Automatic Pill Dispenser

[1] Manjula G, [2] Udaysree P, [3] Ranjitha S, [4] Sangeetha L, [5] Priyanka VJ
[1] Assistance Prof. Department of Computer Science and Engineering, Sri SaiRam College of Engineering, Bangalore, Karnataka, India
[2][3][4] UG Scholars, Department of Computer Science and Engineering, Sri SaiRam College of Engineering, Bangalore, Karnataka, India

Abstract: -- **Earlier, people would live in joint families where atleast one person used to be there at home to take care of aged people. In modern days, people prefer nuclear families where there are no one present to take care of aged people and patients due to their busy working schedule. To overcome this, they need to appoint a caregiver to take care of the patients for their diet, hygiene, medication etc. Payments given to the caregivers will affect their savings. To overcome such problems a model is needed. This model medicates the patients and aged people automatically to inform them regarding medication in time as prescribed by the Doctor. This is done by presetting the prescribed time and comparing it with RTC time. When they are equal, tablets are dispensed. The patient is given sufficient time to take the tablets. If the patient fails, a message is sent to the caregiver informing about the failure. Thus the proposed model is implemented for aged people, patients, bed-ridden and the illiterates to ensure medication at right time and simultaneously notify the caregiver if patient fails to take medications.**

I.   INTRODUCTION

Nowadays a large number of people are suffering from neuro-related disorders like dementia and related diseases. Based on the survey done by Thies W et.al in the year 2001, 24.3 million people suffer from dementia , estimated a worldwide increase of 4.6 million new dementia cases every year. Without changes in mortality and new effective prevention strategies or curative treatments, the numbers of affected people will double every 20 years and may increase to 81.1 million by 2040. According to the US government report [1] generated in 2012, the number of people suffering from dementia in different countries increases year by year. The caregivers of the patients have two critical issues to deal with Diagnosis of disease & assisting the patients. Taking care of people suffering from dementia is a challenging task for relatives and family members. This disease demands the utmost attention of the caregivers. According to the report done by Alzheimer's Association in 2013, the US government is spending $203 billion on caregivers, which is approximately half of the net value of Wal-Mart sales in 2011. Caretaking of the patient involves tasks like bathing, feeding, giving medicines, maintenance of diapers etc. In 2012, the 15.4 million family and other unpaid caregivers of people with AD provided an estimated 17.5 billion hours of unpaid care. This is an average of 21.9 hours of care per caregiver per week. Helping the caregivers, in any of the tasks with the help of an automated system will reduce the burden on the

caregivers. Taking care of people suffering from such diseases is a challenging task. Our project focuses on designing a system to help the caregivers in giving medicines to the patients. The system shown in Fig. 1.1 is designed to dispense medication automatically.
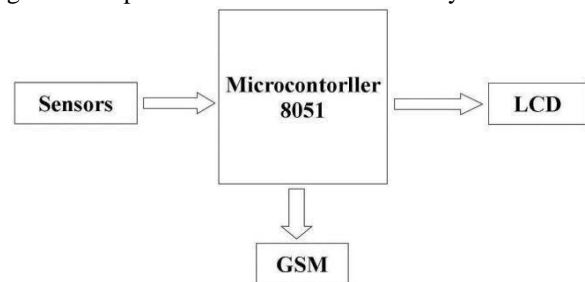

Fig. 1.1: Basic block diagram of APDS

II LITERATURE SURVEY

Frank Sposaro et.al in their paper "iWander: An Android Application for Dementia Patients" [2], have done analysis on taking care of dementia patients for their daily needs, which puts a burden on the caregivers, hence care giver needs to assist the patient on a regular basis. This paper also encourages the promotion of functional independence by the patient by use of mobile technology. It describes a tool by which the quality of treatment for dementia patients is improved using an android application, iWander, runs on several Android based devices with GPS and communication capabilities.

The data collected from the device is evaluated using Bayesian network techniques, which estimate the probability of wandering behaviour. It will better learn and identify normal behavioural patterns, which increase the accuracy of the Bayesian network for all patients. Normal behaviour classifications are also used to alert the caregiver or help patients navigate home if they begin to wander while driving. Muhammad Fahim et.al in their paper "Daily Life Activity Tracking Application for Smart Homes using Android Smartphone" [3] proposes a method of smart homes, which is considered as an independent healthy living for elderly person. The method develops an android smartphone application to assists elderly people for independent living in their own homes. It reduces the health expenditures and burden of health care professionals in care facility units. A smart home as an intelligent agent to perceive the environment and process the sensory data on cloud. It facilitates the care giver assistant by tracking the elderly persons in their own homes and avoids certain accidents. Furthermore, it also helps the family members to track the activities, when they are outside from homes. The above method utilizes the smart phone, smart home, and cloud computing services that may help to reduce the demands on elder's attentions and effort while performing daily life activities. In all the above papers, importance is given to movements and needs of the patients and this needs a smart phone. The problems with these papers are that they cannot reach all the classes of people.

III DESIGN METHODOLOGY

A. Block diagram of AMDS

Automated Medication Dispensing System (AMDS) is a system that dispenses the pre-loaded medicines according to the time prescribed by the doctor and notifies a care giver through a text message in case the patient fails to take the medications. In AMDS, the caregiver has to pre-load the medications according to the doctor's prescription and set the time appropriately. There will be a Real Time Clock (RTC) running and it compares the time that is preset by the caregiver. When the RTC time is equal to the present time, the particular tablet will be dispensed. As people become old, complications with poor listening and sight issues increases. Taking medicines at the right time becomes a difficult task for such people. There will be an audio signal in the form of a buzzer to indicate that the medications have been dispensed at the preset time. This audio signal is very

helpful for the patients who are blind as they get to know that the medications have been dispensed. Along with the audio signal, there is a bright LED light indication that is useful for the deaf people who cannot hear the audio buzzer signals. There is a LCD Display that displays the real time throughout the operation of the system. It also displays the preset timings and a message stating "take the medications". The feedback system is the highlight of the system. Whenever the patient fails to take the medication on time, an IR sensor detects the medication and sends a text-message to the care giver informing about the failure to take medicine. Thus the care giver can check on the patient and know the cause of failure to take medicine. This feedback system is useful as it ensures that the patient takes the medicine on time. It does not allow over dosage of medicine as only those medicines which have to be taken at a particular time will be dispensed. Designing a system like AMDS requires several components to operate in synchronisation with each other. One of the important components is the microcontroller. A microcontroller is a digital device that has an 8051 CPU with program and data memory in it. This device forms the "brain" of AMDS. Other modules like the RTC, GSM, LCD and stepper motor have to be interfaced with this microcontroller as shown in the Fig. 3.1
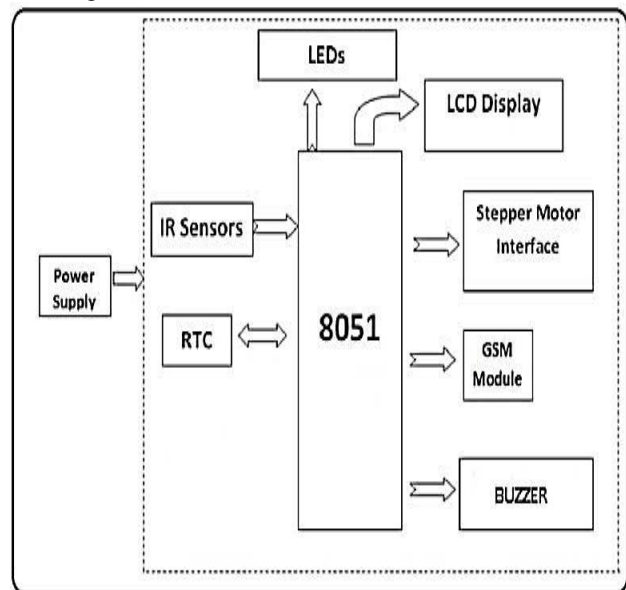

Fig. 3.1: Block Diagram of AMDS

IV. CONCLUSION

A method was needed to ensure that the aged and the patients would take medicines on time as prescribed by the doctor, so that the working class can be relieved o the patient's medicating schedules. Also it was necessary to ensure that correct dosage was given at the correct time in their absence. Simultaneously, the care giver had to be notified in case if the medication was not been taken by the patient. It would also reduce the work-load on the care giver. The system has to be absolutely user friendly and flexible to change the timings at which the medications have to be dispensed. These features have to be incorporated in a system at a very cheap price so that it is affordable by every common man. By the implementation of this project there is a strong potential of cost saving and an increase in efficiency of nursing. Considering this project, by the government and other organization, there can be drastic improvements in the proper medications of the people in a society. Hence the overall health of the society can be improved

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