using ANPR. In such arrangements, there is still the drawback of the requirement to undergo a registration process with the car park operator.

As each system operates independently, the user must register which each separately. Therefore, the overall burden on the user may still be significant. This problem is compounded by the fact that even within the same category of charging system, the user may have to register with multiple operators. For example, two sets of toll-gates may be controlled by two different operators, requiring the user to undergo two separate registration procedures.

Against this background, there is a desire to provide a means of payment of charges incurred during operation of a vehicle which offers improved convenience for the user compared with known systems.

Summary of the Invention

Herein disclosed is a portable device configured to enable completion of transactions, the portable device comprising an input mechanism arranged to enable input into the portable device of an identifier associated with a user of the portable device, and a selection mechanism arranged to enable the user to select a payment mechanism to be associated with the identifier, the portable device further comprising a communication module arranged to transmit data relating to the identifier and the payment mechanism selection to a remote server, and wherein completion of a subsequent transaction relating to the identifier is enabled using the selected payment mechanism.

According to a first aspect of the invention, there is provided a portable device configured to enable completion of transactions, the portable device comprising: an input mechanism arranged to enable input of an identifier into the portable device, wherein the identifier is a registration number of a vehicle associated with a user; a selection mechanism arranged to enable the user to select a payment mechanism to be associated with the identifier, wherein the payment mechanism is a digital wallet entry of a digital wallet, and wherein the digital wallet entry is associated with a payment card; and a communication module arranged to transmit data relating to the identifier and the payment mechanism selection to a remote server; wherein completion of a subsequent transaction relating to the identifier is enabled using the selected payment mechanism, and wherein the digital wallet entry has been associated with the identifier by the user in a prior registration process.

As mentioned in the first aspect, the payment mechanism is a digital wallet entry held in a digital wallet. The digital wallet may be hosted by the remote server. The digital wallet entry is associated with a payment card, and provides a convenient and centralised payment mechanism to be used in completing transactions.

Enabling completion of transactions may, for example, include facilitating a registration process that a user can undergo to register with an operator of a service. Associating an identifier relating to the user with a payment mechanism provides a flexible arrangement, as a payment mechanism may be related to a payment card, but not necessarily tied to a particular operator. This creates the potential for the portable device to enable completion of transactions with multiple operators.

Configuring a portable device to allow a user to enable completion of transactions provides a convenient arrangement for the user, who is able to conduct an enabling process at any location.

By communicating with the remote server, which is, for example, in the case of a payment mechanism in the form of a digital wallet entry, a wallet server configured to maintain a digital wallet for several users, the portable device can configure the remote server to complete subsequent transactions. Therefore, the portable device is not required for anything further once completion of transactions has been enabled. Accordingly, the portable device does not need to be carried by the user. Completion of subsequent transactions is handled by the remote server, which typically has more robust security measures than the portable device.

The communication module may receive data relating to digital wallet entries from the remote server. This beneficially allows the portable device to retrieve information on digital wallet entries that is held securely in a wallet server for presenting to the user. This means wallet entry data need not be stored locally on the portable device.

The input mechanism or input means may comprise a sensor or sensing means arranged to capture the identifier. The sensor may, for example, be configured to capture an image of the identifier. A processor may be arranged to identify the identifier from within the image. For example, the sensor may be a camera. This embodiment provides a convenient arrangement that enables a user to input the identifier into the portable device simply by taking a photograph of the identifier, thereby minimising input required from the user. Since

the camera is provided on a portable device, the identifier can be photographed in any convenient location.

The input mechanism may comprise an alphanumeric keypad configured to allow the user to enter the identifier into the portable device. This feature enables the user to enter the identifier in a manner that ensures the device obtains the identifier correctly.

The selection mechanism may comprise an arrangement for presenting to the user at least one digital wallet entry associated with a payment card. This could be a display on the portable device, on which images of the at least one digital wallet entry can be presented. Alternatively, the arrangement for presenting to the user may comprise an audio component.

In one embodiment, the arrangement for presenting to the user is a touch screen. This provides an enhanced user interface, and also potentially combines the presenting means with the selection mechanism in an efficient arrangement.

Advantageously, the portable device may be a mobile telephone, which is therefore likely to be frequently carried by the user. The portable device may alternatively be a tablet device. Accordingly, the portable device is typically available to the user for conducting an enabling process in any required location. Furthermore, since the user is likely to possess a mobile telephone, a separate device does not need to be provided to allow the user to enable completion of transactions.

As mentioned in the first aspect, the identifier is be a registration number of a vehicle associated with the user. In this embodiment, the portable device can be used to enable completion of transactions arising through use of the vehicle, as the registration number provides a convenient and reliable means of identification.

The input mechanism may include an automatic number plate recognition system for registration number recognition. This beneficially minimises input required from the user, and permits fast input of the identifier into the portable device.

The transaction relating to the identifier for which completion is enabled may be payment for passage of the vehicle through a toll-gate. This advantageously means that toll-gate charges can be paid for automatically, allowing the vehicle to pass through the toll-gate more quickly than if stopping to pay at the toll-gate, without any requirement to set-up and maintain an account with a toll operator.

Similarly, the transaction relating to the identifier for which completion is enabled may be any of the following: payment for entry of the vehicle into a congestion charging zone; payment for parking in a car park; and payment for petrol at a petrol station. As above, by enabling automatic payment for each of these transactions, the time taken to complete the transactions can be reduced, and the user is not required to create and maintain an account with individual operators of each service.

These examples of transactions are not limiting, and the skilled person will appreciate that the transaction could be any transaction relating to use of a vehicle, for example servicing and repair, boarding of a ferry or a train, payment at drive-through restaurants, or even fines imposed for exceeding speed limits or parking illegally.

When a vehicle is recognised at a particular location, for example at a toll-gate, this creates an opportunity for relevant information, for example traffic updates, to be provided to a user by forwarding the data to the portable device.

Alternatively, the identifier may be a personal identifier in the form of the user's face. In this embodiment, the personal identifier can be used to complete any transaction where the user is present. For example, the transaction could be payment for goods in a shopping, payment for use of public transport, or checking in at an airport. The skilled reader will appreciate that there are many further types of transaction possible. To facilitate this, the input mechanism may include an automatic facial recognition system for recognition of the user's face, to enable the user to enter the personal identifier into the portable device quickly and with minimal input.

There is provided an application for a portable device, the application being arranged to enable completion of transactions, the portable device comprising an input mechanism arranged to enable input of data into the portable device; a selection mechanism; and a communication module arranged to transmit data to a remote server; wherein the application is arranged to enable input of an identifier using the input mechanism; present to a user at least one payment mechanism; enable the user to select a payment mechanism to be associated with the identifier using the selection mechanism; and transmit data relating to the identifier and the payment mechanism selection to a remote server using the communication module; and wherein completion of a subsequent transaction related to the identifier is enabled using the selected payment mechanism.

The payment mechanism may be a digital wallet entry of a digital wallet, the digital wallet entry being associated with a payment card.

The portable device may be a portable device according to the first aspect.

According to a second aspect of the invention, there is provided a method of completing transactions, comprising: detecting an identifier, wherein the identifier is a registration number of a vehicle associated with a user; identifying a payment mechanism associated with the identifier, wherein the payment mechanism is a digital wallet entry of a digital wallet and the payment mechanism is related to a payment card; and completing the transaction using the payment mechanism, wherein the digital wallet entry has been associated with the identifier by a user in a prior registration process.

Also disclosed is a method of completing transactions, comprising capturing an identifier; identifying a payment mechanism associated with the identifier, wherein the payment mechanism is related to a payment card; and completing the transaction using the payment mechanism.

The payment mechanism may be a digital wallet entry of a digital wallet.

In one embodiment, the method comprises capturing an image of the identifier, and analysing the image to identify the identifier.

As mentioned in the second aspect, the identifier is be a registration number of a vehicle, in which case the method can be used for the completion of any transaction arising through use of the vehicle, with the registration number providing a convenient and reliable means of identification. For example, the transaction can be any of those described above in relation to the portable device, including: payment for passage of the vehicle through a toll-gate; payment for entry of the vehicle into a congestion charging zone; payment for parking in a car park; and payment for petrol at a petrol station. The advantages of using the method for the completion of such transactions are discussed above in relation to the portable device.

The registration number may be identified using an automatic number plate recognition algorithm, thereby making use of conventional technology for improved integration with existing systems.

In an alternative embodiment in which the identifier is a personal identifier in the form of the user's face, the method can be used for the completion of any transaction where the user is present, as discussed above. The user's face may be identified using an automatic facial recognition algorithm in order to provide an automated system in which security measures can be implemented.

The payment mechanism may have been associated with the identifier by a user in a prior registration process. For example, the prior registration process may have been conducted using the portable device of the first aspect, or the application of the second aspect.

The method may further comprise sending a confirmation request to a user prior to completing the transaction. This beneficially provides real-time user validation for transactions. This may be particularly useful for higher value transactions, for example purchasing petrol for a vehicle, or purchasing a high value item in a shop. In this embodiment, the method may comprise completing the transaction in dependence on receiving confirmation from the user.

According to a third aspect of the invention, there is provided a system for automatic completion of a user transaction with an operator, the system comprising: a first remote server comprising a digital wallet; a second remote server associated with the operator; and a portable device according to the first aspect of the invention.

There is also disclosed a system for automatic completion of a user transaction with an operator, the system comprising a first remote server comprising a digital wallet; a second remote server associated with the operator; and a portable device arranged to communicate with the first server and to enable the user to associate a digital wallet entry stored on the first server with an identifier related to the user; wherein the transaction is associated with the identifier; and wherein the first remote server communicates with the second remote server so as to complete the transaction using the digital wallet entry.

There is provided a method for enabling completion of transactions, the method comprising associating a payment mechanism with an identifier; and transmitting data relating to the identifier and the payment mechanism selection to a remote server; wherein completion of a subsequent transaction relating to the identifier is enabled using the selected payment mechanism.

It will be appreciated that preferred and/or optional features of the first, second and third aspects of the invention may be incorporated alone or in appropriate combination in any other aspect of the invention also.

Brief Description of the Drawings

In order that the invention may be more readily understood, preferred non-limiting embodiments thereof will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic drawing of a first part of an automatic payment system according to an embodiment of the invention, showing components used for associating a vehicle registration with a digital wallet entry and registering with a toll server;

Figure 2 is a flow diagram illustrating a process for using the first part of the automatic payment system of Figure 1 to associate a vehicle registration with a digital wallet entry and register with a toll server;

Figure 3 is a schematic drawing of a second part of an automatic payment system according to an embodiment of the invention, showing components used for making automatic payments; and

Figure 4 is a flow diagram illustrating a process for using the second part of the automatic payment system of Figure 2 to make an automatic payment.

Claims

1. A portable device configured to enable completion of transactions, the portable device comprising:

an input mechanism arranged to enable input of an identifier into the portable device, wherein the identifier is a registration number of a vehicle associated with a user;

a selection mechanism arranged to enable the user to select a payment mechanism to be associated with the identifier, wherein the payment mechanism is a digital wallet entry of a digital wallet, and wherein the digital wallet entry is associated with a payment card; and

a communication module arranged to transmit data relating to the identifier and the payment mechanism selection to a remote server;

wherein completion of a subsequent transaction relating to the identifier is enabled using the selected payment mechanism, and wherein the digital wallet entry has been associated with the identifier by the user in a prior registration process.

2. A portable device according to claim 1, wherein the communication module is arranged to receive data relating to digital wallet entries from the remote server.

3. A portable device according to claim 1 or claim 2, wherein the selection mechanism is arranged to present to the user at least one digital wallet entry associated with a payment card.

4. A portable device according to claim 3, wherein the selection mechanism comprises a touch screen.

5. A portable device according to any preceding claim, wherein the input mechanism comprises sensing means arranged to capture the identifier, or an alphanumeric keypad to allow the user to enter the identifier into the portable device.

6. A portable device according to claim 5, wherein when the input mechanism comprises sensing means arranged to capture an image of the identifier, the input

mechanism further comprises processing means arranged to identify the identifier from within the image, and preferably wherein the sensing means is a camera.

7. A portable device according to any preceding claim, wherein the portable device is a mobile telephone or tablet device.

8. A portable device according to any preceding claim, wherein the input mechanism includes an automatic number plate recognition system for registration number recognition.

9. A portable device according to any preceding claim, wherein the transaction relating to the identifier for which completion is enabled can be at least one of: payment for passage of the vehicle through a toll-gate; payment for entry of the vehicle into a congestion charging zone; payment for parking in a car park; and payment for petrol at a petrol station.

10. A portable device according to any preceding claim, wherein the identifier is a user's face.

11. A portable device according to claim 10, wherein the input mechanism includes an automatic facial recognition system for recognition of the user's face.

12. A method of completing transactions, comprising:

detecting an identifier, wherein the identifier is a registration number of a vehicle associated with a user;

identifying a payment mechanism associated with the identifier, wherein the payment mechanism is a digital wallet entry of a digital wallet and the payment mechanism is related to a payment card; and

completing the transaction using the payment mechanism,

wherein the digital wallet entry has been associated with the identifier by a user in a prior registration process.

13. A method according to claim 12, wherein the registration process is conducted using a portable device according to any one of claims 2 to 5, or an application according to claim 17.

14. A method according to claim 12 or claim 13, wherein detecting the identifier comprises capturing an image of the identifier, and analysing the image to identify the identifier.

15. A method according to any of claims 12 to 14, wherein the registration number is identified using an automatic number plate recognition algorithm.

16. A method according to any of claims 12 to 15, wherein the transaction can be at least one of: payment for passage of the vehicle through a toll-gate; payment for entry of the vehicle into a congestion charging zone; payment for parking in a car park; and payment for petrol at a petrol station.

17. A method according to any one of claims 12 to 16, wherein the identifier is a user's face.

18. A method according to claim 17, wherein the user's face is identified using an automatic facial recognition algorithm.

19. A method according to any one of claims 12 to 18, further comprising sending a confirmation request to a user prior to completing the transaction.

20. A system for automatic completion of a user transaction with an operator, the system comprising:

a first remote server comprising a digital wallet;

a second remote server associated with the operator; and

a portable device according to any of claims 1 to 11.