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HEAD MOUNTED DEVICE SUPPORTING MOBILE PAYMENT, OPERATION METHOD THEREOF, AND ELECTRONIC DEVICE

Abstract

A head-mounted device is provided. The head mounted device includes memory, including one or more storage media, storing instructions; a first camera, a sensor circuit configured to obtain authentication data, a communication interface, and at least one processor communicatively coupled to the memory, the first camera, the sensor circuit, and the communication interface, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to obtain payment-related data based on an image or video obtained through the first camera, obtain the authentication data through the sensor circuit based on the obtained payment-related data, and based on obtaining the authentication data, transmit a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through the communication interface.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION(S) [0001] This application is a continuation application, claiming priority under 35 U.S.C. § 365(c), of an International application No. PCT/KR2023/018237, filed on Nov. 14, 2023, which is based on and claims the benefit of a Korean patent application number 10-2022-0155272, filed on Nov. 18, 2022, in the Korean Intellectual Property Office, of a Korean patent application number 10-2022-0169906, filed on Dec. 7, 2022, in the Korean Intellectual Property Office, and of a Korean patent application number 10-2023-0006827, filed on Jan. 17, 2023, in the Korean Intellectual Property Office, the disclosure of each of which is incorporated by reference herein in its entirety.

BACKGROUND

1. Field

[0002] The disclosure relates to a head-mounted device supporting mobile payment via wireless communication, an operation method thereof, and an electronic device.

2. Description of Related Art

[0003] Electronic devices are rapidly evolving with the advancement of information technology (IT), offering users a wide range of features. Electronic devices may provide network-based communication services, such as multimedia services including music services, video services, or digital broadcast services, call or wireless Internet services.

[0004] Recently, fintech—a fusion of financial services and IT—has gained attention. Regarded as a paradigm shift in the financial sector, fintech is broadening its reach beyond traditional online financial services to include offline financial services and financial platform services. In response, electronic device manufacturers are actively working to develop mobile payment platforms, expand mobile payment services, and enhance mobile banking through partnerships with credit card companies and banks.

[0005] Electronic device manufacturers are actively working to develop mobile payment platforms, expand mobile payment services, and enhance mobile banking through cooperation with credit card companies and banks.

[0006] The above information is presented as background information only to assist with an understanding of the disclosure. No determination has been made, and no assertion is made, as to whether any of the above might be applicable as prior art with regard to the disclosure

SUMMARY

[0007] Aspects of the disclosure are to address at least the above-mentioned problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the disclosure is to provide a head-mounted device supporting mobile payment via wireless communication, an operation method thereof, and an electronic device.

[0008] Additional aspects will be set forth in part in the description which follows and, in part, will

be apparent from the description, or may be learned by practice of the presented embodiments.
[0009] In accordance with an aspect of the disclosure, a head-mounted device is provided. The head-mounted device includes memory, including one or more storage media, storing instructions, a first camera, a sensor circuit configured to obtain authentication data, a communication interface, and at least one processor communicatively coupled to the memory, the first camera, the sensor circuit, and the communication interface, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to obtain payment-related data based on an image or video obtained through the first camera, obtain the authentication data through the sensor circuit based on the obtained payment- related data, and, based on obtaining the authentication data, transmit a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through the communication interface.
[0010] In accordance with another aspect of the disclosure, a method performed by a head-mounted device is provided. The method includes obtaining, by the head-mounted device, payment-related data based on an image or video obtained through a first camera of the head-mounted device, obtaining, by the head-mounted device, authentication data through a sensor circuit of the head-mounted device based on the obtained payment-related data, and, based on obtaining the authentication data, transmitting, by the head-mounted device, a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through a communication interface of the head-mounted device.
[0011] In accordance with another aspect of the disclosure, one or more non-transitory computer-readable storage media storing one or more computer programs including computer-executable instructions that, when executed by at least one processor of a head-mounted device individually or collectively, cause the head-mounted device to perform operations is provided. The operations include obtaining, by the head-mounted device, payment-related data based on an image or video obtained through a first camera of the head-mounted device, obtaining, by the head-mounted device, authentication data through a sensor circuit of the head-mounted device based on the obtained payment-related data, and, based on obtaining the authentication data, transmitting, by the head-mounted device, a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through a communication interface of the head-mounted device.
[0012] In accordance with another aspect of the disclosure, an electronic device is provided. The electronic device includes memory, comprising one or more storage media, storing instructions, a communication interface, a wireless communication coil configured to wirelessly transmit data, and at least one processor communicatively coupled to the memory, the communication interface and the wireless communication coil wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to receive a payment request signal or authentication data from a head-mounted device through the communication interface, and wirelessly transmit payment information through the wireless communication coil based on receiving the payment request signal or the authentication data.
[0013] Other aspects, advantages, and salient features of the disclosure will become apparent to those skilled in the art from the following detailed description, which, taken in conjunction with the annexed drawings, discloses various embodiments of the disclosure.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0014] The above and other aspects, features, and advantages of certain embodiments of the disclosure will be more apparent from the following description taken in conjunction with the

accompanying drawings, in which:
[0015] FIG. **1** is a block diagram illustrating an electronic device in a network environment according to an embodiment of the disclosure;
[0016] FIG. **2** is a perspective view illustrating an internal configuration of a wearable electronic device according to an embodiment of the disclosure;
[0017] FIGS. **3**A and **3**B are views illustrating front and rear surfaces of a wearable electronic device according to various embodiments of the disclosure;
[0018] FIG. **4** is a block diagram illustrating a head-mounted device according to an embodiment of the disclosure;
[0019] FIG. **5**A is a block diagram illustrating an electronic device according to an embodiment of the disclosure;
[0020] FIG. **5**B is a perspective view illustrating a charging case of a head-mounted device according to an embodiment of the disclosure;
[0021] FIG. **6**A is a flowchart illustrating an operation method of a head-mounted device according to an embodiment of the disclosure;
[0022] FIG. **6**B is a view illustrating a signal flow between a head-mounted device and an electronic device according to an embodiment of the disclosure;
[0023] FIG. **6**C is a view illustrating a signal flow between a head-mounted device and an electronic device according to an embodiment of the disclosure;
[0024] FIG. **6**D is a view illustrating a signal flow between a head-mounted device and an electronic device according to an embodiment of the disclosure;
[0025] FIG. **7** illustrates a visual identifier including data related to payment according to an embodiment of the disclosure;
[0026] FIGS. **8**A and **8**B illustrate a visual notification related to payment provided through a display according to various embodiments of the disclosure;
[0027] FIG. **9**A is a flowchart illustrating an operation method of a head-mounted device according to an embodiment of the disclosure;
[0028] FIG. **9**B is a view illustrating a signal flow between a head-mounted device and an electronic device according to an embodiment of the disclosure;
[0029] FIG. **10**A is a flowchart illustrating a signal flow between a head-mounted device and a payment device according to an embodiment of the disclosure;
[0030] FIG. **10**B illustrates a visual notification related to payment provided through a display according to an embodiment of the disclosure;
[0031] FIG. **11**A is a partial perspective view illustrating a head-mounted device including a wireless communication coil according to an embodiment of the disclosure; and
[0032] FIG. **11**B is a partial perspective view illustrating a head-mounted device including a wireless communication coil according to an embodiment of the disclosure.
[0033] Throughout the drawings, it should be noted that like reference numbers are used to depict the same or similar elements, features, and structures.

DETAILED DESCRIPTION

[0034] The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of various embodiments of the disclosure as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the various embodiments described herein can be made without departing from the scope and spirit of the disclosure. In addition, descriptions of well-known functions and constructions may be omitted for clarity and conciseness.
[0035] The terms and words used in the following description and claims are not limited to the bibliographical meanings, but, are merely used by the inventor to enable a clear and consistent understanding of the disclosure. Accordingly, it should be apparent to those skilled in the art that

the following description of various embodiments of the disclosure is provided for illustration purpose only and not for the purpose of limiting the disclosure as defined by the appended claims and their equivalents.

[0036] It is to be understood that the singular forms “a,” “an,” and “the” include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to “a component surface” includes reference to one or more of such surfaces.

[0037] It should be appreciated that the blocks in each flowchart and combinations of the flowcharts may be performed by one or more computer programs which include instructions. The entirety of the one or more computer programs may be stored in a single memory device or the one or more computer programs may be divided with different portions stored in different multiple memory devices.

[0038] Any of the functions or operations described herein can be processed by one processor or a combination of processors. The one processor or the combination of processors is circuitry performing processing and includes circuitry like an application processor (AP, e.g. a central processing unit (CPU)), a communication processor (CP, e.g., a modem), a graphics processing unit (GPU), a neural processing unit (NPU) (e.g., an artificial intelligence (AI) chip), a wireless fidelity (Wi-Fi) chip, a Bluetooth® chip, a global positioning system (GPS) chip, a near field communication (NFC) chip, connectivity chips, a sensor controller, a touch controller, a finger-print sensor controller, a display driver integrated circuit (IC), an audio CODEC chip, a universal serial bus (USB) controller, a camera controller, an image processing IC, a microprocessor unit (MPU), a system on chip (SoC), an IC, or the like.

[0039] FIG. **1** is a block diagram illustrating an electronic device **101** in a network environment **100** according to an embodiment of the disclosure.

[0040] Referring to FIG. **1**, the electronic device **101** in the network environment **100** may communicate with at least one of an electronic device **102** via a first network **198** (e.g., a short-range wireless communication network), or an electronic device **104** or a server **108** via a second network **199** (e.g., a long-range wireless communication network). According to an embodiment, the electronic device **101** may communicate with the electronic device **104** via the server **108**. According to an embodiment, the electronic device **101** may include a processor **120**, memory **130**, an input module **150**, a sound output module **155**, a display module **160**, an audio module **170**, a sensor module **176**, an interface **177**, a connecting terminal **178**, a haptic module **179**, a camera module **180**, a power management module **188**, a battery **189**, a communication module **190**, a subscriber identification module (SIM) **196**, or an antenna module **197**. In an embodiment, at least one (e.g., the connecting terminal **178**) of the components may be omitted from the electronic device **101**, or one or more other components may be added in the electronic device **101**. According to an embodiment, some (e.g., the sensor module **176**, the camera module **180**, or the antenna module **197**) of the components may be integrated into a single component (e.g., the display module **160**).

[0041] The processor **120** may execute, for example, software (e.g., a program **140**) to control at least one other component (e.g., a hardware or software component) of the electronic device **101** coupled with the processor **120**, and may perform various data processing or computation. According to an embodiment, as at least part of the data processing or computation, the processor **120** may store a command or data received from another component (e.g., the sensor module **176** or the communication module **190**) in volatile memory **132**, process the command or the data stored in the volatile memory **132**, and store resulting data in non-volatile memory **134**. According to an embodiment, the processor **120** may include a main processor **121** (e.g., a central processing unit (CPU) or an application processor (AP)), or an auxiliary processor **123** (e.g., a graphics processing unit (GPU), a neural processing unit (NPU), an image signal processor (ISP), a sensor hub processor, or a communication processor (CP)) that is operable independently from, or in conjunction with, the main processor **121**. For example, when the electronic device **101** includes

the main processor **121** and the auxiliary processor **123**, the auxiliary processor **123** may be configured to use lower power than the main processor **121** or to be specified for a designated function. The auxiliary processor **123** may be implemented as separate from, or as part of the main processor **121**.

[0042] The auxiliary processor **123** may control at least some of functions or states related to at least one component (e.g., the display module **160**, the sensor module **176**, or the communication module **190**) among the components of the electronic device **101**, instead of the main processor **121** while the main processor **121** is in an inactive (e.g., sleep) state, or together with the main processor **121** while the main processor **121** is in an active state (e.g., executing an application). According to an embodiment, the auxiliary processor **123** (e.g., an image signal processor or a communication processor) may be implemented as part of another component (e.g., the camera module **180** or the communication module **190**) functionally related to the auxiliary processor **123**. According to an embodiment, the auxiliary processor **123** (e.g., the neural processing unit) may include a hardware structure specified for artificial intelligence model processing. The artificial intelligence model may be generated via machine learning. Such learning may be performed, e.g., by the electronic device **101** where the artificial intelligence is performed or via a separate server (e.g., the server **108**). Learning algorithms may include, but are not limited to, e.g., supervised learning, unsupervised learning, semi-supervised learning, or reinforcement learning. The artificial intelligence model may include a plurality of artificial neural network layers. The artificial neural network may be a deep neural network (DNN), a convolutional neural network (CNN), a recurrent neural network (RNN), a restricted Boltzmann machine (RBM), a deep belief network (DBN), a bidirectional recurrent deep neural network (BRDNN), deep Q-network or a combination of two or more thereof but is not limited thereto. The artificial intelligence model may, additionally or alternatively, include a software structure other than the hardware structure.

[0043] The memory **130** may store various data used by at least one component (e.g., the processor **120** or the sensor module **176**) of the electronic device **101**. The various data may include, for example, software (e.g., the program **140**) and input data or output data for a command related thereto. The memory **130** may include the volatile memory **132** or the non-volatile memory **134**.

[0044] The program **140** may be stored in the memory **130** as software, and may include, for example, an operating system (OS) **142**, middleware **144**, or an application **146**.

[0045] The input module **150** may receive a command or data to be used by other component (e.g., the processor **120**) of the electronic device **101**, from the outside (e.g., a user) of the electronic device **101**. The input module **150** may include, for example, a microphone, a mouse, a keyboard, keys (e.g., buttons), or a digital pen (e.g., a stylus pen).

[0046] The sound output module **155** may output sound signals to the outside of the electronic device **101**. The sound output module **155** may include, for example, a speaker or a receiver. The speaker may be used for general purposes, such as playing multimedia or playing record. The receiver may be used for receiving incoming calls. According to an embodiment, the receiver may be implemented as separate from, or as part of the speaker.

[0047] The display module **160** may visually provide information to the outside (e.g., a user) of the electronic device **101**. The display **160** may include, for example, a display, a hologram device, or a projector and control circuitry to control a corresponding one of the display, hologram device, and projector. According to an embodiment, the display **160** may include a touch sensor configured to detect a touch, or a pressure sensor configured to measure the intensity of a force generated by the touch.

[0048] The audio module **170** may convert a sound into an electrical signal and vice versa. According to an embodiment, the audio module **170** may obtain the sound via the input module **150**, or output the sound via the sound output module **155** or a headphone of an external electronic device (e.g., an electronic device **102**) directly (e.g., wiredly) or wirelessly coupled with the electronic device **101**.

[0049] The sensor module **176** may detect an operational state (e.g., power or temperature) of the electronic device **101** or an environmental state (e.g., a state of a user) external to the electronic device **101**, and then generate an electrical signal or data value corresponding to the detected state. According to an embodiment, the sensor module **176** may include, for example, a gesture sensor, a gyro sensor, an atmospheric pressure sensor, a magnetic sensor, an accelerometer, a grip sensor, a proximity sensor, a color sensor, an infrared (IR) sensor, a biometric sensor, a temperature sensor, a humidity sensor, or an illuminance sensor.
[0050] The interface **177** may support one or more specified protocols to be used for the electronic device **101** to be coupled with the external electronic device (e.g., the electronic device **102**) directly (e.g., wiredly) or wirelessly. According to an embodiment, the interface **177** may include, for example, a high definition multimedia interface (HDMI), a universal serial bus (USB) interface, a secure digital (SD) card interface, or an audio interface.
[0051] A connecting terminal **178** may include a connector via which the electronic device **101** may be physically connected with the external electronic device (e.g., the electronic device **102**). According to an embodiment, the connecting terminal **178** may include, for example, an HDMI connector, a USB connector, an SD card connector, or an audio connector (e.g., a headphone connector).
[0052] The haptic module **179** may convert an electrical signal into a mechanical stimulus (e.g., a vibration or motion) or electrical stimulus which may be recognized by a user via his tactile sensation or kinesthetic sensation. According to an embodiment, the haptic module **179** may include, for example, a motor, a piezoelectric element, or an electric stimulator.
[0053] The camera module **180** may capture a still image or moving images. According to an embodiment, the camera module **180** may include one or more lenses, image sensors, image signal processors, or flashes.
[0054] The power management module **188** may manage power supplied to the electronic device **101**. According to an embodiment, the power management module **188** may be implemented as at least part of, for example, a power management integrated circuit (PMIC).
[0055] The battery **189** may supply power to at least one component of the electronic device **101**. According to an embodiment, the battery **189** may include, for example, a primary cell which is not rechargeable, a secondary cell which is rechargeable, or a fuel cell.
[0056] The communication module **190** may support establishing a direct (e.g., wired) communication channel or a wireless communication channel between the electronic device **101** and the external electronic device (e.g., the electronic device **102**, the electronic device **104**, or the server **108**) and performing communication via the established communication channel. The communication module **190** may include one or more communication processors that are operable independently from the processor **120** (e.g., the application processor (AP)) and supports a direct (e.g., wired) communication or a wireless communication. According to an embodiment, the communication module **190** may include a wireless communication module **192** (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module) or a wired communication module **194** (e.g., a local area network (LAN) communication module or a power line communication (PLC) module). A corresponding one of these communication modules may communicate with the external electronic device **104** via a first network **198** (e.g., a short-range communication network, such as Bluetooth™, wireless-fidelity (Wi-Fi) direct, or infrared data association (IrDA)) or a second network **199** (e.g., a long-range communication network, such as a legacy cellular network, a fifth generation (5G) network, a next-generation communication network, the Internet, or a computer network (e.g., local area network (LAN) or wide area network (WAN)). These various types of communication modules may be implemented as a single component (e.g., a single chip), or may be implemented as multi components (e.g., multi chips) separate from each other. The wireless communication module **192** may identify or authenticate the electronic device **101** in a

communication network, such as the first network **198** or the second network **199**, using subscriber information (e.g., international mobile subscriber identity (IMSI)) stored in the subscriber identification module **196**.

[0057] The wireless communication module **192** may support a 5G network, after a fourth generation (4G) network, and next-generation communication technology, e.g., new radio (NR) access technology. The NR access technology may support enhanced mobile broadband (eMBB), massive machine type communications (mMTC), or ultra-reliable and low-latency communications (URLLC). The wireless communication module **192** may support a high-frequency band (e.g., the millimeter wave (mmWave) band) to achieve, e.g., a high data transmission rate. The wireless communication module **192** may support various technologies for securing performance on a high-frequency band, such as, e.g., beamforming, massive multiple-input and multiple-output (massive MIMO), full dimensional MIMO (FD-MIMO), array antenna, analog beam-forming, or large scale antenna. The wireless communication module **192** may support various requirements specified in the electronic device **101**, an external electronic device (e.g., the electronic device **104**), or a network system (e.g., the second network **199**). According to an embodiment, the wireless communication module **192** may support a peak data rate (e.g., 20 Gbps or more) for implementing eMBB, loss coverage (e.g., 164 dB or less) for implementing mMTC, or U-plane latency (e.g., 0.5 ms or less for each of downlink (DL) and uplink (UL), or a round trip of 1 ms or less) for implementing URLLC.

[0058] The antenna module **197** may transmit or receive a signal or power to or from the outside (e.g., the external electronic device). According to an embodiment, the antenna module **197** may include one antenna including a radiator formed of a conductor or conductive pattern formed on a substrate (e.g., a printed circuit board (PCB)). According to an embodiment, the antenna module **197** may include a plurality of antennas (e.g., an antenna array). In this case, at least one antenna appropriate for a communication scheme used in a communication network, such as the first network **198** or the second network **199**, may be selected from the plurality of antennas by, e.g., the communication module **190**. The signal or the power may then be transmitted or received between the communication module **190** and the external electronic device via the selected at least one antenna. According to an embodiment, other parts (e.g., radio frequency integrated circuit (RFIC)) than the radiator may be further formed as part of the antenna module **197**.

[0059] According to an embodiment, the antenna module **197** may form a mmWave antenna module. According to an embodiment, the mmWave antenna module may include a printed circuit board, a RFIC disposed on a first surface (e.g., the bottom surface) of the printed circuit board, or adjacent to the first surface and capable of supporting a designated high-frequency band (e.g., the mmWave band), and a plurality of antennas (e.g., array antennas) disposed on a second surface (e.g., the top or a side surface) of the printed circuit board, or adjacent to the second surface and capable of transmitting or receiving signals of the designated high-frequency band.

[0060] At least some of the above-described components may be coupled mutually and communicate signals (e.g., commands or data) therebetween via an inter-peripheral communication scheme (e.g., a bus, general purpose input and output (GPIO), serial peripheral interface (SPI), or mobile industry processor interface (MIPI)).

[0061] According to an embodiment, commands or data may be transmitted or received between the electronic device **101** and the external electronic device **104** via the server **108** coupled with the second network **199**. The external electronic devices **102** or **104** each may be a device of the same or a different type from the electronic device **101**. According to an embodiment, all or some of operations to be executed at the electronic device **101** may be executed at one or more of the external electronic devices **102** or **104**, or the server **108**. For example, if the electronic device **101** should perform a function or a service automatically, or in response to a request from a user or another device, the electronic device **101**, instead of, or in addition to, executing the function or the service, may request the one or more external electronic devices to perform at least part of the

function or the service. The one or more external electronic devices receiving the request may perform the at least part of the function or the service requested, or an additional function or an additional service related to the request, and transfer an outcome of the performing to the electronic device **101**. The electronic device **101** may provide the outcome, with or without further processing of the outcome, as at least part of a reply to the request. To that end, a cloud computing, distributed computing, mobile edge computing (MEC), or client-server computing technology may be used, for example. The electronic device **101** may provide ultra low-latency services using, e.g., distributed computing or mobile edge computing. In another embodiment, the external electronic device **104** may include an Internet-of-things (IoT) device. The server **108** may be an intelligent server using machine learning and/or a neural network. According to an embodiment, the external electronic device **104** or the server **108** may be included in the second network **199**. The electronic device **101** may be applied to intelligent services (e.g., smart home, smart city, smart car, or health-care) based on 5G communication technology or IoT-related technology.

[0062] FIG. **2** is a perspective view illustrating an internal configuration of a wearable electronic device **200** according to an embodiment of the disclosure.

[0063] Referring to FIG. **2**, according to an embodiment of the disclosure, a wearable electronic device **200** may include at least one of a light output module **211**, a display member **201**, and a camera module **250**.

[0064] According to an embodiment of the disclosure, the light output module **211** may include a light source capable of outputting an image and a lens guiding the image to the display member **201**. According to an embodiment of the disclosure, the light output module **211** may include at least one of a liquid crystal display (LCD), a digital mirror device (DMD), a liquid crystal on silicon (LCoS), an organic light emitting diode (OLED), or a micro light emitting diode (micro LED).

[0065] According to an embodiment of the disclosure, the display member **201** may include an optical waveguide (e.g., a waveguide). According to an embodiment of the disclosure, the image output from the light output module **211** incident on one end of the optical waveguide may propagate inside the optical waveguide and be provided to the user. According to an embodiment of the disclosure, the optical waveguide may include at least one of at least one diffractive element (e.g., a diffractive optical element (DOE) or a holographic optical element (HOE)) or a reflective element (e.g., a reflective mirror). For example, the optical waveguide may guide the image output from the light output module **211** to the user's eyes using at least one diffractive element or reflective element.

[0066] According to an embodiment of the disclosure, the camera module **250** may capture still images and/or moving images. According to an embodiment, the camera module **250** may be disposed in a lens frame and may be disposed around the display member **201**.

[0067] According to an embodiment of the disclosure, a first camera module **251** may capture and/or recognize the trajectory of the user's eye (e.g., pupil or iris) or gaze. According to an embodiment of the disclosure, the first camera module **251** may periodically or aperiodically transmit information related to the trajectory of the user's eye or gaze (e.g., trajectory information) to a processor (e.g., the processor **120** of FIG. **1**).

[0068] According to an embodiment of the disclosure, a second camera module **253** may configured to capture an external image.

[0069] According to an embodiment of the disclosure, a third camera module **255** may be used for hand detection and tracking, and recognition of the user's gesture (e.g., hand motion). According to an embodiment of the disclosure, the third camera module **255** may be used for 3 degrees of freedom (3DoF) or 6DoF head tracking, location (space, environment) recognition and/or movement recognition. The second camera module **253** may also be used for hand detection and tracking and recognition of the user's gesture. According to an embodiment of the disclosure, at least one of the first camera module **251** to the third camera module **255** may be replaced with a

sensor module (e.g., a LIDAR sensor). For example, the sensor module may include at least one of a vertical cavity surface emitting laser (VCSEL), an infrared sensor, and/or a photodiode.
[0070] FIGS. **3**A and **3**B are views illustrating front and rear surfaces of a wearable electronic device **300** according to various embodiments of the disclosure.
[0071] Referring to FIGS. **3**A and **3**B, in an embodiment, camera modules **311**, **312**, **313**, **314**, **315**, and **316** and/or a depth sensor **317** for obtaining information related to the ambient environment of the wearable electronic device **300** may be disposed on the first surface **310** of the housing.
[0072] In an embodiment, the camera modules **311** and **312** may obtain images related to the ambient environment of the wearable electronic device.
[0073] In an embodiment, the camera modules **313**, **314**, **315**, and **316** may obtain images while the wearable electronic device is worn by the user. The camera modules **313**, **314**, **315**, and **316** may be used for hand detection, tracking, and recognition of the user gesture (e.g., hand motion). The camera modules **313**, **314**, **315**, and **316** may be used for 3D oF or 6DoF head tracking, location (space or environment) recognition, and/or movement recognition. In an embodiment, the camera modules **311** and **312** may be used for hand detection and tracking and recognition of the user's gesture.
[0074] In an embodiment, the depth sensor **317** may be configured to transmit a signal and receive a signal reflected from an object and be used for identifying the distance to the object, such as time of flight (TOF). Alternatively or additionally to the depth sensor **317**, the camera modules **313**, **314**, **315**, and **316** may identify the distance to the object.
[0075] According to an embodiment, camera modules **325** and **326** for face recognition and/or a display **321** (and/or lens) may be disposed on the second surface **320** of the housing.
[0076] In an embodiment, the face recognition camera modules **325** and **326** adjacent to the display may be used for recognizing the user's face or may recognize and/or track both eyes of the user.
[0077] In an embodiment, the display **321** (and/or lens) may be disposed on the second surface **320** of the wearable electronic device **300**. In an embodiment, the wearable electronic device **300** may not include the camera modules **315** and **316** among the plurality of camera modules **313**, **314**, **315**, and **316**. Although not shown in FIGS. **3**A and **3**B, the wearable electronic device **300** may further include at least one of the components shown in FIG. **2**.
[0078] As described above, according to an embodiment, the wearable electronic device **300** may have a form factor to be worn on the user's head. The wearable electronic device **300** may further include a strap and/or a wearing member to be fixed on the user's body part. The wearable electronic device **300** may provide the user experience based on augmented reality, virtual reality, and/or mixed reality while worn on the user's head.
[0079] FIG. **4** is a block diagram illustrating a head-mounted device (HMD) **400** according to an embodiment of the disclosure.
[0080] Referring to FIG. **4**, the head-mounted device **400** (e.g., the wearable electronic device **200** of FIG. **2** or the wearable electronic device **300** of FIG. **3**A) according to an embodiment may include a first camera **410**, a sensor circuit **420**, a first communication interface **430**, a first processor **440** (e.g., the processor **120** of FIG. **1**) and/or a display **450**. Here, the head-mounted device **400** may include some of the components of the electronic device **101** of FIG. **1**, the wearable electronic device **200** of FIG. **2**, or the wearable electronic device **300** of FIG. **3**A.
[0081] In an embodiment, the first camera **410** (e.g., the second camera module **253** of FIG. **2**) is included in the head-mounted device **400** and may capture an image or video of the outside (e.g., in front). In an embodiment, the first camera **410** may be disposed so that a field of view (FOV) includes a gaze direction of the user wearing the head-mounted device **400**, and may obtain an image or video corresponding to an image or video recognizable by the user.
[0082] In an embodiment, the sensor circuit **420** may configured to obtain authentication data. In an embodiment, the authentication data may include the user's biometric data or a designated pattern.

[0083] In an embodiment, the sensor circuit **420** may include a second camera **425** (e.g., the first camera module **251** of FIG. **2**) that captures the user's eyeball. In an embodiment, the second camera **425** may capture and/or recognize an iris and/or a pupil included in the captured user's eyeball. In an embodiment, the second camera **425** may be provided with an LED that emits light (e.g., infrared (IR) light) of a designated frequency band to the user's eyeball.
[0084] In an embodiment, the head-mounted device **400** or the electronic device (e.g., the electronic device **500** of FIG. **5**A) may extract the image of the captured and/or recognized iris, and use the extracted image of the iris as biometric data and/or authentication data. In an embodiment, the head-mounted device **400** may track the user's gaze direction based on the captured and/or recognized pupil. In an embodiment, the sensor circuit **420** may further include a biometric sensor (not illustrated) that obtains the user's biometric data, such as a fingerprint sensor (not illustrated), a voice sensor (not illustrated), or a face recognition sensor (not illustrated), and a motion sensor (not illustrated) that detects the user's head movement or a touch sensor (not illustrated) that detects the user's touch.
[0085] In an embodiment, the sensor circuit **420** may include a third camera **427** (e.g., the third camera module **255** of FIG. **2**) that detects the user's hand or recognizes the user's gesture (e.g., hand motion). In an embodiment, the third camera **427** is disposed to capture a designated position or direction where the user's hand may be positioned, and may capture an image corresponding to the user's gesture. In an embodiment, the head-mounted device **400** or the electronic device (e.g., the electronic device **500** of FIG. **5**A) may use the user's gesture as authentication data by determining whether the user's gesture captured or recognized by the third camera **427** matches a designated pattern. In an embodiment, the user's gesture may be used as authentication data as well as authentication data related to payment. In an embodiment, the user's gesture may be a payment-related signature or a pattern for unlocking the smartphone on a virtual screen. In an embodiment, the user may input a pattern using a gaze as well as input a pattern using the user's hand motion.
[0086] In an embodiment, the first communication interface **430** may communicate with an electronic device (e.g., the electronic device **500** of FIG. **5**A) through a designated communication scheme. In an embodiment, the head-mounted device **400** may set a connection state with the electronic device **500** in a connection method designated through the first communication interface **430**. Here, the operation of setting the connection state may include an operation in which the head-mounted device **400** performs wireless connection with an electronic device (e.g., the electronic device **500** of FIG. **5**A) through the first communication interface **430**. For example, the designated communication scheme may be a wired communication scheme, or at least one wireless communication scheme among Bluetooth (BT), Wi-Fi direct, mobile hotspot, and Wi-Fi connection and/or Wi-Fi tethering using AP (access point).
[0087] In an embodiment, the first processor **440** may execute an application or operation stored in memory (not illustrated, e.g., the memory **130** of FIG. **1**). In an embodiment, the first processor **440** may control at least one other component (e.g., a hardware or software component) included in the head-mounted device **400**, or may perform various data processing or computations.
[0088] In an embodiment, the first processor **440** may provide a visual notification to the user by displaying a specific screen recognizable by the user through the display **450**. In an embodiment, the first processor **440** may be disposed to display a specific screen in front of the user's eyeball through the display **450**. For example, the display **450** may include a liquid crystal display (LCD), a digital mirror device (DMD) display, a liquid crystal on silicon (LCoS) display, an organic light emitting diode (OLED) display, or a micro LED display. In an embodiment, when the display **450** is formed of one of a liquid crystal display device, a digital mirror device display, or an LCoS display, it may further include a light source for irradiating light to a screen output area of the display **450**. In an embodiment, when the display **450** is formed of one of an organic light emitting diode display or a micro LED display, a good quality screen may be provided even when a separate light source is not included. In an embodiment, the display **450** may display a screen in a

transparent or translucent display area (e.g., the display member **201** of FIG. **2**), and may transfer light to the display area through a waveguide.

[0089] FIG. **5**A is a block diagram illustrating an electronic device **500** (e.g., the electronic device **101** of FIG. **1**) according to an embodiment of the disclosure.

[0090] Referring to FIG. **5**A, an electronic device **500** according to an embodiment may include a wireless communication coil **510**, a second communication interface **520**, and/or a second processor **530** (e.g., the processor **120** of FIG. **1**).

[0091] In an embodiment, the wireless communication coil **510** may be a near field communication (NFC) coil or antenna, or a magnetic secure transmission (MST) coil or antenna. In an embodiment, the wireless communication coil **510** may be implemented as a coil or an antenna, and for example, may be implemented in the form of a chip on a circuit board. In an embodiment, the wireless communication coil **510** may transmit payment information, which is data of a short-range wireless communication or magnetic secure transmission type. In an embodiment, a payment device (e.g., the payment device C of FIG. **10**A, e.g., a point of sales (POS) device, an NFC reader, and/or an MST reader) may receive payment information transmitted from the wireless communication coil **510**.

[0092] In an embodiment, the electronic device **500** may communicate with a mobile payment service server for implementing a mobile payment service, and/or a payment server of a card company (and/or a financial institution). In an embodiment, the head-mounted device (e.g., the head-mounted device **400** of FIG. **4**) may communicate with a mobile payment service server for mobile payment service implementation, and/or a payment server of a card company (and/or a financial institution) directly or through the electronic device **500**.

[0093] For example, the mobile payment service server may include a server (e.g., a token service provider (TSP) server) that manages tokens related to payment applications. For example, a payment server of a card company (and/or a financial institution) may include a server (e.g., a trusted service manager (TSM) server) that manages the user's financial account. According to an embodiment, the mobile payment service server may provide payment information (e.g., a one-time token (OTT)) to the electronic device **500** at each payment transaction by interacting with the payment server of a card company (and/or a financial institution), and the electronic device **500** may transmit the payment information, received after undergoing designated security authentication, to the payment device (e.g., the payment device C of FIG. **10**A). The payment device (e.g., the payment device C of FIG. **10**A) may complete the payment transaction by transmitting the payment information back to the payment server of the card company (and/or financial institution) and obtaining payment approval.

[0094] In an embodiment, for near field communication (NFC), the NFC standard (e.g., ISO/IEC 21481) specifies a communication protocol and data exchange format and adopts an unauthorized radio frequency ISM band, so that it may use a frequency in the 13.56 MHz band. In an embodiment, the wireless communication coil **510** may include an NFC antenna for near field communication, a modulator that modulates a signal to be transmitted through the antenna, and a demodulator that demodulates a signal received through the antenna may be included. In an embodiment, the NFC antenna may be connected to the modulator and demodulator through passive elements, and may be mounted on the inner surface of the case of the communication device to wirelessly communicate with other communication devices based on the magnetic field generated by the antenna.

[0095] In an embodiment, the magnetic secure transmission (MST) method uses a pulse-modulated magnetic field to transmit data to the payment device, and may emit magnetic pulses in the form similar to magnetic field fluctuation caused by swiping of a real card. For example, when the wireless communication coil **510** sequentially transmits magnetic pulses in n radiation patterns, the reception radiation pattern adopted by the actual payment device (e.g., the payment device C of FIG. **10**A) may correspond to the nth radiation pattern. In this case, before the wireless

communication coil **510** transmits the magnetic pulse according to the nth radiation pattern, the operation of transmitting the magnetic pulse in n−1 radiation patterns may become meaningless.
[0096] In an embodiment, magnetic secure transmission may be used to transmit tokenized card data to the payment device. In an embodiment, the actual payment card number or portion of it is replaced by a cryptographically generated token, and the token may be in the form of track data, including token data in the format similar to a standard primary account number (PAN). The PAN may include a valid bank identification number (BIN). The token may be downloaded from the card issuer or another online source, or locally generated. The MST transmission of the token may replace the transmission of the valid card number by transmitting a cryptographically generated token that is valid only for one transaction. Therefore, the MST transmission of the token may eliminate the security risk inherent in standard magnetic secure transmission without the need to replace the hardware of the present payment device.
[0097] According to an embodiment, one or more pieces of track data may be transmitted to enhance compatibility with hardware and software of the existing payment device. In an embodiment, the transmission of track 1 data may follow the transmission of track 2 data, or the transmission of track 2 data may follow the transmission of track 1 data.
[0098] In an embodiment, the track 1 data may include start sentinel (SS), field code (FC), primary account number (PAN), field separator (FS), name, additional data (including expiration date and/or service code), discretionary data, end sentinel (ES), and/or longitudinal redundancy check character (LRC). In an embodiment, the track 2 data may include start sentinel (SS), primary account number (PAN), field separator (FS), additional data (including expiration date and/or service code), discretionary data, end sentinel (ES), and/or longitudinal redundancy check character (LRC). In an embodiment, the track 3 data may include start sentinel (SS), field code (FC), use and security data (country code, currency code, currency exponent, amount authorized per cycle, amount remaining this cycle, cycle begin, cycle length, retry count, PIN control parameters, interchange controls, PAN service restriction, SAN-1 service restriction, SAN-2 service restriction, expiration date, and/or card sequence number, card security number.
[0099] For example, according to the magnetic secure transmission radiation pattern P1, the payment data may be converted into a format corresponding to track 2 of the real card, the Baud rate may be set to **200**, and the number of ‘0’ (i.e., lead zero) transmitted before transmission of payment data may be set to 30. Further, ‘0’ (i.e., tail zero) transmitted after transmission of payment data is set to 15. After the magnetic pulse corresponding to the payment data is emitted in such a pattern, without a special delay time (delay=‘0’), the magnetic pulse may be retransmitted in reverse order. For example, payment data is converted to a format corresponding to track 2, the Baud rate of magnetic pulses is set to 200, and the number of ‘0’s (i.e., lead zeros) transmitted before transmission of payment data and the number of ‘0’s (i.e., tail zeros) transmitted after transmission of the payment data may be set to 15 and 30, respectively.
[0100] For example, according to the radiation pattern P2, the payment data is converted into a format corresponding to track 2 of the real card, the Baud rate is set to 800, and the number of ‘0’s (i.e., lead zeros) transmitted before the transmission of the payment data may be set to 30. Further, the number of ‘0’s (i.e., tail zeros) transmitted after transmission of payment data may be set to 30. When the magnetic pulse is radiated in the radiation pattern P2 **602**, e.g., after 950 ms (delay=‘950’ in P2), the magnetic pulse may be radiated according to the next radiation pattern P3.
[0101] In an embodiment, the second communication interface **520** may communicate with a head-mounted device (e.g., the head-mounted device **400** of FIG. **2** or the first communication interface **430**) through a designated communication scheme. In an embodiment, the electronic device **500** may set a connection state with the head-mounted device **400** in a connection method designated through the second communication interface **520**. For example, the designated communication scheme may be a wired communication scheme, or at least one wireless communication scheme among Bluetooth (BT), Wi-Fi direct, mobile hotspot, and Wi-Fi connection and/or Wi-Fi tethering

using AP (access point).
[0102] In an embodiment, the electronic device **500** may be directly communicatively connected to the head-mounted device **400** through a designated communication scheme through the second communication interface **520**, and in an embodiment, may be communicatively connected through a separate device. For example, the electronic device **500** and the head-mounted device **400** may be communicatively connected to a separate external device (not illustrated), and a separate external device (not illustrated) may relay the communicative connection between the electronic device **500** and the head-mounted device **400**. For example, a smartphone (not illustrated) connected to the head-mounted device **400** and the smartwatch **500** at the same time may set up an indirect communication connection between the head-mounted device **400** and the smartwatch **500** by relaying signal transmission/reception between the head-mounted device **400** and the smartwatch **500**. In an embodiment, the electronic device **500** may be in the form of a ring including the wireless communication coil **510**.
[0103] In an embodiment, the second processor **530** may execute an application or operation stored in memory (not illustrated, e.g., the memory **130** of FIG. **1**). In an embodiment, the second processor **530** may control at least one other component (e.g., a hardware or software component) included in the electronic device **500**, or may perform various data processing or computations.
[0104] In an embodiment, the electronic device **500** may be a portable communication device (e.g., a smartphone), a computer device, or a portable multimedia device (e.g., a tablet), or a wearable device such as a smart watch or earbuds. As an example, the electronic device **500** may be a charging case **500** of the head-mounted device **400**.
[0105] FIG. **5**B is a perspective view illustrating a charging case **500** of a head-mounted device (e.g., the head-mounted device **400** of FIG. **4**) according to an embodiment of the disclosure.
[0106] Referring to FIG. **5**B, the charging case **500** of the head-mounted device **400** according to an embodiment may be an example of the electronic device of FIG. **5**A. In an embodiment, the charging case **500** may communicate with the head-mounted device **400** through a designated communication scheme.
[0107] In an embodiment, the charging case **500** may include a charging coil **550** for charging a battery (e.g., the battery **189** of FIG. **1**) included in the head-mounted device **400** in contact with or adjacent to the head-mounted device **400**.
[0108] In an embodiment, the charging case **500** may include a wireless communication coil **510**, which is a near field communication (NFC) coil or a magnetic secure transmission (MST) coil.
[0109] FIG. **6**A is a flowchart **600** illustrating an operation method of a head-mounted device **400** according to an embodiment of the disclosure. FIG. **6**B is a view illustrating a signal flow between a head-mounted device **400** and an electronic device **500** according to an embodiment of the disclosure.
[0110] Referring to FIGS. **6**A and **6**B, the electronic device **500** according to an embodiment may be a portable communication device (e.g., a smartphone).
[0111] In an embodiment, the head-mounted device **400** according to the embodiment may set a connection state with the electronic device **500** in a designated connection method through the first communication interface (e.g., the first communication interface **430** of FIG. **4**) in operation **610**.
[0112] In an embodiment, the head-mounted device **400** may set a connection state with the electronic device **500** in a wired or wireless designated connection method. In an embodiment, the head-mounted device **400** may set a connection state with the electronic device **500** when separated from the charging case or worn or booted by the user. In an embodiment, the head-mounted device **400** may transmit a signal to the electronic device **500** or receive a signal from the electronic device **500** based on the set connection state.
[0113] In an embodiment, the head-mounted device **400** may set a one-time connection state with the electronic device **500** owned by another person through a wired or wireless designated connection method. In an embodiment, the head-mounted device **400** may one-time use the

personal information or security information included in authentication data, the payment application execution signal, and/or the payment request signal, or may automatically delete personal information or security information after the payment operation of the electronic device **500**.

[0114] In an embodiment, in operation **610**, the electronic device **500** may set a connection state with the head-mounted device **400** through a second communication interface (e.g., the second communication interface **520** of FIG. **5**A) in a designated connection method.

[0115] In an embodiment, the head-mounted device **400** may display a screen on a display (e.g., the display **450** of FIG. **4**), and a virtual object (e.g., the virtual object O of FIG. **8**A) may be included on the screen. In an embodiment, data related to the virtual object may be generated by the head-mounted device **400** or may be received from the electronic device **500**.

[0116] In an embodiment, the head-mounted device **400** performs processing and rendering an image corresponding to a virtual object and output the generated image based on the processing and rendering to a display member (e.g., the display member **201** of FIG. **2**) through a display (e.g., the light output module **211** of FIG. **2**).

[0117] In an embodiment, the electronic device **500** performs image processing and rendering processing image corresponding to the virtual object, and the head-mounted device **400** may receive image information (e.g., content) generated based on the processing and rendering from the electronic device **500**. The head-mounted device **400** may display a virtual object on the display member through a display using image information received from the electronic device **500**.

[0118] In an embodiment, in operation **620**, the head-mounted device **400** may obtain payment-related data based on an image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**). The head-mounted device **400** may obtain an image or video in real-time through the first camera, and obtain payment-related data from the obtained image or video in real-time.

[0119] In an embodiment, the head-mounted device **400** may obtain payment-related data based on at least one of a visual identifier (e.g., the visual identifier I of FIG. **7**), a designated gesture, or a designated object included in the obtained image or video. In an embodiment, the head-mounted device **400** may pre-store the designated visual identifier, the designated gesture, or the designated object related to payment, and identify the pre-stored visual identifier, gesture, or object from the obtained image or video.

[0120] In an embodiment, the visual identifier may be a payment icon (e.g., Samsung Pay). In an embodiment, the head-mounted device **400** may obtain data related to payment corresponding to the identified visual identifier and, accordingly, transmit a payment application execution signal to the electronic device **500**.

[0121] In an embodiment, the designated gesture may be a hand motion designated in relation to a mobile payment, and may be a gesture related to the user's signature. In an embodiment, the designated gesture is designated corresponding to each of a plurality of payment methods (e.g., by card) or a plurality of payment applications, and the head-mounted device **400** may transmit a payment application execution signal corresponding to the identified designated gesture to the electronic device **500**.

[0122] In an embodiment, the designated object may be a point of sales (POS) device, an NFC reader, or an MST reader.

[0123] In an embodiment, the head-mounted device **400** may obtain payment-related data through object classification or object recognition from the obtained image or video even when it is not designated in advance. In an embodiment, the head-mounted device **400** may be capable of optical character recognition (OCR) or object classification or object recognition using an artificial intelligence neural network.

[0124] In an embodiment, the head-mounted device **400** may track the user's gaze direction based on an image or video captured by the second camera (e.g., the second camera **425** of FIG. **4**), and obtain data related to payment in response to the user's gaze direction tracked from the obtained

image or video. In an embodiment, the head-mounted device **400** may track the user's gaze direction and obtain payment-related data from a visual identifier or an object at a position corresponding to the user's gaze direction from the image or video captured by the first camera.
[0125] In an embodiment, the head-mounted device **400** may obtain not only the user's gaze, but also an image or video corresponding to the user's gaze direction and the direction indicated by the user's hand (e.g., an operation in which the user points near the POS device with his hand), and obtain payment-related data based on the obtained image or video.
[0126] In an embodiment, the payment-related data may be the user's intent to pay or recognition of a circumstance where payment is required, or data related to a designated payment method in response to a designated visual identifier, a designated gesture, or a designated object. For example, when the head-mounted device **400** recognizes the payment icon (e.g., Samsung Pay), the head-mounted device **400** may obtain data (Samsung Pay) related to mobile payment corresponding to the corresponding icon.
[0127] In an embodiment, in operation **630**, the head-mounted device **400** may provide a visual notification related to payment through a display (e.g., the display **450** of FIG. **4**). In an embodiment, when payment-related data is obtained, the head-mounted device **400** may display a visual notification related to payment on the display. Here, the visual notification may be provided in various forms, and a recognized visual identifier, gesture, or virtual object may be displayed at a position adjacent to the object, or a designated notification (e.g., notification N of FIG. **8**B) related to payment may be displayed.
[0128] In an embodiment, the head-mounted device **400** may receive an input corresponding to the visual notification related to the payment displayed on the display from the user, and determine whether to proceed with the payment based on the user's input. For example, the user's input may be obtained by gesture, touch, head movement, and pupil movement. In an embodiment, the head-mounted device **400** may perform the next operation based on receiving an acknowledgment signal (ack signal) from the electronic device **500**.
[0129] In an embodiment, the head-mounted device **400** may omit the operation **630** of providing a visual notification related to payment and/or the operation of receiving an input corresponding to the visual notification related to payment from the user.
[0130] In an embodiment, in operation **640**, the head-mounted device **400** may transmit a payment application execution signal corresponding to payment-related data to the electronic device **500**. In an embodiment, the head-mounted device **400** may transmit a payment application execution signal to the electronic device **500** through the first communication interface in a designated connection method, and the payment application execution signal may be a signal for executing a payment application corresponding to the obtained payment-related data.
[0131] In an embodiment, when receiving the payment application execution signal, the electronic device **500** may execute the payment application in operation **645**. Here, the payment application corresponds to payment-related data obtained by the head-mounted device **400**, and may be, e.g., a Samsung Pay application.
[0132] In an embodiment, the electronic device **500** may execute the payment application corresponding to the payment application execution signal among one or more payment applications. In an embodiment, when the payment application is not stored, the electronic device **500** may transmit a signal related to payment suspension to the head-mounted device **400**.
[0133] In an embodiment, when the payment application is not stored, the electronic device **500** may execute an installation operation (e.g., an operation of executing an application installation program (Google Play or App Store) that automatically installs the corresponding payment application.
[0134] In an embodiment, in operation **650**, the head-mounted device **400** may obtain authentication data from the user. In an embodiment, the authentication data may include biometric data or a pattern (e.g., gesture) of a designated form. In an embodiment, the head-mounted device

400 may perform operation **650** based on receiving an acknowledgment signal (ack signal) corresponding to the payment application execution signal from the electronic device **500**.

[0135] In an embodiment, in operation **660**, the head-mounted device **400** may transmit a payment request signal for wirelessly transmitting payment information or obtained authentication data to the electronic device **500**.

[0136] In an embodiment, the head-mounted device **400** may transmit authentication data obtained together with the payment request signal. In an embodiment, the payment request signal may be a signal for requesting payment information to be wirelessly transmitted when authentication data matches designated data.

[0137] In an embodiment, in operation **655**, the electronic device **500** may identify whether the authentication data received from the head-mounted device **400** matches the designated data. Here, the designated data may be user authentication data previously stored in the electronic device **500**.

[0138] In an embodiment, when the authentication data matches based on the identification result, the electronic device **500** may execute payment in operation **670**. The electronic device **500** may omit a separate password authentication procedure and execute payment based on the authentication data received from the head-mounted device **400**. In an embodiment, the electronic device **500** may transmit payment information of a near field communication or magnetic secure transmission method through the wireless communication coil.

[0139] In an embodiment, when the authentication data does not match based on the identification result, the electronic device **500** may receive authentication data in operation **657**. In an embodiment, when the authentication data received from the head-mounted device **400** does not match the designated data, the electronic device **500** may receive authentication data (e.g., fingerprint, iris, pattern) from the user in the electronic device **500**.

[0140] In an embodiment, when payment is executed, the electronic device **500** may transmit image data related to the user's signature information to the head-mounted device **400**. In an embodiment, image data related to signature information may be previously stored in the head-mounted device **400** or the electronic device **500**.

[0141] In an embodiment, the head-mounted device **400** may display the user's signature information through a display based on the received image data. In an embodiment, the head-mounted device **400** may display the signature information on the display with the signature information with a left-right inversion, allowing the signature information to be recognized from the opposite side of the user wearing the head-mounted device **400**.

[0142] FIG. **6**C is a view illustrating a signal flow between a head-mounted device **400** and an electronic device **500** according to an embodiment of the disclosure.

[0143] Referring to FIG. **6**C, in operation **610**, the head-mounted device **400** and the electronic device **500** according to the embodiment may set a connection state through the first communication interface (e.g., the first communication interface **430** of FIG. **4**) and the second communication interface (e.g., the second communication interface **520** of FIG. **5**A) in a designated connection method.

[0144] In an embodiment, in operation **620**, the head-mounted device **400** may obtain payment-related data based on an image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**).

[0145] In an embodiment, in operation **650**, the head-mounted device **400** may obtain authentication data from the user.

[0146] In an embodiment, in operation **660**, the head-mounted device **400** may sequentially or simultaneously transmit a payment application execution signal corresponding to payment-related data and the obtained authentication data to the electronic device **500**.

[0147] In an embodiment, when receiving the payment application execution signal and the obtained authentication data, the electronic device **500** may execute a payment application in operation **645**.

[0148] In an embodiment, authentication data obtained by the head-mounted device **400** may be included in the payment request signal. In an embodiment, the head-mounted device **400** may transmit a payment request signal to the electronic device **500** through the first communication interface.
[0149] In an embodiment, in operation **655**, the electronic device **500** may identify whether the authentication data received from the head-mounted device **400** matches the designated data. Here, the designated data may be user authentication data previously stored in the electronic device **500**.
[0150] In an embodiment, when the authentication data matches based on the identification result, the electronic device **500** may execute payment in operation **670**. In an embodiment, the electronic device **500** may transmit payment information of a near field communication or magnetic secure transmission method through a wireless communication coil (e.g., the wireless communication coil **510** of FIG. **5**A).
[0151] In an embodiment, when the authentication data does not match based on the identification result, the electronic device **500** may receive authentication data from the user in operation **657**.
[0152] FIG. **6**D is a signal flow chart between a head-mounted device **400** and an electronic device **500** according to an embodiment of the disclosure.
[0153] Referring to FIG. **6**D, the head-mounted device **400** according to the embodiment may detect the user's wearing of the head-mounted device **400** in operation **605**. In an embodiment, the head-mounted device **400** may detect the user's wearing of the head-mounted device **400** by detecting contact with the user's skin by a contact sensor or separation from the charging case through communication with the charging case. In an embodiment, when the head-mounted device **400** detects separation from the charging case, the power may be automatically turned on or booted.
[0154] In an embodiment, after detecting the user's wearing of the head-mounted device **400**, the head-mounted device **400** may continuously monitor the wearing state and detect the user's release of the wearing state.
[0155] According to an embodiment, the head-mounted device **400** may obtain authentication data from the user in operation **650**. When the charging case is unlocked or opened, according to an embodiment the head-mounted device **400** may capture and recognize the user's face through at least one camera (e.g., the first camera **410** of FIG. **4** or the second camera module **253** of FIG. **2**) of the head-mounted device **400**, and obtain authentication data accordingly.
[0156] According to an embodiment, the head-mounted device **400** and the electronic device **500** may set the connection state in a designated connection method through a first communication interface (e.g., the first communication interface **430** of FIG. **4**) and a second communication interface (e.g., the second communication interface **520** of FIG. **5**A) in operation **610**.
[0157] In operation **655**, according to an embodiment, the head-mounted device **400** may transmit the authentication data obtained from the user to the electronic device **500** through the first communication interface.
[0158] In an embodiment, the head-mounted device **400** may partially change the order of operation **605**, operation **650**, operation **610**, and operation **655**. For example, the head-mounted device **400** may perform operation **610** of setting the connection state in a specified connection method before operation **605** of detecting the wearing of the head-mounted device **400** or before operation **650** of obtaining authentication data.
[0159] In an embodiment, in operation **620**, the head-mounted device **400** may obtain payment-related data based on an image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**).
[0160] In an embodiment, in operation **660**, the head-mounted device **400** may transmit a payment request signal requesting for wirelessly transmitting payment information to the electronic device **500**. In an embodiment, when the user keeps on wearing the head-mounted device **400**, the head-mounted device **400** and/or the electronic device **500** may skip the additional operation of

transmitting/receiving authentication data. In an embodiment, the payment request signal may be a signal for requesting payment information to be wirelessly transmitted when authentication data matches the designated data.

[0161] In an embodiment, in operation **655**, the electronic device **500** may identify whether the authentication data received from the head-mounted device **400** matches the designated data. Here, the designated data may be user authentication data previously stored in the electronic device **500**.

[0162] In an embodiment, when the authentication data matches based on the identification result, the electronic device **500** may execute payment in operation **670**. In an embodiment, the electronic device **500** may transmit payment information of a near field communication or magnetic secure transmission method through the wireless communication coil.

[0163] In an embodiment, when the authentication data does not match based on the identification result, the electronic device **500** may receive authentication data in operation **657**.

[0164] In an embodiment, when authentication data does not match based on the identification result, the electronic device **500** may transmit a signal for deactivating an operation related to payment to the head-mounted device **400**.

[0165] FIG. **7** illustrates a visual identifier I including data related to payment according to an embodiment of the disclosure.

[0166] Referring to FIG. **7**, according to an embodiment, the head-mounted device (e.g., the head-mounted device **400** of FIG. **4**) may obtain payment-related data based on an image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**).

[0167] In an embodiment, the head-mounted device may recognize a visual identifier I included in the image or video, and the visual identifier I may be, e.g., a payment icon (e.g., Samsung Pay) as illustrated in FIG. **7** or a payment icon attached to or displayed on a POS device (e.g., the payment device of FIG. **10**A). In an embodiment, when recognizing a payment icon as illustrated in FIG. **7**, the head-mounted device may obtain payment-related data including the user's payment intent, a payment method, and/or a payment application.

[0168] FIGS. **8**A and **8**B illustrate a visual notification related to payment provided through a display **450** according to various embodiments of the disclosure.

[0169] Referring to FIGS. **8**A and **8**B, according to an embodiment, the head-mounted device **400** may provide a visual notification related to payment through the display **450** when payment-related data is obtained.

[0170] In an embodiment, as illustrated in FIG. **8**A, the head-mounted device **400** may provide a visual notification including the virtual object O. In an embodiment, the virtual object O may be displayed adjacent to the visual identifier I or a designated object (not illustrated), which is a real object included in the image or video obtained through the first camera.

[0171] In an embodiment, the head-mounted device **400** may provide the visual identifier I included in the image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**) or a visual notification (e.g., bordering) emphasizing the designated object (not illustrated) in the form of the virtual object.

[0172] In an embodiment, as illustrated in FIG. **8**B, the head-mounted device **400** may display a designated notification N related to payment. In an embodiment, the designated notification N may be an image related to card information previously stored in the electronic device **500** or the head-mounted device **400**, and the head-mounted device **400** may provide an image including at least one piece of pre-stored card information.

[0173] In an embodiment, the head-mounted device **400** may obtain an input corresponding to the notification N from the user, and determine whether to proceed with payment based on the user's input. For example, the user's input may be obtained by gesture, touch, head movement, and pupil movement.

[0174] In an embodiment, the head-mounted device **400** may display the notification N related to at least one pre-stored card information on the display **450** and receive a selection input

corresponding to at least one card among at least one piece of pre-stored card information from the user. In an embodiment, the head-mounted device **400** may perform a payment based on the user's selection input.

[0175] In an embodiment, the head-mounted device **400** may select an optimal card based on at least one piece of pre-stored card information, and perform a payment based on the selected optimal card. In an embodiment, the head-mounted device **400** may select an optimal card based on optimal data and at least one piece of pre-stored card information.

[0176] In an embodiment, the head-mounted device **400** may obtain, from an image or video obtained from the first camera, affiliate data including data related to discounts, points accumulations and/or installment payments on payments using optical character recognition (OCR) or an artificial intelligence neural network. For example, the head-mounted device **400** may obtain an image or video where affiliate data is displayed in text or pictures, such as posters and advertisement banners, using the first camera.

[0177] In an embodiment, the head-mounted device **400** may obtain position information about the user using a GPS sensor and/or place information through a Wi-Fi scan, and obtain affiliate data including data related to discounts, points accumulation, and/or installment payments on payments based on position information and/or position information. In addition to GPS and/or Wi-Fi scan, the head-mounted device **400** may obtain place information about the place where the head-mounted device **400** is positioned by receiving a beacon signal or an external wireless signal.

[0178] FIG. **9**A is a flowchart **900** illustrating an operation method of a head-mounted device **400** according to an embodiment of the disclosure. FIG. **9**B is a view illustrating a signal flow between a head-mounted device **400** and an electronic device **500** according to an embodiment of the disclosure.

[0179] Referring to FIGS. **9**A and **9**B, according to the embodiment, the head-mounted device **400** may directly perform an authentication operation to minimize the operations of the electronic device **500**.

[0180] In an embodiment, in operation **910**, the head-mounted device **400** may set a connection state with the electronic device **500** in a designated connection method through a first communication interface (e.g., the first communication interface **430** of FIG. **4**). According to an embodiment, the electronic device **500** may set a connection state with the head-mounted device **400** through a second communication interface (e.g., the second communication interface **520** of FIG. **5**A) in operation **910**.

[0181] In an embodiment, in operation **920**, the head-mounted device **400** may obtain payment-related data based on an image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**).

[0182] In an embodiment, in operation **930**, the head-mounted device **400** may provide a visual notification related to payment through a display (e.g., the display **450** of FIG. **4**). In an embodiment, operation **930** of providing a visual notification related to payment may be omitted.

[0183] In an embodiment, in operation **940**, the head-mounted device **400** may transmit a payment application execution signal corresponding to payment-related data to the electronic device **500**.

[0184] In an embodiment, in operation **950**, the head-mounted device **400** may obtain authentication data from the user.

[0185] In an embodiment, in operation **960**, the head-mounted device **400** may identify whether the obtained authentication data matches the designated data. Here, the designated data may be user authentication data previously stored in the head-mounted device **400**. In an embodiment, instead of transmitting authentication data to the electronic device **500**, the head-mounted device **400** may directly identify whether the obtained authentication data matches the designated data.

[0186] In an embodiment, in operation **970**, the head-mounted device **400** may transmit a payment request signal corresponding to payment-related data to the electronic device **500** based on the identification result.

[0187] According to an embodiment, when receiving the payment request signal, the electronic device **500** may execute payment in operation **980**. In an embodiment, the electronic device **500** may transmit payment information of a near field communication or magnetic secure transmission method through a wireless communication coil (e.g., the wireless communication coil **510** of FIG. **5**A).

[0188] FIG. **10**A is a flowchart illustrating a signal flow between a head-mounted device **400** and a payment device C according to an embodiment of the disclosure. FIG. **10**B illustrates a visual notification related to payment provided through a display (e.g., the display **450**) according to an embodiment of the disclosure.

[0189] Referring to FIGS. **10**A and **10**B, the head-mounted device **400** according to the embodiment may directly transmit payment information to the payment device C through a communication scheme available in the head-mounted device **400** without using the wireless communication coil (e.g., the wireless communication coil **510** of FIG. **4**) of the electronic device (e.g., the electronic device **500** of FIG. **4**) connected through the first communication interface (e.g., the first communication interface **430** of FIG. **4**).

[0190] In an embodiment, in operation **1010**, the head-mounted device **400** may obtain payment-related data based on an image or video obtained through the first camera (e.g., the first camera **410** of FIG. **4**). In an embodiment, when obtaining payment-related data, the head-mounted device **400** may determine that a payment intent is present in the user wearing the head-mounted device **400** and execute a payment operation.

[0191] In an embodiment, when the head-mounted device **400** obtains payment-related data, in operation **1020**, the head-mounted device **400** may execute a payment application and scan the payment device C. In an embodiment, the head-mounted device **400** may store a payment application in advance and, when payment-related data is obtained, execute a payment application. In an embodiment, the head-mounted device **400** may scan at least one device present around it through a designated communication scheme (e.g., Bluetooth low energy (BLE)), and identify a device corresponding to the obtained payment-related data as the payment device C.

[0192] In an embodiment, the payment device C may be a device capable of communicating through a designated communication scheme. In an embodiment, the payment device C may receive a payment amount from a payment requester (e.g., a seller), and broadcast POS data and/or a payment amount related to the payment device C in a designated communication scheme in operation **1025**. In an embodiment, the designated communication scheme may be a communication scheme capable of maintaining security.

[0193] In an embodiment, the head-mounted device **400** may obtain the POS data and/or the payment amount broadcast from the payment device C, and display the POS data and/or the payment amount on the display **450** in operation **1030**. In an embodiment, as illustrated in FIG. **10**B, the head-mounted device **400** may display an image R including the POS data and payment amount on the display area (e.g., the display member **201** of FIG. **2**) through the display **450**. In an embodiment, the head-mounted device **400** may display the image related to the POS data or the payment amount around the payment device C on the display area (e.g., the display member **201** of FIG. **2**). In an embodiment, the head-mounted device **400** may determine whether the obtained payment amount and the amount displayed on the payment device C through the first camera (e.g., the first camera **410** of FIG. **4**) match that recognized by optical character recognition (OCR). In an embodiment, the head-mounted device **400** may display the determination result through the display **450** or may provide a notification thereof. In an embodiment, when determining that the obtained payment amount and the amount displayed on the payment device C through the first camera (e.g., the first camera **410** of FIG. **4**) do not match that recognized by OCR, the head-mounted device **400** may stop the payment operation.

[0194] In an embodiment, the head-mounted device **400** may skip operation **1010** of obtaining payment-related data and, when obtaining the POS data and/or the payment amount broadcast from

the payment device C, perform a payment operation.
[0195] In an embodiment, when the head-mounted device **400** obtains payment-related data in operation **1010**, it may skip operation **1025** of broadcasting POS data and/or payment amount by the payment device C, and may broadcast device information and a payment attempt signal of the head-mounted device **400**.
[0196] In an embodiment, the head-mounted device **400** may obtain approval from the user in operation **1040**. The head-mounted device **400** may obtain approval by an input received from the user in response to the POS data and/or the payment amount displayed on the display **450**.
[0197] In an embodiment, the head-mounted device **400** may determine that approval from the user has been obtained when the POS data and/or the payment amount of the payment device C captured by the camera matches the POS data and/or the payment amount broadcast by the payment device C in operation **1010** of obtaining the payment-related data.
[0198] In an embodiment, in operation **1050**, the head-mounted device **400** may obtain authentication data from the user and identify whether the obtained authentication data matches the designated data. Here, the designated data may be user authentication data previously stored in the head-mounted device **400**.
[0199] In an embodiment, in operation **1060**, the head-mounted device **400** may transmit payment information to the payment device C through a designated communication scheme. In an embodiment, the payment information may be card information previously stored in the head-mounted device **400**, and may be transmitted in an encrypted state to maintain security.
[0200] According to an embodiment, in operation **1070**, the payment device may execute payment based on the received payment information.
[0201] In an embodiment, in operation **1080**, the payment device may transmit a payment completion signal to the head-mounted device **400** based on the execution of the payment.
[0202] In an embodiment, in operation **1090**, the head-mounted device **400** may display a payment result through the display **450** based on the received payment completion signal. In an embodiment, the payment result may include a success of payment or a failure of payment and, when payment fails, a cause of failure may be displayed at the same time.
[0203] In an embodiment, when the head-mounted device **400** obtains payment-related data based on the image or video obtained through the first camera in operation **1010**, the head-mounted device **400** may transmit payment information to the payment device C. In an embodiment, the head-mounted device **400** may obtain payment-related data from the image or video by tracking the user's gaze direction. In an embodiment, the head-mounted device **400** may obtain identification information (e.g., POS information) of the payment device C using payment-related data. In an embodiment, the head-mounted device **400** may transmit payment information to the payment device in a designated communication scheme based on the identification information about the payment device C. In an embodiment, the head-mounted device **400** may transmit payment information through beamforming centered on the gaze direction of the user wearing the head-mounted device **400** or the forward direction of the head-mounted device **400**.
[0204] FIG. **11**A is a partial perspective view illustrating a head-mounted device **400** including a wireless communication coil **480** according to an embodiment of the disclosure. FIG. **11**B is a partial perspective view illustrating a head-mounted device **400** including a wireless communication coil **490** according to an embodiment of the disclosure.
[0205] Referring to FIGS. **11**A and **11**B, a head-mounted device according to an embodiment may include a wireless communication coil **480** or **490**. In an embodiment, the wireless communication coil **480** or **490** may be near field communication (NFC) coils or magnetic secure transmission (MST) coils.
[0206] According to an embodiment, the wireless communication coil **480** or **490** of the head-mounted device **400** may be disposed in the lens **470**. In an embodiment, the lens **470** may be transparent or translucent to allow light to pass therethrough.

[0207] According to an embodiment, the head-mounted device **400** may wirelessly transmit payment information through the wireless communication coil **480** or **490** when obtaining payment-related data or generating a payment request signal.
[0208] Referring to FIG. **11**A, the wireless communication coil **480** according to an embodiment may be formed to surround an outer surface of the lens **470**. In an embodiment, the lens **470** of the head-mounted device **400** may be formed in a plate or panel shape, and the wireless communication coil **480** may be wound on the outer surface of the lens **470** at least once.
[0209] Referring to FIG. **11**B, the wireless communication coil **490** according to an embodiment may be wound inside a lens **470**. In an embodiment, the lens **470** of the head-mounted device **400** may be formed in a plate or panel shape, and the wireless communication coil **490** may be formed of a transparent material, and may be wound and positioned inside the lens **470** or be disposed to overlap the lens **470**.
[0210] According to an embodiment of the disclosure, a head-mounted device **200**, **300**, **400** may comprise a first camera **410**, **253**; a sensor circuit **420** configured to obtain authentication data, a first communication interface **430**, and at least one first processor **440**, **120** operatively connected to the first camera **410**, **253**, the sensor circuit **420**, and the first communication interface **430**. The at least one first processor **440**, **120** may be configured to obtain payment-related data based on an image or video obtained through the first camera **410**, **253**. The at least one first processor **440**; **120** may be configured to obtain the authentication data through the sensor circuit **420** based on the obtained payment-related data. The at least one first processor **440**; **120** may be configured to, based on obtaining the authentication data, transmit a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device **500** through the first communication interface **430**.
[0211] According to an embodiment, in the head-mounted device **200**, **300**, **400**, the at least one first processor **440**, **120** may be configured to set a connection state with the electronic device **500** in a designated connection method through the first communication interface **430**.
[0212] According to an embodiment, in the head-mounted device **200**, **300**, **400**, the at least one first processor **440**, **120** may be configured to as at least part of obtaining the payment-related data, obtain the payment-related data based on at least one of a visual identifier I included in the obtained image or video, a designated gesture, or a designated object.
[0213] According to an embodiment, in the head-mounted device **200**, **300**, **400**, the sensor circuit **420** may include a second camera **425**, **251** configured to capture a user's eyeball. The at least one first processor **440**, **120** may be configured to, as at least part of obtaining the payment-related data, track a direction of the user's gaze based on an image or video captured by the second camera **425**, **251**, and obtain the payment-related data corresponding to the tracked direction of the user's gaze in the obtained image or video.
[0214] According to an embodiment, in the head-mounted device **200**, **300**, **400**, the at least one first processor **440**, **120** may be configured to transmit a payment application execution signal corresponding to the payment-related data to the electronic device **500** when the payment-related data may be obtained.
[0215] According to an embodiment, in the head-mounted device **200**, **300**, **400**, the at least one first processor **440**, **120** may be configured to as at least part of transmitting the payment request signal or the obtained authentication data to the electronic device **500**, identify whether the obtained authentication data matches designated data, and based on a result of the identification, transmit the payment request signal to the electronic device **500** through the first communication interface **430**.
[0216] According to an embodiment. in the head-mounted device **200**, **300**, **400**, the at least one first processor **440**, **120** may be configured to transmit the obtained authentication data to the electronic device **500** through the first communication interface **430**, as at least part of transmitting the payment request signal or the obtained authentication data to the electronic device **500**.

[0217] According to an embodiment, in the head-mounted device **200**, **300**, **400**, the sensor circuit **420** may include a second camera **425**, **251** capturing a user's eyeball. The authentication data may be biometric data related to the user's iris, identified based on the image or video captured by the second camera **425**, **251**.
[0218] According to an embodiment, the head-mounted device **200**, **300**, **400** may further comprise a display **450** displaying a screen provided to a user. The at least one first processor **440**, **120** may be configured to provide a visual notification N related to the payment through the display **450** when the payment-related data may be obtained.
[0219] According to an embodiment of the disclosure, a method for operating a head-mounted device **200**, **300**, **400** may comprise obtaining (operations **620**, **920**, **1010**) payment-related data based on an image or video obtained through a first camera **410**, **253**. The method for operating the head-mounted device **200**, **300**, **400** according to an embodiment may comprise obtaining (operations **650**, **950**) authentication data through a sensor circuit **420** based on the obtained payment-related data. The method for operating the head-mounted device **200**, **300**, **400** according to an embodiment may comprise, based on obtaining the authentication data, transmitting (operations **660**, **970**) a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device **500** through a first communication interface **430**.
[0220] According to an embodiment, the method for operating the head-mounted device **200**, **300**, **400** may comprise setting a connection state with the electronic device **500** in a designated connection method through the first communication interface **430**.
[0221] According to an embodiment, in the method for operating the head-mounted device **200**, **300**, **400**, obtaining the payment-related data may obtain the payment-related data based on at least one of a visual identifier I included in the obtained image or video, a designated gesture, or a designated object.
[0222] According to an embodiment, the method for operating the head-mounted device **200**, **300**, **400** may further comprise transmitting (operation **640**) a payment application execution signal corresponding to the payment-related data to the electronic device **500** when the payment-related data may be obtained.
[0223] According to an embodiment, in the method for operating the head-mounted device **200**, **300**, **400**, transmitting (operations **660**, **970**) the payment request signal or the obtained authentication data to the electronic device **500** may include identifying (operation **960**) whether the obtained authentication data matches designated data, and based on a result of the identification, transmitting (operations **970**) the payment request signal to the electronic device **500** through the first communication interface **430**.
[0224] According to an embodiment, the method for operating the head-mounted device **200**, **300**, **400** may comprise obtaining (operations **630**, **930**, **1030**) providing a visual notification N related to the payment through a display **450**.
[0225] According to an embodiment of the disclosure, a non-transitory computer-readable storage medium storing one or more programs may comprise obtaining payment-related data based on an image or video obtained through a first camera **410**, **253** based on an execution of an application. The storage medium according to an embodiment may comprise obtaining authentication data through a sensor circuit **420** based on the obtained payment-related data. The storage medium according to an embodiment may comprise, based on obtaining the authentication data, transmitting a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device **500** through a first communication interface **430**.
[0226] According to an embodiment of the disclosure, an electronic device **500** may comprise a second communication interface **520**, a wireless communication coil **510** configured to wirelessly transmit data, and at least one second processor **530**, **120** operatively connected to the second

communication interface **520** and the wireless communication coil **510**. The at least one second processor **530**, **120** may be configured to receive a payment request signal or authentication data from a head-mounted device **200**, **300**, **400** through the second communication interface **520**. The at least one second processor **530**, **120** may be configured to wirelessly transmit payment information through the wireless communication coil **510** based on receiving the payment request signal or the authentication data.

[0227] According to an embodiment, in the electronic device **500**, the at least one second processor **530**, **120** may be configured to set a connection state with the head-mounted device **200**, **300**, **400** in a designated connection method through the second communication interface **520**.

[0228] According to an embodiment, in the electronic device **500**, the at least one second processor **530**, **120** may be configured to, based on receiving the payment request signal or the authentication data from the head-mounted device **200**, **300**, **400**, execute an payment application, based on receiving the payment application execution signal corresponding to the payment-related data from the head-mounted device **200**, **300**, **400**. The at least one second processor **530**, **120** may be configured to identify whether the authentication data received from the head-mounted device **200**, **300**, **400** matches designated data.

[0229] According to an embodiment, in the electronic device **500**, the authentication data may be biometric data related to the user's iris, identified based on the image or video captured by the head-mounted device **200**, **300**, **400**.

[0230] According to an embodiment, in the electronic device **500**, the wireless communication coil **510** may be a coil of a near field communication (NFC) scheme or a magnetic secure transmission (MST) scheme. The transmitted payment information may be data of the near field communication scheme or the magnetic secure transmission scheme.

[0231] The electronic device according to an embodiment may be one of various types of electronic devices. The electronic devices may include, for example, a portable communication device (e.g., a smart phone), a computer device, a portable multimedia device, a portable medical device, a camera, an electronic device, or a home appliance. According to an embodiment of the disclosure, the electronic devices are not limited to those described above.

[0232] It should be appreciated that various embodiments of the disclosure and the terms used therein are not intended to limit the technological features set forth herein to particular embodiments and include various changes, equivalents, or replacements for a corresponding embodiment. With regard to the description of the drawings, similar reference numerals may be used to refer to similar or related elements. It is to be understood that a singular form of a noun corresponding to an item may include one or more of the things, unless the relevant context clearly indicates otherwise. As used herein, each of such phrases as “A or B,” “at least one of A and B,” “at least one of A or B,” “A, B, or C,” “at least one of A, B, and C,” and “at least one of A, B, or C,” may include all possible combinations of the items enumerated together in a corresponding one of the phrases. As used herein, such terms as “1st” and “2nd,” or “first” and “second” may be used to simply distinguish a corresponding component from another, and does not limit the components in other aspect (e.g., importance or order). It is to be understood that if an element (e.g., a first element) is referred to, with or without the term “operatively” or “communicatively”, as “coupled with,” “coupled to,” “connected with,” or “connected to” another element (e.g., a second element), it means that the element may be coupled with the other element directly (e.g., wiredly), wirelessly, or via a third element.

[0233] As used herein, the term “module” may include a unit implemented in hardware, software, or firmware, and may interchangeably be used with other terms, for example, “logic,” “logic block,” “part,” or “circuitry”. A module may be a single integral component, or a minimum unit or part thereof, adapted to perform one or more functions. For example, according to an embodiment, the module may be implemented in a form of an application-specific integrated circuit (ASIC).

[0234] An embodiment of the disclosure may be implemented as software (e.g., the program **140**)

including one or more instructions that are stored in a storage medium (e.g., internal memory **136** or external memory **138**) that is readable by a machine (e.g., the electronic device **101**). For example, a processor (e.g., the processor **120**) of the machine (e.g., the electronic device **101**) may invoke at least one of the one or more instructions stored in the storage medium, and execute it, with or without using one or more other components under the control of the processor. This allows the machine to be operated to perform at least one function according to the at least one instruction invoked. The one or more instructions may include a code generated by a complier or a code executable by an interpreter. The storage medium readable by the machine may be provided in the form of a non-transitory storage medium. Wherein, the term “non-transitory” simply means that the storage medium is a tangible device, and does not include a signal (e.g., an electromagnetic wave), but this term does not differentiate between where data is semi-permanently stored in the storage medium and where the data is temporarily stored in the storage medium.

[0235] According to an embodiment, a method according to various embodiments of the disclosure may be included and provided in a computer program product. The computer program products may be traded as commodities between sellers and buyers. The computer program product may be distributed in the form of a machine-readable storage medium (e.g., compact disc read only memory (CD-ROM)), or be distributed (e.g., downloaded or uploaded) online via an application store (e.g., Play Store™), or between two user devices (e.g., smart phones) directly. If distributed online, at least part of the computer program product may be temporarily generated or at least temporarily stored in the machine-readable storage medium, such as memory of the manufacturer's server, a server of the application store, or a relay server.

[0236] According to an embodiment, each component (e.g., a module or a program) of the above-described components may include a single entity or multiple entities. Some of the plurality of entities may be separately disposed in different components. According to an embodiment, one or more of the above-described components may be omitted, or one or more other components may be added. Alternatively or additionally, a plurality of components (e.g., modules or programs) may be integrated into a single component. In such a case, according to various embodiments, the integrated component may still perform one or more functions of each of the plurality of components in the same or similar manner as they are performed by a corresponding one of the plurality of components before the integration. According to various embodiments, operations performed by the module, the program, or another component may be carried out sequentially, in parallel, repeatedly, or heuristically, or one or more of the operations may be executed in a different order or omitted, or one or more other operations may be added.

[0237] While the disclosure has been shown and described with reference to various embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the disclosure as defined by the appended claims and their equivalents.

Claims

1. A head-mounted device, comprising: memory, comprising one or more storage media, storing instructions; a first camera; a sensor circuit configured to obtain authentication data; a communication interface; and at least one processor communicatively coupled to the memory, the first camera, the sensor circuit, and the communication interface, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to: obtain payment-related data based on an image or video obtained through the first camera, obtain the authentication data through the sensor circuit based on the obtained payment-related data, and based on obtaining the authentication data, transmit a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through the communication interface.

2. The head-mounted device of claim 1, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to: set a connection state with the electronic device in a designated connection method through the communication interface.
3. The head-mounted device of claim 1, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to: as at least part of obtaining the payment-related data, obtain the payment-related data based on at least one of a visual identifier included in the obtained image or video, a designated gesture, or a designated object.
4. The head-mounted device of claim 1, wherein the sensor circuit includes a second camera configured to capture a user's eyeball, and wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to, as at least part of obtaining the payment-related data: track a direction of a user's gaze based on an image or video captured by the second camera, and obtain the payment-related data corresponding to the tracked direction of the user's gaze in the obtained image or video.
5. The head-mounted device of claim 1, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to: transmit a payment application execution signal corresponding to the payment-related data to the electronic device when the payment-related data is obtained.
6. The head-mounted device of claim 1, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to, as at least part of transmitting the payment request signal or the obtained authentication data to the electronic device: identify whether the obtained authentication data matches designated data, and based on a result of the identification, transmit the payment request signal to the electronic device (**500**) through the communication interface.
7. The head-mounted device of claim 1, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to: as at least part of transmitting the payment request signal or the obtained authentication data to the electronic device, transmit the obtained authentication data to the electronic device through the communication interface.
8. The head-mounted device of claim 1, wherein the sensor circuit includes a second camera configured to capture a user's eyeball, and wherein the authentication data is biometric data related to a user's iris, identified based on the image or video captured by the second camera.
9. The head-mounted device of claim 1, further comprising a display displaying a screen provided to a user, wherein the instructions, when executed by the at least one processor individually or collectively, cause the head-mounted device to: provide a visual notification related to a payment through the display when the payment-related data is obtained.
10. A method performed by a head-mounted device, the method comprising: obtaining, by the head-mounted device, payment-related data based on an image or video obtained through a first camera of the head-mounted device; obtaining, by the head-mounted device, authentication data through a sensor circuit of the head-mounted device based on the obtained payment-related data; and based on obtaining the authentication data, transmitting, by the head-mounted device, a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through a communication interface of the head-mounted device.
11. The method of claim 10, further comprising: setting a connection state with the electronic device in a designated connection method through the communication interface.
12. The method of claim 10, further comprising: as at least part of obtaining the payment-related data, obtaining the payment-related data based on at least one of a visual identifier included in the obtained image or video, a designated gesture, or a designated object.
13. The method of claim 10, further comprising, as at least part of obtaining the payment-related

data: tracking a direction of a user's gaze based on an image or video captured by a second camera of the head-mounted device, and obtaining the payment-related data corresponding to the tracked direction of the user's gaze in the obtained image or video.

14. An electronic device, comprising: memory, comprising one or more storage media, storing instructions; a communication interface; a wireless communication coil configured to wirelessly transmit data; and at least one processor communicatively coupled to the memory, the communication interface and the wireless communication coil; wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to: receive a payment request signal or authentication data from a head-mounted device through the communication interface, and wirelessly transmit payment information through the wireless communication coil based on receiving the payment request signal or the authentication data.

15. The electronic device of claim 14, wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to: set a connection state with the head-mounted device in a designated connection method through the communication interface.

16. The electronic device of claim 14, wherein the instructions, when executed by the at least one processor individually or collectively, cause the electronic device to: based on receiving the payment request signal or the authentication data from the head-mounted device, execute a payment application, and identify whether the authentication data received from the head-mounted device matches designated data.

17. The electronic device of claim 14, wherein the authentication data is biometric data related to a user's iris, identified based on an image or video captured by the head-mounted device.

18. The electronic device of claim 14, wherein the wireless communication coil is a coil of a near field communication (NFC) scheme or a magnetic secure transmission (MST) scheme, and wherein the transmitted payment information is data of the NFC scheme or the MST scheme.

19. One or more non-transitory computer-readable storage media storing one or more computer programs including computer-executable instructions that, when executed by at least one processor of a head-mounted device individually or collectively, cause the head-mounted device to perform operations, the operations comprising: obtaining, by the head-mounted device, payment-related data based on an image or video obtained through a first camera of the head-mounted device; obtaining, by the head-mounted device, authentication data through a sensor circuit of the head-mounted device based on the obtained payment-related data; and based on obtaining the authentication data, transmitting, by the head-mounted device, a payment request signal requesting for wirelessly transmitting payment information or the obtained authentication data to an electronic device through a communication interface of the head-mounted device.

20. The one or more non-transitory computer-readable storage media of claim 19, the operations further comprising: setting a connection state with the electronic device in a designated connection method through the communication interface.