

ELECTRONIC TAGS AND INTERNET OF THINGS INTERACTIVE SYSTEM

TECHNICAL FIELD

[0001] The application relates to the technical field of the Internet of Things, in particular to an electronic tag and an Internet of Things interactive system.

BACKGROUND

[0002] Traditional software applications usually rely on manual input to receive data, and then perform a series of logical processing to output the required data information. In particular, much of the unstructured data needs to be interpreted and entered in a human way to help software applications process quickly and accurately. In addition, software applications have difficulty interacting with the actual real world and rely on a variety of different electronic devices to assist them.

[0003] However, the above-mentioned manual processes are prone to many undesirable defects, such as unavoidable human error and relatively high labor costs. Therefore, there is an urgent need to provide the right equipment to facilitate the interaction between software applications and the real world, avoiding the introduction of manual operation.

SUMMARY

[0004] In the first aspect, the application provides an electronic tag. The electronic tag includes: a power module configured to convert an electric energy provided by an electric energy storage device into at least one power supply voltage; a control module connected with the power module and powered by the power supply voltage; and a plurality of peripherals connected with the control module and the power module respectively; wherein the peripheral device interacts with the user at least one way under controlling of the control module.

[0005] Optionally, the control module includes a microcontroller integrating Wi-Fi function and Bluetooth function; wherein, the microcontroller provides several peripheral interface

connected to corresponding peripheral.

[0006] Optionally, the control module further includes: a reset switch configured to provide the power supply voltage to a reset interface of the microcontroller for resetting the microcontroller, in response to a reset action of user; wherein one end of the reset switch is connected to the power supply voltage, and the other end of the reset switch is connected to the reset interface of the microcontroller.

[0007] Optionally, the control module further includes: a key switch configured to provide the power supply voltage to a key interface of the microcontroller, in response to a key action of user; wherein one end of the key switch is connected to the power supply voltage, and the other end of the key switch is connected to the key interface of the microcontroller.

[0008] Optionally, the power module includes: a constant current voltage charger connected with a DC voltage source and electric energy storage device respectively, which is configured to: draw electric energy from the DC voltage source, and provide to the electric energy storage device with constant target current value; a first voltage converter connected to the electric energy storage device and configured to convert the electric energy provided by the electric energy storage device into a first power supply voltage; a second voltage converter connected to the electric energy storage device and configured to convert the electric energy provided by the electric energy storage device into a second power supply voltage.

[0009] Optionally, the peripheral includes: an electronic paper display screen connected with at least a part of the peripheral interface of the microcontroller and configured to display a corresponding image according to an electrical signal from the microcontroller; and a driving unit connected with the second power supply voltage and the electronic paper display screen respectively, wherein the driving unit configured to elevating the second power supply voltage to a door operator driving voltage of the electronic paper display screen.

[0010] Optionally, the peripheral further includes: at least one USB interface connected with at least a part of the peripheral interface of the microcontroller.

[0011] Optionally, the peripheral further includes a speaker connected to the microcontroller and the first power supply voltage; and a plurality of indicator lights connected to the microcontroller and the first power supply voltage.

[0012] Optionally, the peripheral further includes: RGB-LED module with a power supply end and a signal end; wherein the power supply end of the RGB-LED module is connected with the electric energy storage device, and the signal end of the RGB-LED module is connected with the peripheral interface of the microcontroller.

[0013] In the second aspect, the application further provides an interactive system of the Internet of Things. The interactive system of the Internet of Things includes at least one electronic tag described above and an intelligent terminal; wherein a signal transmission channel is established between the intelligent terminal and the electronic tag, and data information is transmitted based on the signal transmission channel to realize one or more interactions.

[0014] Optionally, the intelligent terminal is provided with an application matching with the electronic tag; the electronic tag is connected to a door lock control device; wherein the intelligent terminal is configured to establish a wireless signal transmission channel between the electronic tag, when a marking signal of the electronic tag is detected, and sent an identity information based on the wireless signal transmission channel; the electronic tag is configured to output an unlocking signal to the described door lock control device, and upload a corresponding record information to a server, when described identity information satisfies the preset authentication condition; wherein the described record information comprises the identity information and an unlocking information.

[0015] Optionally, the system further includes a plurality of sensor devices; wherein the sensor device is selected from one or more of the following: NFC module; QR code scanning equipment; infrared sensors; and electromagnetic sensors.

[0016] Optionally, the electromagnetic sensor is configured to detect the state of the door lock, and output an alarm signal, when the state of the door lock is abnormal; the NFC module is configured to read the identity information from corresponding NFC card, and

provide to the electronic tag; the QR code scanning equipment is configured to obtain the identity information contained in QR code and provide to the electronic tag.

[0017] Optionally, the intelligent terminal is provided with an application matching with the electronic tag; the electronic tag is connected to an equipment to be monitored; wherein the electronic tag is configured to detect the running state of the equipment, and when the equipment runs abnormally, send abnormal information to the server; and the intelligent terminal is configured to display an abnormal information in a preset manner on the application.

[0018] Optionally, the abnormal information includes location of the abnormal device, device status, and/or cause of the abnormality of the equipment.

DESCRIPTION OF THE DRAWINGS

[0019] One or more embodiments are exemplarily illustrated by corresponding drawings, and these exemplary illustrations do not limit the embodiments. Components in the drawings with the same reference numerals are represented as similar components unless otherwise stated. The figures in the drawings do not impose any proportional limitations unless specifically indicated.

[0020] Fig.1 is a functional block diagram of the electronic tag according to the embodiment of the present application.

[0021] Fig.2 is the circuit schematic diagram of the power module according to the embodiment of the present application.

[0022] Fig.3 is the circuit schematic diagram of the control module according to the embodiment of the present application.

[0023] Fig.4 is the schematic diagram of the key switch, the reset switch and an ADC peripheral circuit according to the embodiment of the present application.

[0024] Fig.5 is the circuit schematic diagram of the electronic-paper display screen and its driving circuit according to the embodiment of the present application.

[0025] FIG.6 is the circuit schematic diagram of the speaker and the indicator lights

according to the embodiment of the present application.

[0026] FIG.7 is the circuit schematic diagram of the R GB-LED module according to the embodiment of the present application.

[0027] Fig.8 is the circuit schematic diagram of the USB interface according to the embodiment of the present application.

[0028] FIG.9 is the circuit schematic diagram of connectors according to the embodiment of the present application.

[0029] FIG.10 is a schematic diagram of the Internet of Things interactive system according to the embodiment of the present application.

DETAILED DESCRIPTION

[0030] The present application is described in detail below in conjunction with specific embodiments, and it should be emphasized that the following descriptions are only illustrative and are not intended to limit the scope of the present application and its application.

[0031] It should be noted that, unless otherwise specified and limited, the terms "center," "longitudinal," "lateral," "upper," "lower," "vertical," "horizontal," "inner," "outer," and similar indications of orientation or positional relationships used in this specification are based on the orientation or positional relationships shown in the accompanying figures. They are provided for the convenience of describing the present application and simplifying the description, and do not indicate or imply that the devices or components referred to must have specific orientations or be constructed and operated in a particular orientation. Therefore, they should not be construed as limitations on the present application. Terms such as "installation," "connection," "attachment," "fixing," and similar terms should be broadly interpreted. For example, they can refer to fixed connections or detachable connections, or connections made integrally. They can involve mechanical connections or electrical connections, direct connections or indirect connections through intermediate media. Furthermore, the terms "first" and "second" are used for descriptive purposes only

and should not be construed as indicating relative importance or implying a specific quantity of the indicated technical features. Thus, features designated as "first" or "second" may include one or more of such features, either explicitly or implicitly. The term "multiple" means two or more. The term "and/or" includes any and all combinations of the listed items, either individually or collectively. The specific meanings of the above terms in this application can be understood by those skilled in the art based on the specific circumstances..

[0032] Fig.1 is a functional block diagram of the electronic tag according to the embodiment of the present application. As shown in Fig.1, the electronic tag includes a power module 100, a control module 200 and several peripheral 300.

[0033] The power module 100 is a functional module for controlling and managing the power supply. It can connect to an electric energy storage device and convert the electric energy provided by the electric energy storage device into one or more power supply voltages, which are provided to other functional modules of the electronic tag.

[0034] The "energy storage device" is a device that stores and releases electrical energy. A person skilled in the art may choose to use any appropriate type of electrical energy storage device according to the needs of the actual situation. For example, in order to meet the needs of portability, etc., a lightweight lithium-ion battery with a rechargeable function is used.

[0035] In some embodiments, as shown in Fig.2, the power module 100 includes a constant current voltage charger U11, a first voltage converter U12, a second voltage converter U13 and its related peripheral circuit structures.

[0036] The constant current voltage charger U11 is a functional unit used to charge the electric energy storage device. It can draw power from a DC voltage source and supply it to the energy storage device at a constant target current value to charge the energy storage device.

[0037] Specifically, the peripheral circuit structure of the constant current voltage charger U11 includes: a first capacitor C1, a second capacitor C2, a third capacitor C3, a fourth

capacitor C4, a first indicator LED 1, a second indicator LED 2, a first resistance R1, a second resistance R2 and a current regulation resistor Rprog.

[0038] The first capacitor C1 is connected to the power input VCC of the constant current voltage charger U11, the second capacitor C2 is connected to the battery connection terminal BAT of the constant current voltage charger U11, and the third capacitor C3 and the fourth capacitor C4 are connected in parallel, and are located between the battery positive electrode VBAT and the reference ground GND.

[0039] The first indicator LED1 is connected to the first indication end CHRG of the constant current voltage charger U11 through the first resistor R1 and is connected to the DC voltage source VCC (e.g., DC voltage of 5V). The second indicator LED2 is connected to the second indicator terminal STDBY of the constant current voltage charger U11 through the second resistor R2, and is connected to the DC voltage source VCC. The first indicator LED1 and the second indicator LED2 are used to show charging completion and whether charging is in progress, respectively.

[0040] For example, when charging is complete, the second indicator STDBY can be pulled low to make the second indicator LED2 on, and vice versa, it can remain in a high impedance state and the second indicator LED2 off. While charging is in progress, the first indicator CHRG can be pulled low to make the first indicator LED1 on, otherwise it can remain in a high impedance state and the first indicator LED1 will turn off.

[0041] In some embodiments, the current regulation resistor Rprog is connected to the current-setting terminal PROG of the constant current voltage charger U11, and the magnitude of the charging current can be adjusted by changing the resistance value of current regulation resistor Rprog. For example, the resistance value of the current regulation resistor Rprog can be set to 1.1k, and the corresponding charging current is 1000mA.

[0042] The voltage converter is a functional unit that converts an input voltage to an ideal target voltage and outputs the ideal target voltage (i.e., DC-DC converter). In this embodiment, two voltage converters are provided with two supply voltages, which are

called "first voltage converters" and "second voltage converters" for ease of description, and the output power supply voltages are called "first power supply voltage" and "second power supply voltage" respectively.

[0043] In practice, the power provided by the electric energy storage device can be input into the voltage converter, and after the conversion of the voltage converter, the required power supply voltage (for example, 3.3V DC voltage) can be output.

[0044] Specifically, please continue to refer to Fig. 2, the first voltage converter and the second voltage converter can implement by the same structure and peripheral circuit design and provide the first power supply voltage VDD1 and the second power supply voltage VDD2 respectively, at their output VOUT to supply power to different modules.

[0045] The peripheral circuit of the first voltage converter includes: a fifth capacitor C5, a sixth capacitor C6 and a seventh capacitor C7. The peripheral circuits of the second voltage converter include: an eighth capacitor C8, a ninth capacitor C9 and a tenth capacitor C10.

[0046] Please continue to refer to Fig.1, the control module 200 is the control core of the electronic tag, provides logic operation and information processing function. The control module 200 can be connected with the power module 100, and supply by the power supply voltage provided by the power module 100.

[0047] In some embodiments, as shown in Fig.3, the control module 100 includes a microcontroller U2 integrated with Wi-Fi function and Bluetooth function and related peripheral circuits to realize the corresponding control function.

[0048] The microcontroller U2 provides a plurality of different peripheral interfaces, which can be connected with the corresponding interactive device, so that the interactive device can run smoothly and interact with the user accordingly.

[0049] Specifically, the microcontroller U2 can include a processor chip and its on-chip memory, and provide Wi-Fi and Bluetooth capabilities. Further, the peripheral interfaces supported by the microcontroller include, but are not limited to, GPIO, SPI, LCD, Camera interface, UART, I2C, I2S, infrared remote control, pulse counter, LED PWM, USB 1.1 OTG,

USB Serial/JTAG controller, MCPWM, SDIO host interface, GDMA, ADC, touch sensor, temperature sensor, timer, and watchdog.

[0050] Continuing with Fig.3, the peripheral circuits of the microcontroller U2 include an eleventh capacitor C11, a twelfth capacitor C12, a thirteenth capacitor C13, a fourteenth capacitor C14, a fifteenth capacitor C15, a sixteenth capacitor C16, and a crystal oscillator X1.

[0051] The eleventh capacitor C11 and the twelfth capacitor C12 are connected to the first power supply voltage VDD1, and the first power supply voltage VDD1 supplies power to the microcontroller U2. The fifteenth capacitor C15, the sixteenth capacitor C16, and the crystal oscillator X1 are connected to the microcontroller U2 to provide a suitable clock signal. The thirteenth capacitor C13 and the fourteenth capacitor C14 are connected to the two IO interfaces of the microcontroller U2, respectively, and are connected to the input ADC_IN1 and ADC_IN2 of an analog-to-digital converter (ADC).

[0052] In other embodiments, as shown in Fig. 4, the control module may further include a key switch K1, a reset switch K2 and a peripheral working circuit 400 of the analog-to-digital converter.

[0053] The key switch K1 and the reset switch K2 are respectively connected to the connection port corresponding to the microcontroller U2 to realize the key detection and reset function of the microcontroller. The peripheral working circuit 400 of the analog-to-digital converter can ensure the normal operation and operation of the analog-to-digital converter.

[0054] Specifically, one end of the key switch K1 is connected to the first power supply voltage VDD1, and the other end of the key switch K2 is connected to the key interface KEY of the microcontroller. Therefore, when a key action occurs, the first power supply voltage VDD1 is supplied to the key interface KEY, and a level change is generated so that the microcontroller U2 detects and determines whether the key action occurs.

[0055] Similarly, one end of the reset switch K2 is connected to the first power supply voltage VDD1, and the other end of the reset switch K2 is connected to the reset interface

RST of the microcontroller. Thus, when a reset action occurs, the first power supply voltage VDD1 is supplied to the key interface KEY, which causes a level change to reset the microcontroller U2.

[0056] The peripheral working circuit 400 is mainly composed of a third resistor R3, a fourth resistor R4, a fifth resistor R5, a sixth resistor R6, a seventh resistor R7 and an eighth resistor R8, which supplies power (ADC_VBAT) and provides input signal for the analog-to-digital converter.

[0057] Continuing with Fig.1, "peripherals" are auxiliary devices connected to a control module to extend its functionality, additional input/output functions, or storage functions. The peripherals can be powered by the power module, connected through the peripheral interface of the control module, and realize data transmission and functional interaction with the control module.

[0058] In some embodiments, as shown in Fig. 5, the peripheral 300 may include an electronic paper display screen 310 and a driver unit 320.

[0059] The electronic paper display screen 310 can be connected with the peripheral interface corresponding to the microcontroller to realize the display function. The driver unit 320 is a step-up circuit that is connected to the second power supply voltage VDD2 to raise the second power supply voltage to a higher voltage level required for the gate drive voltage of the electronic paper display screen, so that the electronic paper display screen can run and display.

[0060] Specifically, the connection port corresponding to the electronic paper display screen 310 and the microcontroller U2 is shown in Fig. 5. In Fig.5, the electronic paper display screen 310 is shown as a number of connection pins, some of which can be grounded by a series of capacitors.

[0061] Continuing to Fig. 5, the drive unit 320 includes a first regulator diode D1, a second regulator diode D2, a third regulator diode D3, an inductor L1, a switch tube Q1, a ninth resistor R9, a tenth resistor R10, and an eleventh capacitor C11.

[0062] In the actual use process, through the switching operation between the inductor L1,

the eleventh capacitor C11 and the switch Q1 between on/off, the second power supply voltage VDD2 can be boosted to a driving voltage that meets the needs of use.

[0063] The second regulator diode D2 and the third regulator diode D3 are connected to pins 21 and 23 of the e-paper display 310 respectively and are used as positive gate drive voltage (VGH) and negative gate drive voltage (VGL).

[0064] In other implementations, as shown in Fig. 6, the peripheral may also include a speaker 330 and a plurality of indicator 340.

[0065] The speaker 330 can be connected to the microcontroller U2 and the second power supply voltage VDD2. It receives a control signal from the microcontroller U2 and turned on or off accordingly. The indicator 340 can be set up in a number of ways, which are connected to the microcontroller U2 and the second supply voltage VDD2 respectively. The indicator 340 can be turned on or off under the control of the microcontroller.

[0066] Specifically, please continue to refer to Fig. 6, the speaker 330 consists by a buzzer BUZ and second switch Q2. One end of the buzzer BUZ can be connected to ground through the second switch Q2, and the other end of the buzzer BUZ can be connected to the second power supply voltage VDD2 through the diode D4. The control end of the switch Q2 is connected to the connection port of the microcontroller U2, whereby the microcontroller U2 can control the operation situation of switch Q2, and thus control whether the buzzer BUZ emits sound.

[0067] Further, each indicator light 340 can be an LED, such as LED3 and LED4 shown in Fig. 6. They can be respectively connected to the corresponding connection ports of microcontroller U2 and connected to the second power supply voltage VDD2 through resistors R31 and R41. Therefore, microcontroller U2 can control whether the LED lights up based on the actual operating state, allowing users to visually observe the actual operating status of the electronic tag.

[0068] Ideally, as shown in Fig. 7, the peripheral further include a RGB-LED module 350. The RGB-LED module 350 is an integrated device with four pins. It integrates RGB LEDs of three different colors and can be controlled using a single control signal to adjust colors

and brightness levels.

[0069] Specifically, please refer to Fig. 7, where the power supply terminal VDD of the RGB-LED module 350 can be connected to the positive of the energy storage device VBAT. The signal terminal DIN of the RGB-LED module is connected to the peripheral interface corresponding to the microcontroller U2.

[0070] In other embodiments, as shown in Fig. 8, the peripheral further includes at least one USB interface 360.

[0071] The USB interface 360 is connected to at least a part of the peripheral interface of the microcontroller to provide data transmission functions. The USB port 360 can also be further used as a charging port to provide 5V voltage to the charger, enabling it to charge the energy storage device inside the electronic tag.

[0072] Preferably, please continue to refer to Fig.8, the electronic tag can also have a variety of different connectors which are used to realize the connection between different functional modules or circuit units. For example, the key connector 410, the three UART connectors 421 to 422 (for bug fixes on different chips), the power connector 430, the SPI connector 440, the IO connector 450, the battery connector 460, and the erase connector 470. Fig. 8 shows the specific connection relationship between the connector and each functional module.

[0073] Based on the electronic tag provided in the embodiment of the present application, the application further provides an interactive Internet of Things system. Fig.10 is a schematic diagram of the structure of the interactive Internet of Things system according to the embodiment of the present application.

[0074] As shown in Fig.10, the interactive Internet of Things system includes at least one electronic tag 10, at least one intelligent terminal 20 and a server 30. The Electronic tag 10, the intelligent terminal 20 and the server 30 can establish a signal transmission channel between any two, and transmit data information based on this signal transmission channel.

[0075] The interactive Internet of Things system can be applied to various scenarios to help electronic devices establish connections with the real world and minimize a range of

defects caused by human operation. To fully illustrate the inventive concept of this application, the operational process of the IoT interaction system is described in detail using the practical application scenario of an access control system as an example.

[0076] When applied to an access control system, the electronic tag can be connected to the door lock control device as the main controller of the door lock. The intelligent terminal is installed with an application that matches the electronic tag, so that it is easy to establish contact with the electronic tag.

[0077] When the user carries the intelligent terminal close to the electronic tag, the specific marking signal of the electronic tag can be detected. When the specific marking signal (e.g., iBeacon signal) is detected, the intelligent terminal can establish a wireless signal transmission channel (e.g., Bluetooth Low Energy connection) with the electronic tag and send identity information based on the wireless signal transmission channel.

[0078] The identity information can be authenticated on the server or in the electronic tag to confirm whether it has the right to open the door. When confirming that the identity information meets the preset authentication conditions and has the authority to open the door, the electronic tag can output the unlocking signal to the door lock control device to unlock the door lock.

[0079] Further, the electronic tag can also upload the relevant information of unlocking to the server for storage, so as to facilitate subsequent management and traceability. The information related to unlocking may include: the user's identity information, unlocking time, and unlocking location.

[0080] Even better, the interactive Internet of Things system can also add more sensor devices to help provide more access control functions. This sensor device includes but is not limited to NFC module; QR code scanning equipment; infrared sensors and electromagnetic sensors.

[0081] For example, if the NFC module is installed, the NFC module can be used to read the identity information of the corresponding NFC card and send it to an electronic tag. In this way, temporary visitors can open the door lock by holding an NFC card or an NFC-

enabled smart terminal.

[0082] Similarly, if the QR code scanning equipment is installed, it can obtain the identity information contained in the QR code and send it to the electronic tag. In this way, temporary visitors can also open the door lock by displaying a QR code.

[0083] This operation method can easily and flexibly operate the access rights and access time of visitors, effectively reducing the manual operation required.

[0084] In other implementations, an electromagnetic sensor can be utilized to detect the state of the door lock when an electromagnetic sensor is provided. As a result, the electronic tag can output an alarm signal or notify the security guard to deal with it in time when the door lock status is abnormal.

[0085] In addition to the application scenario of the access control system, the Internet of Things interactive system of the embodiment of the present application can be further applied to the scenario of equipment running anomaly detection. The following is explained in detail with specific examples.

[0086] In this scenario, the electronic tag can be connected to a specific device to obtain and determine the status information of the device. There is an application that matches the electronic tag installed on the intelligent terminal.

[0087] The electronic tag can continuously detect the running status of the equipment, and send abnormal information to the server when the equipment is abnormal. Such abnormal information may include, but is not limited to, the location of the device, the status of the device, and/or the cause of the abnormality.

[0088] Correspondingly, the intelligent terminal can connect to the server by running the application and the abnormal information can be displayed in a preset way on the intelligent terminal. For example, the location of the faulty device can be displayed in the form of a map and the specific fault cause of the faulty device is displayed in the form of a list.

[0089] Using the above-mentioned Internet of Things interactive system, continuous detection of equipment can be realized, which is conducive to maintenance personnel to

know the operation of equipment in time, and quickly locate the cause of the fault and the location of the equipment, which greatly improves the efficiency of equipment maintenance.

[0090] The above content provides further detailed explanations based on specific/preferred embodiments of the present application, but it should not be construed that the specific implementation of the present application is limited to these explanations. Those skilled in the art can make various modifications and improvements within the scope of the present application without departing from the underlying concept. Such modifications and improvements are also considered to be within the scope of protection of the present application.

WHAT IS CLAIMED IS:

1. An electronic tag comprising:

a power module configured to convert an electric energy provided by an electric energy storage device into at least one power supply voltage;

a control module connected with the power module and powered by the power supply voltage;

a plurality of peripherals connected with the control module and the power module respectively; wherein the peripheral device interacts with the user at least one way under controlling of the control module.

2. The electronic tag according to claim 1, wherein the control module comprises: a microcontroller integrating Wi-Fi function and Bluetooth function; wherein, the microcontroller provides several peripheral interface connected to corresponding peripheral.

3. The electronic tag according to claim 2, wherein the control module further comprises: a reset switch configured to provide the power supply voltage to a reset interface of the microcontroller for resetting the microcontroller, in response to a reset action of user;

wherein one end of the reset switch is connected to the power supply voltage, and the other end of the reset switch is connected to the reset interface of the microcontroller.

4. The electronic tag according to claim 2, wherein the control module further comprises: a key switch configured to provide the power supply voltage to a key interface of the microcontroller, in response to a key action of user;

wherein one end of the key switch is connected to the power supply voltage, and the other end of the key switch is connected to the key interface of the microcontroller.

5. The electronic tag according to claim 2, wherein the power module comprises:

a constant current voltage charger connected with a DC voltage source and electric energy storage device respectively, which is configured to: draw electric energy from the DC voltage source, and provide to the electric energy storage device with constant target current value;

a first voltage converter connected to the electric energy storage device and configured to convert the electric energy provided by the electric energy storage device into a first power supply voltage;

a second voltage converter connected to the electric energy storage device and configured to convert the electric energy provided by the electric energy storage device into a second power supply voltage.

6. The electronic tag according to claim 5, wherein the peripheral comprises:

an electronic paper display screen connected with at least a part of the peripheral interface of the microcontroller and configured to display a corresponding image according to an electrical signal from the microcontroller; and

a driving unit connected with the second power supply voltage and the electronic paper display screen respectively, wherein the driving unit configured to elevating the second power supply voltage to a door operator driving voltage of the electronic paper display screen.

7. The electronic tag according to claim 5, wherein the peripheral further comprises:

at least one USB interface connected with at least a part of the peripheral interface of the microcontroller.

8. The electronic tag according to claim 5, wherein the peripheral further comprises:

a speaker connected to the microcontroller and the first power supply voltage; and

a plurality of indicator lights connected to the microcontroller and the first power supply voltage.

9. The electronic tag according to claim 2, wherein the peripheral further comprises: RGB-LED module with a power supply end and a signal end;

wherein the power supply end of the RGB-LED module is connected with the electric energy storage device, and the signal end of the RGB-LED module is connected with the peripheral interface of the microcontroller.

10. An interactive system of the Internet of Things, comprising:

at least one electronic tag according to the claim 1;

an intelligent terminal;

wherein a signal transmission channel is established between the intelligent terminal and the electronic tag, and data information is transmitted based on the signal transmission channel to realize one or more interactions.

11. The Internet of things interactive system according to claim 10, wherein the intelligent terminal is provided with an application matching with the electronic tag; the electronic tag is connected to a door lock control device;

wherein the intelligent terminal is configured to establish a wireless signal transmission channel between the electronic tag, when a marking signal of the electronic tag is detected, and sent an identity information based on the wireless signal transmission channel;

the electronic tag is configured to output an unlocking signal to the described door lock control device, and upload a corresponding record information to a server, when described identity information satisfies the preset authentication condition; wherein the described record information comprises the identity information and an unlocking information.

12. The Internet of things interactive system according to claim 10, further comprising a plurality of sensor devices; wherein the sensor device is selected from one or more of the following:

NFC module;
QR code scanning equipment;
infrared sensors; and
electromagnetic sensors.

13. The Internet of things interactive system according to claim 12, wherein the electromagnetic sensor is configured to detect the state of the door lock, and output an alarm signal, when the state of the door lock is abnormal;

the NFC module is configured to read the identity information from corresponding NFC card, and provide to the electronic tag;

the QR code scanning equipment is configured to obtain the identity information contained in QR code and provide to the electronic tag.

14. The Internet of things interactive system according to claim 10, wherein the intelligent terminal is provided with an application matching with the electronic tag; the electronic tag is connected to an equipment to be monitored;

wherein the electronic tag is configured to detect the running state of the equipment, and when the equipment runs abnormally, send abnormal information to the server; and the intelligent terminal is configured to display an abnormal information in a preset manner on the application.

15. The Internet of things interactive system according to claim 14, wherein the abnormal information comprises location of the abnormal device, device status, and/or cause of the abnormality of the equipment.