A NOVEL SMART CARD FOR GREENBACK VERSEMENT

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ABSTRACT:

With the rapid development of information technology, computer technology and microelectronics technology, the world information industry, having experienced two waves of computer and the Internet, now is meeting the third wave — "Internet of Things". Currently, mobile phone-based credit card payment is becoming more and more common in the world, the convenience of mobile phones provides a basis for carrying out various of payment services. Meanwhile, with the mobile communication network, mobile payment can take place at anytime, anywhere, getting rid of the limitations of time and space.But in future the RFID based mobile phone payment and RFID card payment is possible which is as similar as phone based card payment.

I. INTRODUCTION

This paper aims at designing a general account for paying bills to electricity, telephone, tax office, water department all in one card the user has to debit the amount in is database provided to him. The government department has access to his account and can get the bill amount. Further we have provided a user face displayer to see whether he is the concerned person or not. A buzzer is provided to identify unauthorized access. The embedded microcontroller processes the information got from RFID card and give it to the application software via serial port. The application software has options to credit the amount into user accounts. So that the particular department can open the user account balance and debit the amount. The application software is done using high level graphical user interface VISUAL STUDIO.

II. DEFINITION

The concept of Internet of Things was put forward for thefirst time by MIT (Massachusetts Institute of America) in 1999,the basic idea of which was to connect RFID and other sensorsto form a distributed network of RFID architecture.Currently, there is not a uniform definition of the Internetof Things, and there are also big differences in theunderstanding toward it because of the different industries andareas. According to the general international definition, theInternet of Things refers to a network by which, through someinformation sensor devices, such as radio frequencyidentification, infrared sensors, global positioning systems,laser scanners and so on, according to the agreed protocol,anything can be linked to the Internet, to exchange andcommunicate information, in order to achieve intelligentidentification, location, tracking, monitoring and management.

III. PROSPECTS OF THE INTERNET OF THINGS

Internationally, the United States, European Union, Japanand South Korea and other countries attach great importance tothe development of the Internet of Things and have made a lotof research work. In 2009, the EU issued "Internet of Things— An action plan for Europe".

U.S. President Obama oncesaid, "Wisdom of the Earth is the basis for long-termdevelopment and prosperity, but also is the key of the UnitedStates to regain competitiveness in the 21st century"Nowadays, China has made substantial progress ontechnology of the Internet of Things, which has been officiallyclassified as one of the five national new strategic industries since prime minister Wen Jiabao proposed "Sensing China" inAugust 2009. Therefore, developing the Internet of Things isnot only an opportunity for the development of nationaleconomy in China at the present, but also will become one ofthe main driving force for the future economic development.

IV. BUSINESS ARCHITECTURE OF THE INTERNET OF THINGS

Business system of the Internet of Things generally can bedivided into three parts — perception layer, network layer andapplication layer. The perception layer includes all kinds ofinformation sensing equipment (Radio FrequencyIdentification, Smart Sense, Global Positioning System, Laser Scanner and so on). The network layer, the core part of theInternet of Things, located between the perception layer andthe application layer, not only needs to accomplish the functionof managing and business processing perception layer terminal,but also realizes information exchange with the applicationlayer according to the predetermined communication protocols.The following chart shows how it works.As is shown in the Chart 1, RFID, as the terminal of theInternet of Things' perception layer, is one of the coretechnologies to realize the Internet of Things. It is consideredas the most important and promising information technology inthe 21st century owning to its advantages, such as non-contact,low cost, high reliability, long life, easy to carry. This paper,taking it as a starting point, combining RFID with mobilephone, explores the realization of site charge pay with themobile phone.
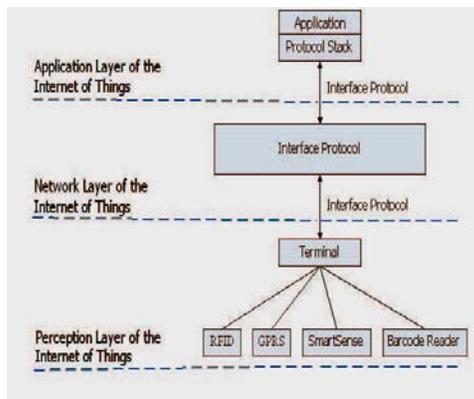

Figure. 1 architecture of the internet of things

The author believes that mobile phone, as the terminal of the Internet of Things' perception layer, will surely become a focus of the future Internet of Things' development and have a large market potential.

V. THE ANALYSIS ON THE REALIZATION OF RFID-BASEDMOBILE PAYMENT

A. Remote payment and on-site credit card payment:

According to different applying scenes, mobile phone payment has two forms — remote payment and on-site credit card payment. Remote payment, using the mode of online payment, mainly refers to the remote access transaction process achieved through WEB, WAP, IVR and other means. On-site credit card payment is another means of payment — taking a mobile phone close to the surface of Intelligent POS machines and through the radio frequency technology to complete the transaction. The on-site payment based on RFID, because of its safety, reliability, and other advantages, plays an essential role in the current mobile payment field.

B. SIM-pass, RF-SIM & NFC:

Currently, there are three implementations for non-contact mobile phone credit card payment: SIM-pass, RF-SIM and NFC.

automatically adjusted in 10-500cm, and the existing mobile phones needn't to be transformed. Meanwhile,

for the RF antenna is integrated in the SIM card, the existing mobile communication channel can be used for online payment.

1) SIM-PASS SOLUTION:

SIM-pass card, combining the technologies of DI card and SIM card, is called dual-interface SIM card. It has twoworking modes: contact and non-contact. The contact mode is to achieve SIM functions, while non-contact mode to achieve payment function, and is compatible with multiple application specification of smart card.

The mobile phone using SIM-pass technology can carry out a variety of on-site mobile phone payment services with the support of the wireless communication network and corresponding mobile payment service platform. SIM-pass works in the 13.56MHz band, and its biggest advantage is the strong compatibility, which can be compatible with most industry sectors both at home and abroad.

The mobile phone payment based on SIM-pass can be widely applied to the current non-contact card fields such as, transport, finance, social security, fueling, government, citizen cards and so on. However, since 13.56MHz is a lower frequency, a specific radio frequency antenna must be set in the inside of the mobile phone in order to achieve non-contact payment function. Currently, there are two solutions, one is to weld sensor antenna on the SIM-pass card, and the other is to integrate the antenna in the back cover of the mobile phone.

The firstsolution costs low, but the antennas may be easily damaged, and the hardware connection is instable and the reliability ispoor. While the second one needs to re-manufacture mobile phones, thus needs large cost.

2) RF-SIM SOLUTION:

RF-SIM card is a highly integrated card system, which packages the ordinary mobile phone SIM chip and the RF antenna (2.4GHz) to one card. It looks like ordinary mobile phone cards, and its interface complies with ISO7816 standards. RF-SIM works in the 2.4GHz band. Although its compatibility is poor, and the consistency of technical indicators of the large-scale production is difficult toguarantee, its advantages are talked by people. With the 2.4GHz RF antenna integrated in the SIM card, the carrier can penetrate the thick batteries and the back cover of mobile phones, the communication distance can be

3) NFC SOLUTION:

NFC (Near Field Communication), the short-range wireless communication technology, is evolved from the integration of the RFID technology and the Internet technology. It integrates non-contact reader, non-contact card and peer-to-peer function into a single chip, and then is loaded into mobile phone. It has a characteristic of two-way connection andidentification, with the working frequency in 13.56MHz, andthe role of distance about 10cm.NFC chip manufacturers provide NFC Chip andcorresponding interface accessories. On this basis, terminalmanufacturers develop and manufacture NFC chip, and thensell it to users or service providers.

The mobile phone based on NFC technology works in the13.56MHz band, and has a strong compatibility the same asSIM-pass. However, we have developed a special NFC phone.If the mobile phone users want to use mobile payment, he mustpurchase the corresponding NFC mobile phone. Meanwhile,NFC device manufacturers need to provide a dedicated NFCmobile payment card reader, and to install it in the appropriateindustry sectors, such as subways, buses, banks and so on.

C. COMPARISON OF SIM-PASS, RF-SIM AND NFC:

SIM-pass, RF-SIM and NFC have advantages anddisadvantages. But mobile payment is a complex and hugesystem, it needs to consider compatibility, reliability, stability,reading and writing speed and distance, antennas,electromagnetic properties and series of performanceindicators.

1) From the perspective of the frequency band, 13.56MHz frequency band is the world's most widely used RFID frequency band, and almost all influential non-contact applications in the world work in the 13.56MHz frequency band. All the world-renowned chip suppliers and system integrators produce mature products based on 13.56MHz in large amounts, and can provide a complete solution. That is to say, 13.56MHz frequency band products have withstood the double test of the market and technology, and has already had a

very solid practical application basis. In contrast, 2.4GHz frequency band has no internationally unified

communications standard, and there are rare 2.4GHz-based products on the market. Furthermore, 2.4GHz, a global universal frequency band, supports Bluetooth, Wi-Fi, Zigbee, UWB and other equipments, thus the security and conflict of communication need to go through rigorous verification.

2) From the perspective of mobile terminals, the biggest advantage of RF-SIM is that it requires no transformation of mobile phone. A RF-SIM chip is just plugged into an ordinary mobile phone, and mobile phone payment can be achieved.The "SIM-pass + Antenna" solution does not need to transform mobile phone, thus is the easiest program to implement mobile payment, but its reliability and stability are very poor, and will bring a lot of inconvenience to the users in later use of mobile phone. The "Integrate the Antenna" solution is also more easily to achieve mobile phone payment, however, it needs to transform mobile phone, not only increases the cost but also requires the manufacturer's technical support in the late stage.

3) Taking all the factors into consideration, we can see that the NFC mobile phone based on 13.56MHz is muchbetter than SIM-pass and RF-SIM solution. Firstly, although there is no comprehensive standard for NFC solution, and it still needs to replace the mobile phone, the author believes that, at present, there is no uniform standard for the Internet of Things, so NFC technology, taking this opportunity, can be incorporated into the standard range of the future Internet of Things. Secondly, the vast majority of domestic mobile phone users are keen on the import mobile phones, China can develop NFC mobile phone manufacturing industry by virtue of the development of the Internet of Things and the mobile phone payment, thus to promote the early arrival of the Internet of Things.

VI. EXISTING SYSTEM:

This paper analyses the Internet of Things and the prospect of its development at first, and then provides a business structure. And taking mobile payment based on RFID as the perception terminal of the Internet of Things, it emphatically introduced and comparatively analyses three solutions tomobile payment based on RFID. Considering various performance indicators and domestic and international factors, the author thinks that the best solution is NFC mobile phone based on 13.56MHz, which can not only

be compatible with current global big industries, but also promote the development of mobile phone

manufacturers and the arrival of the era of the Internet of Things in China.

VII. DRAWBACKS OF EXISTING SYSTEM:

Most of the online banking sites as also the online financial transaction sites require you to open an online account with them. You need to register to the institution in order to be authorized to perform money transactions with them. This involves a username and a password, which implies the need of password protection. You also need to maintain an account per organization, which can make it bothersome for some of you.

For secure online transactions, the site that hosts your account should follow strict security policies. If the passwords are susceptible to being hacked, it can mean a serious financial loss for you. Banks or financial institutes, which maintain your personal information, cannot afford to expose it to hackers. There is a potential risk of your personal and account details being stolen.

One of the most severe disadvantages of electronic payment systems is that of identity theft. The available security measures can prevent the sensitive information from being exposed. But it is important to use virus protection or firewalls for your computer. It is important to carry out money transactions over a secure server.

There is a great risk involves in the theft or the closing of the smart cards. In case the cards fall in unsafe hands, there is a danger of the expenditure of your entire bank balance. There are measures to inform the concerned authorities about the loss of the card. But, the time between losing the card and informing the authorities is critical. Unauthorized users may carry out transactions in your name during this period oftime.

Mostly, electronic cash is based on cryptographic systems. The transactions are encoded by means of numeric keys while the transaction details travel across the net. Though electronic payments are resistant to forgery, the keys are vulnerable to attack.

This was not to discourage you from taking to electronic payments. It was rather to make you aware of the disadvantages of electronic payment systems. While we are moving towards a paperless environment, we are inviting issues related to electronic security.

VIII. PROPOSAL SYSTEM

From the idea of this paper, we are going to change the RFID mobile payment to RFID card. The government will be highly beneficial by this type of payment.The user has to credit the amount to his account in his respective bank. The government department like Electricity office, Telephone office, water department and tax department will debit the amount from thair account correspondingly.

After debiting the amount, the message will be send to the user about the payment of bills to the department offices.The user can recheck the account by using the RFID card in any ATM centres.

By swipe the RFID card in RFID reader, the personal information of the user will be displayed in the ATM displayer. Then it ask the password to get into the account.

The user has to give the password and it will open the account, then he/ she can access the account. This is for authentication purposes. If the card is stolen means, if somebody uses this card, he cannot open because of the password provided to them. The buzzer will sound when any unautherised person uses the card.

Block Diagram
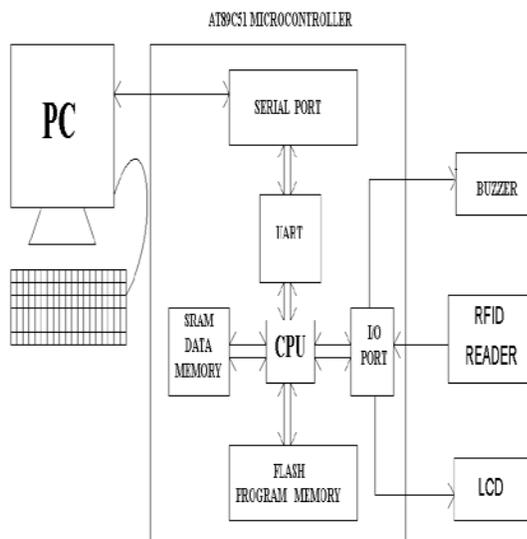
Advantages of Proposed System

- Secure transaction is carried through this RFID card payment.
- The government department will automatically debit the amount when the bill date comes.
- After debiting the amount, the message will be send to the users about the bill payments.
- Uneducated people can easily access the account whenever it is required.

IX. CONCLUSION

The main benefit to each user is convenience. Compared to online, debit cards and mobile payment, a smart RFID card allows small short-term payment to be quickly made to a user who need to pay a balance remaining, provided the total charges do not exceed the maximum debit line for the RFID card. Smart cards also provide more fraud protection than online and mobile payment.

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