

A Smart Home System Design Based on GSM

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ABSTRACT

This paper introduces a mobile phone short message control method in smart home based on GSM (Global System for Mobile communications). AT commands and the system structure is illustrated in detail. The hardware system including STC89C51 and TC35i is presented. The software framework is also analyzed clearly in this paper. In addition, some other potential application areas and its direction of development in future are given at last.

Keywords: GSM; Smart Home; STC89C51; Wireless Communication

1. Introduction

As the prevailing trend of IOT (Internet of Things) [1] covering the global, smart home find its way in the trend. All control and communication method dashed into this area: GSM, WIFI, CAN, Bluetooth, ZigBee. They all try to solve those problems in this smart world [2]. Among these solutions, GSM has a prominent position as mobile phone has been a comprehensive communicating fashion in modern society.

GSM is a kind of digital mobile communication network. It is developing rapidly in recent years. And the short message service is an important business network based on GSM. Its simple and efficient performance as well as relatively low fee absorbs the customers. [3] Moreover, the technical possibility for many types of remote monitoring make it bound to be the most convenient and welcomed way in smart home control as people can monitor their home anytime anywhere. In this paper, I'll present you a wonderful smart home solution based on GSM and explain the implementation of software and hardware.

2. System Framework

The GSM control system contains the communication part, the control center and the object to be controlled. Figure 1 is the system block diagram.

In this system, GSM module plays the communication role. STC89C516RD+ bears the task of a control center. The relay module connected to home appliances is the object to be controlled. There are several channels of relays on the module. Each connects to a different home appliance.

The GSM module with a smart card is responsible for receiving text messages from the GSM network and

transmitting the short message from the local MCU (STC89C516RD+) to the GSM network. It also receives message command from user's mobile and sends the corresponding command to the control center STC89C516RD+. The controller analysis the command and conducts the relay to open or close the anticipated channel, such to open or close the related appliance. After this, the control center indicates the GSM module to send feedback message to the user terminal.

3. AT Commands

MCU communicate with GSM module through AT (Attention Commands) [4]. AT command set is the interface standard between TE (terminal equipment) and TA (terminal adaptor), as well as between DTE (data terminal equipment) and DCE (data circuit terminal equipment). In the early 1990s, AT command set is only used in the operation of modem. With a series of evolution, AT commands are added GSM07.05 standards. Up to now, Most of the GSM modules support this standard.

3.1. The Syntax of Basic AT Commands

Each AT command must begin with "AT" or "at", and end with <CR>. Four kinds of syntax are showed in Table 1.



Figure 1. The block diagram of the mobile control system.

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Includes case studies relating to IoTSG with cloud and fog computing machine learning and blockchain **Next Generation of Internet of Things** Raghvendra Kumar, Brojo Kishore Mishra, Prasant Kumar Pattanaik, 2021-06-14 This book includes selected papers from the International Conference on Next Generation of Internet of Things ICNGIoT 2021 organized by the Department of Computer Science and Engineering School of Engineering GIET University Gunupur Odisha India during 5-6 February 2021 The book covers topics such as IoT network design and architecture IoT network virtualization IoT sensors privacy and security for IoT SMART environment social networks data science and data analytics cognitive intelligence and augmented intelligence and case studies and applications Industrial Internet of Things and Cyber-Physical Systems: Transforming the Conventional to Digital Kumar, Pardeep, Ponnusamy, Vasaki, Jain, Vishal, 2020-05-22 With the help of artificial intelligence machine learning and big data analytics the internet of things IoT is creating partnerships within industry where machines processes and humans communicate with one another As this radically changes traditional industrial operations this results in the rapid design cheap manufacture and effective customization of products Answering the growing demand of customers and their preferences has become a challenge for such partnerships Industrial Internet of Things and Cyber Physical Systems Transforming the Conventional to Digital is a collection of innovative research that discusses development implementation and business impacts of IoT technologies on sustainable societal development and improved life quality Highlighting a wide range of topics such as green technologies wireless networks and IoT policy this book is ideally designed for technology developers entrepreneurs industrialists programmers engineers technicians researchers academicians and students **Vehicular Communications for Smart Cars** Niaz Chowdhury, Lewis Mackenzie, 2021-12-30 This book covers a wide range of topics from the smart transportation domain It discusses protocols applications and security concerns in various vehicular networks using examples and easy to understand figures The first four chapters focus on vehicular network protocols and applications while the remaining four chapters incorporate security trust and privacy issues with examples from real life cases The book concludes with a vision of what to expect in the near future and will be an invaluable resource for anybody interested in this nascent technology and its variegated applications Dr Niaz Chowdhury is a postdoctoral research associate at the Knowledge Media Institute the Open University in England Dr Lewis M Mackenzie is a senior lecturer in computing science at the University of Glasgow Smart Buildings Digitalization O.V. Gnana Swathika, K. Karthikeyan, Sanjeevikumar Padmanaban, 2022-02-23 This book explains the concept of data centers including data collection public parking systems smart metering and sanitizer dispensers Electric urban transport systems and effective electric distribution in smart cities are discussed as well The extensive role of power electronics in smart building applications such as electric vehicles rooftop terracing and renewable energy integration is included Case studies on automation in smart homes and commercial and official buildings are elaborated This book describes the complete implication of smart buildings via industrial commercial and community platforms **FEATURES** Systematically defines energy

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