

INTELLIGENT AND ADVANCED MEDICAL INTIMATION SYSTEM WITH VOICE ALLERTS

E LAKSHMI PRASANNA¹S MOHANDAS²

¹ E Lakshmi prasanna, M.Tech Student, Dept Of ECE, SVR College Of Engineering And Technology, Ayyaluru(V), Nandyal(Mn),Kurnool(Dst), A.P., India.

² S Mohandas, M Tech, Asst. Professor ,Dept Of ECE, SVR College Of Engineering And Technology, Ayyaluru(V), Nandyal(Mn),Kurnool(Dst), A.P., India.

Abstract: Assistive Technology (AT) maintains and improves the individual's functioning and independence, thereby promoting their well-being. But today only from each 10 people in need have access to AT due to high costs and a lack of awareness, availability, personal training, policy and financing. By 2050, more than 2 billion people will need at least 1 assistive product with many elderly needing or more. Elderly make important contributions to the society. Though some people aged well, other become frail, with a high risk of disease. In this paper, we propose a first approach related the design of AT device. This uses open source technologies and gives a new choice in taking medication dosages. "The Intelligent PillBox" allows the organization of several medication schedules that health disorders presented in elderly need basically. Arduino Mega 2560 was took as the principal controller. This prototype contains; a programmable alarm system with an automatic opening and closing system, an interactive user interface and a notification system through GSM network. The development of this device is focused in the support of elderly people and other vulnerable groups that may need for an assisted care.

Keywords: GSM, Temperature sensor, IR sensor, ECG sensor.

INTRODUCTION

Assistive care area has become an important field in medical sciences. World Health Organization (WHO) defines Assistive Technology (AT) "As systems and services related to delivery of assistive products that enables people to live healthy, productive, independent, and dignified lives, and also able to participate in education, the market labour and civic life"[1]. AT includes adaptive, assistive, and rehabilitative devices, which are classified into a software, hardware based and prosthetic implants [2]. Priority groups on medical area (could vary according the location) are; pregnant, individuals with intellectual and development disabilities, also special needs, individuals with catastrophic diseases, kids, and elderly [3]. All of them could be benefit from assistive technology in order to reduce the need for formal health services. Then, by 2050, more than 2 billion people will need at least 1 assistive product with many elderly needing 2 or more [4]. Elderly, those aged 60 or above, make important contributions as family members, active economy participants, volunteers, etc. Though some people aged well, many

other become frail and some of them at risk of disease and a costly dependence [5]. Particularly, demential and cognitive disorders have become a common health problem of elder people. This is due the natural aging which increases chronic diseases. Those health problems require dosages of drugs, which could be supplied many times on a day. Brain troubles are common because of brain tissues deterioration and ends among other things in problems to remind the time to take the medication.

THE HARDWARE SYSTEM

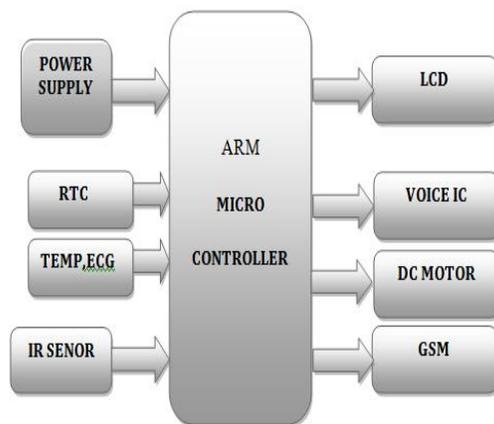


Fig.1.Block diagram

BOARD HARDWARE FEATURES

Micro Controller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI:

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer(CISC) designs.

Liquid-Crystal Display:

Lcd is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. Lcds are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

GSM:

An embedded system is a special-purpose system in which the computer is completely encapsulated by or dedicated to the device or system it controls. Unlike a general-purpose computer, such as a personal computer, an embedded system performs one or a few pre-defined tasks, usually with very specific requirements. Since the system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product. Embedded systems are often mass-produced, benefiting from economies of scale. Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service. The standard is used in approx. 85 countries in the world including such locations as Europe, Japan and Australia.

Temperature Sensor:

A thermistor is a type of resistor whose resistance is dependent on temperature. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting over current protectors, and self-regulating heating elements. The TMP103 is a digital output temperature sensor in a four-ball wafer chip-scale package (WCSP). The TMP103 is capable of reading temperatures to a resolution of 1°C.



Fig:2: Temperature sensor

ECG Sensor:

The electrocardiogram (ECG or EKG) is a diagnostic tool that is routinely used to assess the electrical and muscular functions of the heart. The electrocardiogram (ECG) has grown to be one of the most commonly used medical tests in modern medicine. Its utility in the diagnosis of a myriad of cardiac pathologies ranging from myocardial ischemia and infarction to syncope and palpitations has been invaluable to clinicians for decades.



Fig .3: ECG Sensor

IR Tx and Rx:

Transmitter and receiver are incorporated in a single housing. The modulated infrared light of the transmitter strikes the object to be detected and is reflected in a diffuse way. Part of the reflected light strikes the receiver and starts the switching operation. The two states – i.e. reflection received or no reflection – are used to determine the presence or absence of an object in the sensing range. This system safely detects all objects that have sufficient reflection. For objects with a very bad degree of reflection (matt black rough surfaces) the use of diffuse reflection sensors for short ranges or with background suppression is recommended.

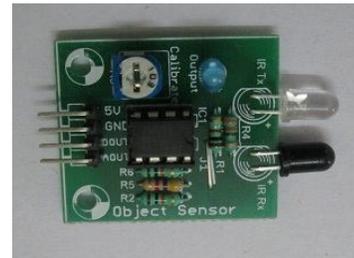


Fig .4: IR sensor

Motor Driver:

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.



Fig.5.Gear Motor

In its common mode of operation, two DC motors can be driven simultaneously, both in forward and

reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively. Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

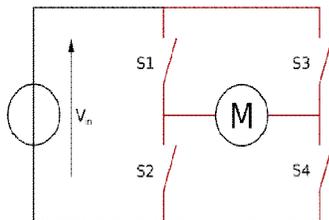


Fig.6. H-Bridge

Voice IC:

The APR33A3 device offers true single-chip voice recording, non-volatile storage, and playback capability for 40 to 60 seconds. The device supports both random and sequential access of multiple messages. Sample rates are user-selectable, allowing designers to customize their design for unique quality and storage time needs. Integrated output amplifier, microphone amplifier, and AGC circuits greatly simplify system design. The device is ideal for use in portable voice recorders, toys, and many other consumer and industrial applications. Single-chip, high-quality voice recording & playback solution.

- No external ICs required
- Minimum external components

- Non-volatile Flash memory technology
- ser-Selectable messaging options

Random access of multiple fixed-duration messages

Sequential access of multiple variable-duration messages programming & development systems not required

Level-activated recording & edge-activated play back switches

Operating current: 25 mA typical

Standby current: 1 uA typical

Automatic power-down



Fig .7: Voice IC module

CONCLUSION

System for remote access terminal using GPRS enabled embedded server is designed in this paper. Using cellular services such as SMS and GPRS to users can control and manage the intelligent appliances using a GPRS network over the internet. The more we can prepare for the future, the better it will be when it arrives. It is not too early to start planning for a world where more people, information, and things will be connected than ever before [7]. In Future work it has a scope to store the fingerprint data of a person who tries to access the door and the

details of that person posted into our webpage [2]. Thus achieving a sophisticated and secured smart home system developed.

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AUTHOR DETAILS



Name: E Lakshmi prasanna

Qualification: M tech, Embedded system.

Mail Id: prasannagoud494@gmail. Com

Phone:9052170494



Name: S Mohandas

Qualification:M tech

Designation: Associate professor

Mail Id: mohannptel@gmail.com

Ph No: 7702559166