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SHORT MESSAGE SENDING PLATFORM BASED ON GSM MODEM

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Abstract. With the development of smart phones, more and more functions rely on short messages to achieve and Global System for Mobile communication (GSM) is always embedded into a certain system as a tool. The article gives a short introduction about GSM services, and then to realize the SMS sending platform used by Attention command (AT). When correctly connected to the GSM hardware services, it can greatly improve the efficiency of sending messages.

Keywords: GSM, AT command, SMS sending, hardware services.

Introduction

Short Message Service, commonly abbreviated as SMS, is a text messaging service component of most telephone, Internet and mobile device systems. With the popularization of mobile phones and smart phones, mobile phone networks have also become increasingly mature. If the mobile phone and the computer network can be combined, it will greatly facilitate people's daily life [1]. However, it is inconvenient to edit short messages on mobile phones, and the input and display are limited, so it is not suitable for industrial applications. Enterprises need an efficient, safe and cost-effective platform. Therefore, the information platform of SMS modem came into being, and the GSM Modem is one of the communication products.

GSM (Global System for Mobile communication) is widely use in the world. Therefore, it is necessary to design a mobile phone short message sending platform based on GSM Modem. With the development of mobile communication technology, GSM network technology is mature and has the characteristics of wide coverage, but the establishment of dedicated data faces many problems such as high cost of transmission network, short communication distance, poor communication effect, etc [2]. Using reasonable and effective GSM network resources, these problems will be solved by using wireless GSM modem.

Over View of development at home and abroad

This is a method that is more suitable for small project development at present. It can be realized only by proficient use of AT commands and serial port programming knowledge, but it needs the support of hardware GSM MODEM. In general, developers will choose to use VC platform and GSM Modem to develop SMS platform [3]. Many technical functions have been completed by using GSM technology at home and abroad:

The GSM remote temperature detection system design of STM32 [4], the remote transmission of data is completed in the form of short messages through the GSM network, and the remote wireless transmission of data is realized through the serial communication RS-232 interface combined with the existing single-chip microcomputer system;

Using the global system of industrial mobile communication (GSM) monitoring of arduino uno [5], after the sensor detects fire and gas leakage, it immediately sends a message through the short message service (SMS) to notify the house owner, firefighter, etc. departments and authorities.

Realize automatic monitoring and short message service system through GSM Modem [6]. It detects unexpected events in the environment, generates alerts with detailed messages, and sends them to users to prevent dangerous situations from happening.

Judging from the functions realized in the above references, GSM is embedded into a certain system as a tool, and when a certain value set in the system is reached, GSM can be used as a sending platform to send warning information to the user’s mobile phone conveniently and quickly. In fact, the design completed in this topic is the part of these systems that use GSM to send short messages.

Overview of SMS sending platform

In order to realize the SMS sending platform based on the GSM module, VS2015 is used as the development environment, and C++ is used as the programming language to establish an object-oriented software development platform. The computer uses a serial port or USB interface to connect to the SMS modem through a dedicated connection line, and realizes data communication with the SMS modem through a series of instructions. Through the research of AT command, short message encoding and decoding process, a software program based on dialog box is designed to realize the function of sending short message. Realize the hardware connection between SMS modem and computer by installing the driver. After the computer is successfully connected to the GSM Modem, you can send text messages to the mobile phone conveniently and quickly.

First, use the API communication function to open the serial port, and use the AT command to check whether the CSM module is connected successfully. If the connection fails, the running of the program will end directly, and it needs to be restarted to repeat the above steps until the GSM module is connected normally. If the connection is successful, the content of the short message input by the user is encoded using the above coding method and the PDU format data is generated according to the number of the short message center, the number of the destination user for receiving the short message, the coding method and the validity period of the short message. Analyze the PDU data format of the short message by analyzing the message to be sent stored in the mobile phone [2]. The actual flow chart of the entire sending short message system platform is shown in Figure 1.

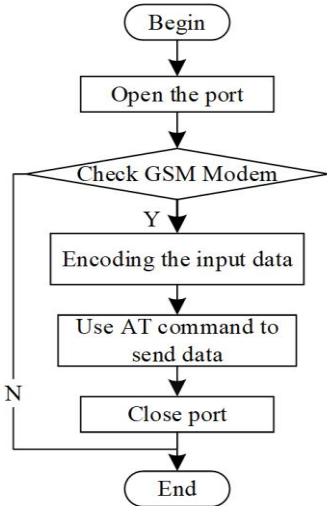


Figure 1. The overall flow of the SMS sending platform

SMS modem hardware interface

First of all, the SMS modem development interface refers to a series of functions or controls provided by the manufacturer of SMS Modem for programmers when programmers program and communicate with SMS Modem. The manufacturer of SMS modem provides 4 kinds of development interface modes for programmers. These four development interface modes are using AT command, SMS modem secondary development kit, SMS modem communication middleware and SMS gateway provided by a third party [3].

Secondly, when users need to obtain relevant information in SMS modem, they need to use AT commands to achieve it. The API function of the SMS modem secondary development kit encapsulates AT commands. The specific hardware connection of SMS Modem is shown in Figure 2. Beginning of the cycle of searching for local single-pixel extrema.

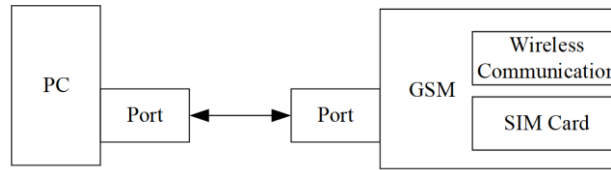


Figure 2. Hardware connection of SMS modem

The hardware interface of SMS modem mainly has two forms: USB and COM serial port. If the serial port mode is used, the hardware connection process is as follows: first, use the serial port connector SMS modem and PC; secondly, insert the SIM card into the communication card slot of the SMS modem, and then connect the external power supply of the SMS modem. If you use the USB connection mode, you only need to insert the SMS modem into the USB port of the computer to realize data communication.

The GSM is a USB serial port single-port industrial type, which supports development kits of multiple programming languages including C++. Its data terminal is always online, and can adapt to low and high temperature working environments. The 2G/3G/4G card of this card does not support other network operators for the time being. Figure 3 shows the SMS modem used in this design.



Figure 3. A kind of industrial-grade USB interface GSM modem

AT command

AT is the abbreviation of the "Attention". The AT command set is an industry standard for the modem communication interface, and it is a command that the modem can recognize and execute. The AT command set is sent from the data terminal equipment (computer) to the terminal adapter (SMS modem). Nokia, Ericsson, Motorola and Hewlett-Packard jointly developed a set of AT command sets for GSM, forming GSM07.05 and GSM07.07 technical specifications. These include controls over SMS. The PDU mode is based on the AT instruction set.

Usually, the command of the GSM module starts with the prefix AT, which means "attention". This prefix must be set at the beginning of each command, and at the same time, the end of each command must be terminated with "<CR>" or "<nr>", that is, carriage return. Note that these terminating characters can also be provided by their ASCII values in equivalent hexadecimal, octal, or decimal form. A list of these important commands is given in Table 1 [6].

Table 1. Command list of AT commands

Command	Purposes
AT	Check response
AT + COPS ?	Read cell operator
ATD "telephone number;"	Dial number
ATH	Hang up command
AT + CMGF = < mode > < CR >	Set messaging mode
AT + CMGS = " telephone number "	Set the target number of calls
< messages > < CR > n032	Send messages

Conclusion

This article introduces the method of using GSM Modem mobile phone text messages, learns AT commands, and finally realizes the sending and group sending of text messages. There are also many functions that need to be perfected. The following features are what are lacking in this design:

First, increase the length of text messages sent by mobile phones. This design supports the sending of text messages with a maximum of 128 characters. If more than 128 characters are used, they need to be sent in batches.

Second, learn the receiving rules of SMS modem and add the function of receiving SMS. In this way, the functions of the software will be further improved, and the receiving and sending modules can be integrated to make it fully functional.

The above problems can be further solved, so that the SMS platform has a certain degree of advancement and universality, and becomes a software product with social value.

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