor 120 may determine that the vehicle is a private hire vehicle. As
- 20    another example, if the image contains a sticker showing that the vehicle is a private hire vehicle, the processor 120 may determine that the vehicle is a private hire vehicle. As another example, if the image contains a taxi sign, the processor 120 may determine that the vehicle is a private hire vehicle. The processor 120 may further determine that the vehicle is a taxi. As another example, if the image does not contain such sticker, the taxi
- 25    sign and any other predetermined feature, the processor 120 may determine that the vehicle is a private vehicle.

Although not shown in Fig. 2, as described above, in some embodiments, the input module 110 may further comprise the second imaging module 112 positioned near the entry barrier 141, for example before the entry barrier 141, to capture photographic video

or images of the identifier of the unauthorised vehicle, for example, a licence plate, a car plate, a registration plate and a number plate of the vehicle. In this manner, the second imaging module 112 may obtain an image of the licence plate as the second dataset.

5 The second imaging module 112 may transmit the second dataset to the processor 120 via the communication module 150. The processor 120 may then analyse the received second dataset. For example, the processor 120 may process the second dataset to obtain the captured image, interpret the image using the OCR technology, and recognise the alphabetic, numeric or alphanumeric characters indicated in the licence plate.

10 Thereafter, the processor 120 is operable to determine whether to verify an identifier of a user, for example a driver, accompanied with the vehicle, based on the check of the first dataset (S230).

More specifically, if the processor 120 determines that the vehicle is the private vehicle, the processor 120 may request the driver to provide the driver's identifier. If however the processor 120 determines that the vehicle is the private hire vehicle, the processor 120  
15 may not request to provide the driver's identifier.

In the event that it is determined that the vehicle is the private vehicle:

The driver's identifier may be in the form of at least one of the following: a QR code, barcode, data matrix and maxicode. In some other embodiments, the identifier may be in the form of pin numbers, alphanumeric code or security pattern. It may be appreciated  
20 that the identifier has been provided to the driver, for example by a messaging service, once an identity of the driver has been registered by the authorised person, for example a resident. In this manner, the driver's communication device 300 may store the identifier, and the driver is able to show the driver's identifier once the processor 120 requests the driver to provide the driver's identifier.

25 In some embodiments, the driver's identifier may comprise one or more biometric identifier data such as, but not limited to, fingerprint, handprint, facial recognition, voice recognition, retinal scan and iris scan. The biometric identifier data may be used to verify the driver.

In some embodiments, there is a fourth imaging module 114 (not shown) positioned near the entry barrier 141, and the driver may scan the driver's identifier using the fourth imaging module 114. In some other embodiments, the driver may show the driver's identifier to a security officer. In some other embodiments, the driver may send the driver's identifier to the processor 120 via a wired/wireless communication.

Once the driver provides the driver's identifier, the processor 120 is operable to verify the driver's identifier by checking whether the driver's identifier has been registered in the database 130. It may be appreciated that the database 130 may be a centralised database and/or a decentralised database. In some embodiments, the database 130 includes, but is not limited to, an internal database incorporated into the processor 120 and/or an external database. In some other embodiments, the decentralised database includes a distributed ledger. The distributed ledger comprises a plurality of blocks, and each block of the plurality of blocks stores the driver's identifier.

If the driver's identifier has been registered in the database 130, the processor 120 is operable to record a date and/or time of the entry of the vehicle with the driver's identifier and the identifier of the vehicle, for example the licence plate number, into the database 130, and control an entry barrier 141 to allow the vehicle to enter the premises.

If however the driver's identifier has not been registered in the database 130, the processor 120 is operable to contact an authorised person, for example a resident, to verify an identity of the driver. The driver may inform the processor 120 of the information of the resident, for example the resident's name and/or unit number. The processor 120 may call and/or send a message to the resident to verify the identity of the driver. In another example, the processor 120 may allow the security officer to call and/or send a message to the resident to verify the identity of the driver.

If the identity of the driver is verified by the resident who has invited the driver, the processor 120 is operable to record a date and/or time of the entry of the vehicle with the identity of the driver and the licence plate number of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises. In some embodiments, the resident can control the processor 120 to produce a new identifier for the driver.

In the event that it is determined that the vehicle is the private hire vehicle:

If the processor 120 determines that the vehicle is the private hire vehicle, the processor 120 is operable to record a date and/or time of the entry of the vehicle with the licence plate number of the vehicle into the database 130, and control the entry barrier 141 to allow the vehicle to enter the premises.

Although not shown in Fig. 3, as described above, the input module 110 may further comprise the third imaging module 113 positioned near the exit barrier 142, for example before the exit barrier 142, to capture photographic video or images of the identifier of the unauthorised vehicle, for example, a licence plate, a car plate, a registration plate and a number plate of the vehicle. In this manner, the third imaging module 113 may obtain an image of the licence plate as the third dataset, before the exit barrier 142.

The third imaging module 113 may transmit the third dataset to the processor 120 via the communication module 150. The processor 120 may then analyse the received third dataset. For example, the processor 120 may process the third dataset to obtain the captured image, interpret the image using the OCR technology, and recognise the licence plate number which may be in the form of alphabetic, numeric or alphanumeric characters indicated in the licence plate.

Once the processor 120 recognises the licence plate number of the vehicle, the processor 120 is operable to record a date and/or time of an exit of the vehicle with the licence plate number of the vehicle into the database 130, and control the exit barrier 142 to allow the vehicle to exit the premises.

In this manner, the processor 120 is operable to distinguish between private vehicle and private hire vehicle, by the obtained first dataset, and allow the security officer or the processor 120 itself to check the driver's identifier for the private vehicle and not to check the driver's identifier for the private hire vehicle. In this regard, the disclosure or invention may reduce a security officer's manual and laborious work in check and verification of the driver's identifier.

In addition, the processor 120 is operable to decide whether to record the licence plate number of the vehicle with the driver's identifier into the database 130, based on the

verification of the driver's identifier. In this regard, the disclosure or invention may save a capacity of the database 130.

Although not shown, it may be appreciated that the user may further include a passenger. It may be appreciated that the identifier of the user may further include an identity document such as an identification card of the user.

Fig. 4 shows a flow diagram in accordance with some embodiments of the present invention.

Once the vehicle arrives at the entry barrier 141 of the premises (S301), the first imaging module 111 may capture the image to obtain the first dataset (S302). The processor 120 may determine whether the vehicle is the private hire vehicle or the private vehicle (S303) and then the second imaging module 112 may capture the licence plate to obtain the second dataset (S304, S311).

Although not shown, in some other embodiments, after the second imaging module 112 captures the licence plate to obtain the second dataset (S304, S311), the processor 120 may determine whether the vehicle is the private hire vehicle or the private vehicle (S303). Although not shown, in some other embodiments, a single imaging module may capture the licence plate to obtain the first dataset in relation to the licence plate number of the vehicle. The processor 120 may determine whether the vehicle is the private hire vehicle or the private vehicle based on the licence plate number of the vehicle.

In the event that it is determined that the vehicle is the private hire vehicle:

If the vehicle is determined to be the private hire vehicle, the second imaging module 112 may capture the licence plate to obtain the second dataset (S304). Thereafter, the details of vehicle, for example the licence plate number and date and/or time of the entry of the vehicle may be recorded (S305). The entry barrier 141 may then open and the vehicle can enter the premises (S306).

Since the vehicle is the private hire vehicle, the vehicle may be required to exit the premises within few minutes. Before the exit barrier 142, the third imaging module 113 may capture the licence plate to obtain the second dataset (S307). Thereafter, the details

of vehicle, for example the licence plate number and date and/or time of the exit of the vehicle may be recorded (S308). The exit barrier 142 may then open (S309) and the vehicle can exit the premises (S310).

In the event that it is determined that the vehicle is the private vehicle and the driver's identifier is verified:

If the vehicle is determined to be the private vehicle, the second imaging module 112 may capture the licence plate to obtain the second dataset (S311). The processor 120 may request the driver to present the driver's identifier (S312). Once the driver presents the driver's identifier, the processor 120 may verify the driver's identifier (S313).

Once the driver's identifier is verified, the details of vehicle, for example the licence plate number, the driver's particular, and date and/or time of the entry of the vehicle may be recorded (S314). The driver's particular may include, but not be limited to, the driver's name, address, contact number, at least a part of the driver's identification number (for example, last few digits of NRIC number or passport number), and information of resident who has invited the driver. The entry barrier 141 may then open and the vehicle can enter the premises (S306).

Although not shown, the vehicle may then park at a parking lot of the premises. In some embodiments, the processor 120 may send a parking lot information, for example an available or recommendable parking space, to the driver. It may be appreciated that the processor 120 may recommend the parking space to the driver based on the resident's location.

Before the exit barrier 142, the third imaging module 113 may capture the licence plate to obtain the third dataset (S307). Thereafter, the details of vehicle, for example the licence plate number may be recorded (S308). It may be appreciated that in some other embodiments, at least one of the licence plate number, the driver's particular, and date and/or time of the exit of the vehicle may be recorded as the details of vehicle. The exit barrier 142 may then open (S309) and the vehicle can exit the premises (S310).

In the event that it is determined that the vehicle is the private vehicle and the driver's identifier is not verified:

If however the driver's identifier is not verified, the security officer may verify the identity of the driver with the resident (S315). It may be appreciated that in some other embodiments, the processor 120 may be involved in verification of the identity of the driver. For example, the processor 120 may obtain an image of the driver's identity from the fourth imaging module 114, send the image of the driver's identity to the resident, and receive a verification from the resident.

Once the driver is verified by the resident (S316), the security officer may obtain the driver's particulars from the driver, and input the driver's particulars into the database 130 (S317). Although not shown, the processor 120 may input the driver's particulars into the database 130.

The processor 120 may then generate the driver's identifier and send the same to the driver. The driver may then receive the driver's identifier from the processor 120. Thereafter, the second imaging module 112 may capture the licence plate once again (S311) and the driver may present the driver's identifier (S312). The processor 120 may verify the driver's identifier (S313).

Once the driver's identifier is verified, the details of vehicle, for example a licence plate number, the driver's particular, and date and/or time of the entry of the vehicle may be recorded (S314). The driver's particular may include, but not be limited to, the driver's name, address, contact number and information of resident who has invited the driver. The entry barrier 141 may then open and the vehicle can enter the premises (S306).

If however the driver is not verified by the resident (S316), the vehicle may have to exit the premises (S310).

Fig. 5 shows a flow diagram in accordance with some embodiments of the present invention. In particular, Fig. 5 illustrates the flow diagram showing a process for inviting the visitor.

The resident may send an invitation to a visitor via an application provided by the security management platform (S401). The visitor may receive the invitation (S402). In some embodiments, the visitor receives the invitation via a message such as SMS, MMS and/or

IM. In some other embodiments, the visitor receives the invitation via a notification of the application provided by the security management platform.

A main system 100 (also referred to as “main server”) is a system 100 for premises (referred to as “first premises”). The system 100 may check if a contact number, for example a mobile number, of the visitor is stored in the database 130 (S403).

If the contact number of the visitor is stored in the database 130 (S404), the visitor’s identity, for example name and/or contact number of the visitor, may be extracted from the database 130 or onsite server. The main system 100 may be able to extract the visitor’s identity using the visitor’s contact number. The main system 100 may then send a message to the visitor to confirm the visitor’s identity (S405).

If the identity is confirmed by the visitor (S406), the main system 100 may update the particulars of visit into the database 103 (S407).

If however the identity is not confirmed by the visitor (S406), the visitor may be required to key in the visitor’s particulars (S408). For example, if the visitor’s mobile number has been changed, the visitor may be required to key in the visitor’s updated particulars. The main system 100 may then update the particulars into the database 103 (S407).

If however the contact number is not stored in the database 130 (S404), the visitor may be required to key in the visitor’s particulars (S408). The main system 100 may then update the particulars into the database 103 (S407).

Thereafter, the records of visit may be sent to an onsite server (S409). The particulars of the visitor may be recorded in the onsite server (S410). In this manner, in future if the same visitor is going to visit another premises (referred to as “second premises”) which is connected with the onsite server, a main system of the second premises may use the particulars and/or identity which have been recorded for the visit of the first premises.

It may be appreciated by the person skilled in the art that variations and combinations of features described above, not being alternatives or substitutes, may be combined to form yet further embodiments falling within the intended scope of the invention.

## CLAIMS

1. A system for facilitating security management of premises comprising:  
an input module operable to obtain a first dataset from an unauthorised vehicle;  
and  
5 a processor operable to check whether the first dataset relates to at least one vehicle type;  
wherein the processor is operable to determine whether to verify an identifier of a user accompanied with the vehicle, based on the check of the first dataset.
- 10 2. The system according to claim 1, wherein the processor is operable to determine whether the vehicle type is a private vehicle or a private hire vehicle, based on the check of the first dataset.
- 15 3. The system according to claim 2, wherein the first dataset relates to an identifier of the vehicle.
4. The system according to claim 3, wherein the processor is operable to check whether the identifier of the vehicle is registered as the at least one vehicle type, to check whether the first dataset relates to the at least one vehicle type.
- 20 5. The system according to claim 2, wherein the first dataset relates to a feature accompanied with the vehicle; and the processor is operable to check whether the first dataset contains at least one predetermined feature in relation to the vehicle type.
- 25 6. The system according to claim 5, wherein the input module is operable to obtain a second dataset relating to an identifier of the vehicle.

7. The system according to claim 6, wherein the input module comprises a first input module operable to obtain the first dataset and a second input module operable to obtain the second dataset.

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8. The system according to claim 7, wherein the second input module obtains the second dataset after the first input module obtains the first dataset.

9. The system according to claim 7, wherein the at least one predetermined feature includes at least one of the following: an object, a sticker and a sign showing that the vehicle is the private hire vehicle.

10. The system according to claim 3 or 6, wherein the processor is operable to decide whether to record the identifier of the vehicle with the identifier of the user into a database, based on the verification of the identifier of the user.

11. The system according to claim 10, wherein if the processor determines that the vehicle is the private vehicle, the processor is operable to request the user to provide the identifier of the user.

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12. The system according to claim 11, wherein the processor is operable to verify the identifier of the user by checking whether the identifier of the user has been registered in the database.

13. The system according to claim 12, wherein if the identifier of the user has been registered in the database, the processor is operable to record a date and/or time of an

entry of the vehicle with the identifier of the user and the identifier of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises.

5 14. The system according to claim 12, wherein if the identifier of the user has not been registered in the database, the processor is operable to contact an authorised person to verify an identity of the user.

10 15. The system according to claim 14, wherein if the identity of the user is verified by the authorised person, the processor is operable to produce a new identifier of the user.

16. The system according to claim 14, wherein if the identity of the user is verified by the authorised person, the processor is operable to record a date and/or time of the entry of the vehicle with the identity of the user and the identifier of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises.

15 17. The system according to claim 10, wherein if the processor determines that the vehicle is the private hire vehicle, the processor is operable to record a date and/or time of an entry of the vehicle with the identifier of the vehicle into the database, and control an entry barrier to allow the vehicle to enter the premises.

20 18. The system according to claim 10, wherein the input module further comprises a third input module arranged before an exit barrier and operable to obtain a third dataset relating to the identifier of the vehicle.

25 19. The system according to claim 18, wherein once the third input module obtains the third dataset from the vehicle, the processor is operable to record a date and/or time of

an exit of the vehicle with the identifier of the vehicle into the database, and control the exit barrier to allow the vehicle to exit the premises.

5 20. The system according to claim 1, wherein the identifier of the user has been provided to the user once an identity of the user has been registered, and wherein the identifier is in the form of at least one of the following: a QR code, barcode, data matrix, maxicode and biometric identifier data.

10 21. A method for facilitating security management of premises comprising:  
obtaining a first dataset from an unauthorised vehicle;  
checking whether the first dataset relates to at least one vehicle type; and  
determining whether to verify an identifier of a user accompanied with the vehicle,  
based on the check of the first dataset.