

Payment Devices, Methods for Controlling a Payment Device, and Non-transitory Computer-readable Media

FIELD OF INVENTION

[0001] The present invention relates broadly, but not exclusively, to payment devices, methods for controlling a payment device, and non-transitory computer-readable media.

BACKGROUND

[0002] Payment devices (for example payment cards such as credit cards or debit cards, or contactless payment devices such as fobs or wearable devices such as rings or wristbands or watches) provide a convenient way of effecting payment. However, there is a fraud risk associated with such payment device, in particular with payment devices which provide contactless payment. Contactless payment devices (for example payment cards) are convenient in that they are able to be used for transactions (typically up to a certain limit of transaction value and/or number of transactions within a given time window) without the cardholder needing to use a cardholder verification method (CVM) such as PIN (personal identification number) entry in order for the transaction to be approved. However, because no CVM is required, it is possible in the case of theft of the card for it to be used without the cardholder's consent.

[0003] A need therefore exists to provide methods and/or systems to address the above problem.

SUMMARY

[0004] According to various embodiments, a payment device may be provided. The payment device may include: an accelerometer configured to determine acceleration data of the payment device; a determination circuit configured to determine based on the acceleration data whether the payment device is held or moved in a pre-determined way; and a function activation circuit configured to activate a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way; wherein the pre-

determined function includes switching between accounts associated with the payment device.

[0005] According to various embodiments, a method for controlling a payment device may be provided. The method may include: determining acceleration data of the payment device using an accelerometer; determining based on the acceleration data whether the payment device is held or moved in a pre-determined way; and activating a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way; wherein the pre-determined function includes switching between accounts associated with the payment device.

[0006] According to various embodiments, a non-transitory computer-readable medium may be provided. The non-transitory computer-readable medium may store instructions which, when executed by a processor, make the processor perform a method for controlling a payment device, the method including: determining acceleration data of the payment device using an accelerometer; determining based on the acceleration data whether the payment device is held or moved in a pre-determined way; and activating a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way; wherein the pre-determined function includes switching between accounts associated with the payment device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Embodiments of the invention will be better understood and readily apparent to one of ordinary skill in the art from the following written description, by way of example only, and in conjunction with the drawings, in which:

[0008] Figure 1A shows a payment device according to various embodiments;

[0009] Figure 1B shows a payment device according to various embodiments;

[0010] Figure 1C shows a flow diagram illustrating a method for controlling a payment device according to various embodiments

[0011] Figure 2 shows an illustration of an exemplary flow of a payment device locking / unlocking method according to various embodiments.

DETAILED DESCRIPTION

[0012] Embodiments of the present invention will be described, by way of example only, with reference to the drawings. Like reference numerals and characters in the drawings refer to like elements or equivalents.

[0013] Some portions of the description which follows are explicitly or implicitly presented in terms of algorithms and functional or symbolic representations of operations on data within a computer memory. These algorithmic descriptions and functional or symbolic representations are the means used by those skilled in the data processing arts to convey most effectively the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities, such as electrical, magnetic or optical signals capable of being stored, transferred, combined, compared, and otherwise manipulated.

[0014] Unless specifically stated otherwise, and as apparent from the following, it will be appreciated that throughout the present specification, discussions utilizing terms such as “scanning”, “calculating”, “determining”, “replacing”, “generating”, “initializing”, “outputting”, or the like, refer to the action and processes of a computer system, or similar electronic device, that manipulates and transforms data represented as physical quantities within the computer system into other data similarly represented as physical quantities within the computer system or other information storage, transmission or display devices.

[0015] The present specification also discloses apparatus for performing the operations of the methods. Such apparatus may be specially constructed for the required purposes, or may comprise a computer or other device selectively activated or reconfigured by a computer program stored in the computer. The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various machines may be used with programs in accordance with the teachings herein. Alternatively, the construction of more specialized apparatus to perform the required method steps may be appropriate. The structure of a conventional computer will appear from the description below.

[0016] In addition, the present specification also implicitly discloses a computer program, in that it would be apparent to the person skilled in the art that the individual steps of the method described herein may be put into effect by computer code. The

computer program is not intended to be limited to any particular programming language and implementation thereof. It will be appreciated that a variety of programming languages and coding thereof may be used to implement the teachings of the disclosure contained herein. Moreover, the computer program is not intended to be limited to any particular control flow. There are many other variants of the computer program, which can use different control flows without departing from the spirit or scope of the invention.

[0017] Furthermore, one or more of the steps of the computer program may be performed in parallel rather than sequentially. Such a computer program may be stored on any computer readable medium. The computer readable medium may include storage devices such as magnetic or optical disks, memory chips, or other storage devices suitable for interfacing with a computer. The computer readable medium may also include a hard-wired medium such as exemplified in the Internet system, or wireless medium such as exemplified in the GSM mobile telephone system. The computer program when loaded and executed on such a general-purpose computer effectively results in an apparatus that implements the steps of the preferred method.

[0018] Payment devices (for example payment cards such as credit cards or debit cards, or contactless payment devices such as fobs or wearable devices such as rings or wristbands or watches) provide are a convenient way of effecting payment. However, there is a fraud risk associated with such payment devices, in particular with payment devices which provide contactless payment. Contactless payment devices (for example payment cards) are convenient in that they are able to be used for transactions (typically up to a certain limit of transaction value and/or number of transactions within a given time window) without the cardholder needing to use a cardholder verification method (CVM) such as PIN (personal identification number) entry in order for the transaction to be approved. However, because no CVM is required, it is possible in the case of theft of the card for it to be used without the cardholder's consent. Contactless payment devices (for example payment cards) on one side improve the user experience of consumer while on other side increases the risk of fraudulent transaction (transaction performed without consumer's consent).

[0019] According to various embodiments, devices and methods are provided to prevent fraud on payment devices, for example payment cards (which may also be referred to as smart cards) and also provide another form of consumer input

method. According to various embodiments, a payment device, for example a payment card, for example a smart card, with an accelerometer is provided.

[0020] According to various embodiments, an accelerometer is embedded inside a smart card or other payment-enabled device. The accelerometer may help to recognize gesture, motion and also can be used to input data by performing a particular gesture like tapping the card or other device on a table or other hard surface. Various embodiments may be deployed on any credit/debit card issued (for example any Mastercard® credit card or Mastercard® debit card).

[0021] Figure 1A shows a payment device 100 according to various embodiments. The payment device 100 may include an accelerometer 102 configured to determine acceleration data of the payment device 100. The payment device 100 may further include a determination circuit 102 configured to determine based on the acceleration data whether the payment device 100 is held or moved in a pre-determined way. The payment device 100 may further include a function activation circuit 106 configured to activate a pre-determined function of the payment device 100 if it is determined that the payment device 100 is held or moved in the pre-determined way. According to various embodiments, the pre-determined function may include or may be switching between accounts associated with the payment device 100. The payment device 100 may further include a payment circuit 107. The payment circuit 107 may be configured to execute the payment application during a transaction (for example, if the payment device 100 is a Mastercard® card, the payment circuit 107 may be an M/Chip. The gesture input (in other words: the motion or orientation of the payment device 100, which may be determined by the determination circuit 102) may be used to switch between accounts by causing the payment application to receive configuration data appropriate to the respective accounts, or each account may be associated with a separate payment application resident on the payment device 100 and the appropriate payment application may be selected via the gesture input; in other words, the pre-determined function may be switching between accounts by causing the payment application to receive configuration data appropriate to the respective accounts, or selecting an appropriate payment application (wherein each account may be associated with a separate payment application resident on the payment device 100).

[0022] According to various embodiments, data relating to the respective accounts may include a primary account number (PAN), an expiry date, and/ or a Card Validation Code 2 (CVC2), for example. According to various embodiments, instead of

the PAN, a token may be provided which may stand in for the PAN so that when the payment device 100 is used for a transaction, the merchant receives only the token and not the real PAN. The token may be received by the payment network and may be mapped back to the actual PAN (in other words: the token may be detokenized) by a tokenization service (e.g. Mastercard® Digital Enablement Service, MDES) before going to the card issuer to finish the authorization process for the transaction. Once authorization is done, the PAN may again be mapped back to the token (e.g. by MDES) before going back to the merchant with the authorization result.

[0023] According to various embodiments, the payment device 100 may be a payment card such as a credit card or a debit card, or a contactless payment device such as a fob or wearable device such as a ring or a wristband or a watch.

[0024] According to various embodiments, switching between accounts may be carried out in a circular manner; for example, switching may occur from a first account to a second account, or from a second account to a third account, and so on; once switching is to be carried out from the last account, it will be switched to the first account. For example, if there are only two accounts, switching between the accounts corresponds to toggling between the two accounts (i.e. switching is carried out from the first account to the second account, or from the second account to the first account). For example, if there are three accounts, switching may be carried out from the first account to the second account, or from the second account to the third account, or from the third account to the first account.

[0025] According to various embodiments, switching between accounts may be carried out in a directed manner; for example, by having specific pre-determined ways for each of the account, switching may be carried out directly to a desired account; for example a first pre-determined way may be associated with a first account, and a second pre-determined way may be associated with a second account.

[0026] According to various embodiments, the pre-determined way may include or may be one or more of the following: tapping the payment device 100; double tapping the payment device 100; multiple tapping the payment device 100; rotating the payment device 100; moving the payment device 100 in a circle; tilting the payment device 100; holding the payment device 100 vertically; holding the payment device 100 horizontally; or holding the payment device 100 at an angle with respect to ground.

[0027] According to various embodiments, the pre-determined function may further include or may be activating the payment device 100; and/ or de-activating the payment device 100. It will be understood that activating/de-activating may include disabling the card altogether, or selectively enabling/disabling or unblocking/blocking one or more payment applications, or enabling/disabling an NFC interface of the payment device 100.

[0028] Figure 1B shows a payment device 108 according to various embodiments. The payment device 108 may, similar to the payment device 100 illustrated in Figure 1A, include an accelerometer 102 configured to determine acceleration data of the payment device 108. The payment device 108 may, similar to the payment device 100 illustrated in Figure 1A, further include a determination circuit 102 configured to determine based on the acceleration data whether the payment device 108 is held or moved in a pre-determined way. The payment device 108 may, similar to the payment device 100 illustrated in Figure 1A, further include a function activation circuit 106 configured to activate a pre-determined function of the payment device 108 if it is determined that the payment device 108 is held or moved in the pre-determined way. According to various embodiments, the pre-determined function may include or may be switching between accounts associated with the payment device 108. The payment device 108 may further include a contactless payment interface 110, such as will be described in more detail below. The payment device 108 may further include an indicator 112, such as will be described in more detail below. The payment device 108 may further include an energy source 114, such as will be described in more detail below. The payment device 108 may further include an interface 116, such as will be described in more detail below.

[0029] According to various embodiments, the pre-determined function may include or may be enabling the contactless payment interface 110 and/ or disabling the contactless payment interface 110.

[0030] According to various embodiments, the indicator 112 may be configured to indicate a status of the payment device 108.

[0031] According to various embodiments, the pre-determined function may include indicating the status of the payment device 108.

[0032] According to various embodiments, the status may be at least one of an activated state; a de-activated state; or an account selected for use with the payment device 108.

[0033] According to various embodiments, the energy source 114 may be configured to provide energy to the accelerometer 102 and/ or the determination circuit 104 and/ or the function activation circuit 106.

[0034] According to various embodiments, the energy source 114 may include or may be a battery.

[0035] According to various embodiments, the energy source 114 may be configured to harvest energy.

[0036] According to various embodiments, the energy source 114 may be configured to harvest at least one of solar power, thermal energy, or kinetic energy.

[0037] According to various embodiments, the interface 116 may be an interface to a payment device terminal, for example a card terminal. According to various embodiments, the interface 116 may be configured to provide energy to the accelerometer 102 and/ or the determination circuit 104 and/ or the function activation circuit 106.

[0038] Figure 1C shows a flow diagram 118 illustrating a method for controlling a payment device. In 120, acceleration data of the payment device may be determined using an accelerometer. In 122, it may be determined (for example based on the acceleration data) whether the payment device is held or moved in a pre-determined way. In 124, a pre-determined function of the payment device may be activated if it is determined that the payment device is held or moved in the pre-determined way. The pre-determined function may include or may be switching between accounts associated with the payment device.

[0039] According to various embodiments, the pre-determined way may include one or more of the following: tapping the payment device; double tapping the payment device; multiple tapping the payment device; rotating the payment device; moving the payment device in a circle; tilting the payment device; holding the payment device vertically; holding the payment device horizontally; or holding the payment device at an angle with respect to ground. It will be understood that the accelerometer may determine acceleration data, which includes both an

acceleration component of an acceleration of the payment device with respect to the surrounding of the payment device (for example caused by tapping the payment device), and a component related to gravity (in other words: gravitational acceleration; which is caused by attraction between the mass of the payment device and the mass of the earth). As such, based on the overall amount of the gravitation measured by the accelerometer, not only a movement of the payment device may be determined, but also a spatial orientation of the payment device may be determined.

[0040] According to various embodiments, the pre-determined function may further include or be activating the payment device and/ or de-activating the payment device.

[0041] According to various embodiments, the pre-determined function may include or may be enabling a contactless payment interface and/ or disabling the contactless payment interface.

[0042] According to various embodiments, the pre-determined function may include or may be indicating the status of the payment device.

[0043] According to various embodiments, the status may include or may be at least one of: an activated state; a de-activated state; or an account selected for use with the payment device.

[0044] According to various embodiments, a non-transitory computer-readable medium may be provided. The non-transitory computer-readable medium may store instructions which, when executed by a processor, make the processor perform a method for controlling a payment device, the method including: determining acceleration data of the payment device using an accelerometer; determining based on the acceleration data whether the payment device is held or moved in a pre-determined way; and activating a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way; wherein the pre-determined function includes switching between accounts associated with the payment device.

[0045] According to various embodiments, a tap of the smart card on a surface may turn on the contactless interface (i.e. put the smart card into an activated state) which may be kept disabled (i.e. in a de-activated state) otherwise, giving consumer the flexibility of activating the card only when he is about to perform the

transaction. Fraudulent transactions like the card being kept in the pocket and somebody bringing the contactless terminal near the card may otherwise be able to perform the transaction without consumer consent.

[0046] According to various embodiments, a tapping gesture of the user may help to determine if the transaction is normal or done in abnormal way.

[0047] According to various embodiments, the smart card may support multiple accounts, and by using information acquired by the accelerometer, the account which is active may be switched. In other words, with the accelerometer embedded on the smart card, double tapping on the surface can switch the accounts. So this can be used as a user interface as well.

[0048] Figure 2 shows a flow diagram 200 illustrating locking (in other words: deactivating) and unlocking (in other words: activating) a payment device according to various embodiments.

[0049] In 202, the consumer may want to perform a transaction. In 204, the consumer may take out the payment device which has the contactless interface disabled. In 206, the consumer may tap the payment device vertically to enable the interface. In 208, the consumer may tap on the terminal (for example horizontally) as normally done (for example in order to effect a transaction). In 210, the transaction is performed successfully. In 212, the consumer may tap again on the surface vertically to disable the contactless interface. In 214, the payment device may be locked further for any contactless transactions, so that, like indicated in 216, fraudulent transaction like the payment device being kept in the user's pocket and the terminal being brought near to the payment device is not possible.

[0050] Figure 3 depicts an exemplary computing device 300, hereinafter interchangeably referred to as a computer system 300 or as a server 300, where one or more such computing devices 300 may be used to implement the payment device terminal, for example the card terminal. The following description of the computing device 300 is provided by way of example only and is not intended to be limiting.

[0051] As shown in Figure 3, the example computing device 300 includes a processor 304 for executing software routines. Although a single processor is shown for the sake of clarity, the computing device 300 may also include a multi-processor system. The processor 304 is connected to a communication infrastructure 306 for communication

with other components of the computing device 300. The communication infrastructure 306 may include, for example, a communications bus, cross-bar, or network.

[0052] The computing device 300 further includes a main memory 308, such as a random access memory (RAM), and a secondary memory 310. The secondary memory 310 may include, for example, a storage drive 312, which may be a hard disk drive, a solid state drive or a hybrid drive and/or a removable storage drive 314, which may include a magnetic tape drive, an optical disk drive, a solid state storage drive (such as a USB flash drive, a flash memory device, a solid state drive or a memory card), or the like. The removable storage drive 314 reads from and/or writes to a removable storage medium 344 in a well-known manner. The removable storage medium 344 may include magnetic tape, optical disk, non-volatile memory storage medium, or the like, which is read by and written to by removable storage drive 314. As will be appreciated by persons skilled in the relevant art(s), the removable storage medium 344 includes a computer readable storage medium having stored therein computer executable program code instructions and/or data.

[0053] In an alternative implementation, the secondary memory 310 may additionally or alternatively include other similar means for allowing computer programs or other instructions to be loaded into the computing device 300. Such means can include, for example, a removable storage unit 322 and an interface 350. Examples of a removable storage unit 322 and interface 350 include a program cartridge and cartridge interface (such as that found in video game console devices), a removable memory chip (such as an EPROM or PROM) and associated socket, a removable solid state storage drive (such as a USB flash drive, a flash memory device, a solid state drive or a memory card), and other removable storage units 322 and interfaces 350 which allow software and data to be transferred from the removable storage unit 322 to the computer system 300.

[0054] The computing device 300 also includes at least one communication interface 324. The communication interface 324 allows software and data to be transferred between computing device 300 and external devices via a communication path 326. In various embodiments of the inventions, the communication interface 324 permits data to be transferred between the computing device 300 and a data communication network, such as a public data or private data communication network. The communication interface 324 may be used to exchange data between different computing devices 300 which such computing devices 300 form part an interconnected computer network. Examples of a communication interface 324 can include a modem,

a network interface (such as an Ethernet card), a communication port (such as a serial, parallel, printer, GPIB, IEEE 1394, RJ45, USB), an antenna with associated circuitry and the like. The communication interface 324 may be wired or may be wireless. Software and data transferred via the communication interface 324 are in the form of signals which can be electronic, electromagnetic, optical or other signals capable of being received by communication interface 324. These signals are provided to the communication interface via the communication path 326.

[0055] As shown in Figure 3, the computing device 300 further includes a display interface 302 which performs operations for rendering images to an associated display 330 and an audio interface 332 for performing operations for playing audio content via associated speaker(s) 334.

[0056] As used herein, the term "computer program product" (or computer readable medium, which may be a non-transitory computer readable medium) may refer, in part, to removable storage medium 344, removable storage unit 322, a hard disk installed in storage drive 312, or a carrier wave carrying software over communication path 326 (wireless link or cable) to communication interface 324. Computer readable storage media (or computer readable media) refers to any non-transitory, non-volatile tangible storage medium that provides recorded instructions and/or data to the computing device 300 for execution and/or processing. Examples of such storage media include magnetic tape, CD-ROM, DVD, Blu-ray™ Disc, a hard disk drive, a ROM or integrated circuit, a solid state storage drive (such as a USB flash drive, a flash memory device, a solid state drive or a memory card), a hybrid drive, a magneto-optical disk, or a computer readable card such as a PCMCIA card and the like, whether or not such devices are internal or external of the computing device 300. Examples of transitory or non-tangible computer readable transmission media that may also participate in the provision of software, application programs, instructions and/or data to the computing device 300 include radio or infra-red transmission channels as well as a network connection to another computer or networked device, and the Internet or Intranets including e-mail transmissions and information recorded on Websites and the like.

[0057] The computer programs (also called computer program code) are stored in main memory 308 and/or secondary memory 310. Computer programs can also be received via the communication interface 324. Such computer programs, when executed, enable the computing device 300 to perform one or more features of embodiments discussed herein. In various embodiments, the computer programs, when executed, enable the processor 304 to perform features of the above-described

embodiments. Accordingly, such computer programs represent controllers of the computer system 300.

[0058] Software may be stored in a computer program product and loaded into the computing device 300 using the removable storage drive 314, the storage drive 312, or the interface 350. The computer program product may be a non-transitory computer readable medium. Alternatively, the computer program product may be downloaded to the computer system 300 over the communications path 326. The software, when executed by the processor 304, causes the computing device 300 to perform functions of embodiments described herein.

[0059] It is to be understood that the embodiment of Figure 3 is presented merely by way of example. Therefore, in some embodiments one or more features of the computing device 300 may be omitted. Also, in some embodiments, one or more features of the computing device 300 may be combined together. Additionally, in some embodiments, one or more features of the computing device 300 may be split into one or more component parts. The main memory 308 and/or the secondary memory 310 may serve(s) as the memory for the card terminal; while the processor 304 may serve as the processor of the card terminal.

[0060] Some portions of the description herein are explicitly or implicitly presented in terms of algorithms and functional or symbolic representations of operations on data within a computer memory. These algorithmic descriptions and functional or symbolic representations are the means used by those skilled in the data processing arts to convey most effectively the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities, such as electrical, magnetic or optical signals capable of being stored, transferred, combined, compared, and otherwise manipulated.

[0061] Unless specifically stated otherwise, and as apparent from the description herein, it will be appreciated that throughout the present specification, discussions utilizing terms such as “receiving”, “scanning”, “calculating”, “determining”, “replacing”, “generating”, “initializing”, “outputting”, or the like, refer to the action and processes of a computer system, or similar electronic device, that manipulates and transforms data represented as physical quantities within the computer system into other data similarly represented as physical quantities within the computer system or other information storage, transmission or display devices.

[0062] The present specification also discloses apparatus for performing the operations of the methods. Such apparatus may be specially constructed for the required purposes, or may comprise a computer or other device selectively activated or reconfigured by a computer program stored in the computer. The algorithms and displays presented herein are not inherently related to any particular computer or other apparatus. Various machines may be used with programs in accordance with the teachings herein. Alternatively, the construction of more specialized apparatus to perform the required method steps may be appropriate. The structure of a computer suitable for executing the various methods / processes described herein will appear from the description herein.

[0063] In addition, the present specification also implicitly discloses a computer program, in that it would be apparent to the person skilled in the art that the individual steps of the method described herein may be put into effect by computer code. The computer program is not intended to be limited to any particular programming language and implementation thereof. It will be appreciated that a variety of programming languages and coding thereof may be used to implement the teachings of the disclosure contained herein. Moreover, the computer program is not intended to be limited to any particular control flow. There are many other variants of the computer program, which can use different control flows without departing from the spirit or scope of the invention.

[0064] Furthermore, one or more of the steps of the computer program may be performed in parallel rather than sequentially. Such a computer program may be stored on any computer readable medium. The computer readable medium may include storage devices such as magnetic or optical disks, memory chips, or other storage devices suitable for interfacing with a computer. The computer readable medium may also include a hard-wired medium such as exemplified in the Internet system, or wireless medium such as exemplified in the GSM mobile telephone system. The computer program when loaded and executed on such a computer effectively results in an apparatus that implements the steps of the preferred method.

[0065] According to various embodiments, a "circuit" may be understood as any kind of a logic implementing entity, which may be special purpose circuitry or a processor executing software stored in a memory, firmware, or any combination thereof. Thus, in an embodiment, a "circuit" may be a hard-wired logic circuit or a

programmable logic circuit such as a programmable processor, e.g. a microprocessor (e.g. a Complex Instruction Set Computer (CISC) processor or a Reduced Instruction Set Computer (RISC) processor). A "circuit" may also be a processor executing software, e.g. any kind of computer program, e.g. a computer program using a virtual machine code such as e.g. Java. Any other kind of implementation of the respective functions which will be described in more detail below may also be understood as a "circuit" in accordance with an alternative embodiment.

[0066] It will be understood that the terms "smart card", "payment card" or just "card" are used interchangeably herein, and each of them may be an example of a payment device. It will be understood that any property described for any of a smart card, a payment card, or a card, may generally also be provided for any other kind of payment device. Likewise, any payment device described herein may be a smart card or a payment card, for example a credit card or debit card.

[0067] It will be appreciated by a person skilled in the art that numerous variations and/or modifications may be made to the present invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects to be illustrative and not restrictive.

CLAIMS

1. A payment device comprising:
 - an accelerometer configured to determine acceleration data of the payment device;
 - a determination circuit configured to determine based on the acceleration data whether the payment device is held or moved in a pre-determined way; and
 - a function activation circuit configured to activate a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way;
 - wherein the pre-determined function comprises switching between accounts associated with the payment device.
2. The payment device of claim 1,
 - wherein the pre-determined way comprises at least one of:
 - tapping the payment device;
 - double tapping the payment device;
 - multiple tapping the payment device;
 - rotating the payment device;
 - moving the payment device in a circle;
 - tilting the payment device;
 - holding the payment device vertically;
 - holding the payment device horizontally; or
 - holding the payment device at an angle with respect to ground.
3. The payment device of any one of claims 1 to 2;
 - wherein the pre-determined function further comprises at least one of:
 - activating the payment device; or
 - de-activating the payment device.
4. The payment device of any one of claims 1 to 3, further comprising:
 - a contactless payment interface.
5. The payment device of claim 4;
 - wherein the pre-determined function comprises at least one of:
 - enabling the contactless payment interface; or
 - disabling the contactless payment interface.

6. The payment device of any one of claims 1 to 5, further comprising:
an indicator configured to indicate a status of the payment device.
7. The payment device of claim 6,
wherein the pre-determined function comprises indicating the status of the payment device.
8. The payment device of any one of claims 6 to 7,
wherein the status comprises at least one of:
an activated state;
a de-activated state; or
an account selected for use with the payment device.
9. The payment device of any one of claims 1 to 8, further comprising:
an energy source configured to provide energy to at least one of the accelerometer, the determination circuit or the function activation circuit.
10. The payment device of claim 9,
wherein the energy source comprises a battery.
11. The payment device of any one of claims 9 to 10,
wherein the energy source is configured to harvest energy.
12. The payment device of claim 11,
wherein the energy source is configured to harvest at least one of solar power, thermal energy, or kinetic energy.
13. The payment device of any one of claims 1 to 12, further comprising:
an interface to a device terminal, the interface configured to provide energy to at least one of the accelerometer, the determination circuit or the function activation circuit.
14. A method for controlling a payment device, the method comprising:
determining acceleration data of the payment device using an accelerometer;

determining based on the acceleration data whether the payment device is held or moved in a pre-determined way; and

activating a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way;

wherein the pre-determined function comprises switching between accounts associated with the payment device.

15. The method of claim 14,
wherein the pre-determined way comprises at least one of:
tapping the payment device;
double tapping the payment device;
multiple tapping the payment device;
rotating the payment device;
moving the payment device in a circle;
tilting the payment device;
holding the payment device vertically;
holding the payment device horizontally; or
holding the payment device at an angle with respect to ground.
16. The method of any one of claims 14 to 15;
wherein the pre-determined function further comprises at least one of:
activating the payment device; or
de-activating the payment device.
17. The method of any one of claims 14 to 16;
wherein the pre-determined function comprises at least one of:
enabling a contactless payment interface; or
disabling the contactless payment interface.
18. The method of any one of claims 14 to 17,
wherein the pre-determined function comprises indicating the status of the payment device.
19. The method of claim 18,
wherein the status comprises at least one of:
an activated state;
a de-activated state; or

an account selected for use with the payment device.

20. A non-transitory computer-readable medium configured to storing instructions which, when executed by a processor, make the processor perform a method for controlling a payment device, the method comprising:

determining acceleration data of the payment device using an accelerometer;

determining based on the acceleration data whether the payment device is held or moved in a pre-determined way; and

activating a pre-determined function of the payment device if it is determined that the payment device is held or moved in the pre-determined way;

wherein the pre-determined function comprises switching between accounts associated with the payment device.