INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Automated Medical Counter (AMC)

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Abstract: The need to go to the hospital, take all the necessary tests, consult a doctor and then buy their prescribed medicine takes more time. In the proposed system AMC (Automated Medical Counter) which works similarly to an ATM machine. With the help of Heartbeat sensor, Temperature sensor, Ultrasonic sensor, Load cell with camera and headphone connected to the medical machine the counter user can be monitored from the remote area. Application is installed in both the ends for voice communication with doctor. Doctor examines the patient, prescribes the medicines and the Medicine Dispatcher will dispatch the medicines from the AMC machine to the user. The main architecture of the system is based on smart devices and sensor networks performed in a wireless manner which is used to analyse the patients and the sick people in a real time environment. These parameters in this system are developed to work in a set of co-related manner so that the system can facilitate to diagnose the patient by the doctor using the tele-monitoring system. It gives the facilitation for the continuous investigation which is used for the patient in case of emergencies.
Keyword: Automated Medical Counter (AMC), rural and remote areas, Medicine dispatcher, sensors and data.

I.   INTRODUCTION

ural areas particularly in India have around 35,000 hospitals in total which incorporates an estimate of 14,00,000 beds. But these facilities don't satisfy the needs. People often ignore minor illnesses which in turn becomes critical if not treated properly.

Hence, to minimize the health problems our proposed idea resolves various diagnosis troubles. AMC can be installed in rural areas as well as in remote areas such as national and state highways where it's difficult to find a hospital. Availability of a low cost system analysing patient's condition that include heartbeat measurement by placing a finger between bright red light of LED and light detector, human body temperature measurement and getting digital value using a small temperature sensor and various other tests that takes a lot of time in any healthcare centre is what we are stating as Automated Medical Counter (AMC).
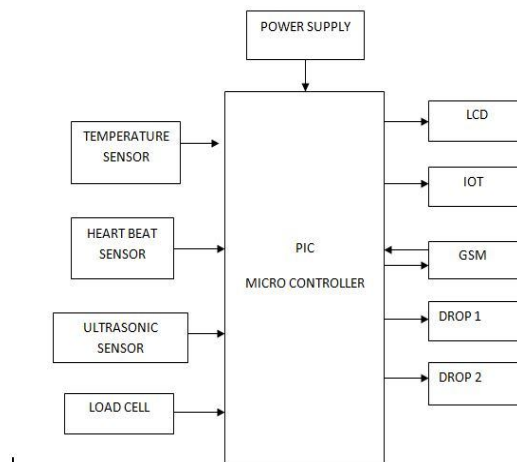
II.   BLOCKDIAGRAM

Fig 1: Block Diagram

Initially the patient enters the booth and his/her diagnosis initiated by heartbeat measurement followed by body temperature measurement (LM34 series). Height and weight are also mandatory of a basic diagnosis, so Ultra sonic sensor and Load cell records these two parameters. GSM module is used to create a real time interaction between the user and the doctor which uses AT commands. These commands are provided to GSM via PC or controller. Further GSM is serially interfaced with controller (PIC16F877A MC) using MAX232 which is an integrated circuit that converts TIA-232 levels to TTL-232 levels signals suitable for digital logic circuits. Internet of Things (IoT) module is used update the data recorded in real time scenario from each cycle of

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analysis into a database.

A. Power Supply
AC power is converted to DC (+12V) and supplied to the GSM and IoT module while PIC16F877A MC gets DC power which is provided from step down transformer

B. Sensors
1) *Heartbeat sensor:* Index finger should be placed between the LED and LDR. Heartbeat sensor works on the principle of optoelectronics.
2) *Temperature sensor* Here we use LM34 series temperature sensor. These are precision integrated-circuits and its output is linearly proportional to Celsius temperature. LM34 doesn't require any external calibration or calculation and provides temperature in an accurate range.
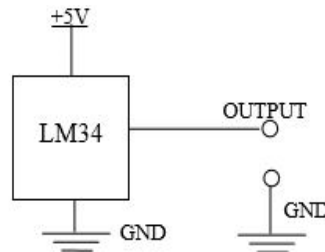

Fig 2: Temperature sensor

3) *Ultrasonic sensor:* It is a transducer that works in similar fashion as *sonar or radar* does. This consists of a system of transmitter and a receiver. The sound wave from the transmitter is reflected back by the object at some distance *D* and is falls back on the receiver end. The distance D, then can be calculated by using the following formula (in this case height of the user H)

$$H = h(AMC\ height) - D$$

$$D = \frac{speed\ of\ sound\ x\ time\ taken}{2}$$

4) *Load cell:* It converts the mechanical energy (force) into electrical signal. This phenomenon is used in weighing machines.

C. Modules installed and Working
Internet of Things (IoT) and GSM module has been interfaced with PIC microcontroller with the help of MAX232 serial interface. Once the user has been diagnosed completely the data in digital format gets updated in a database. This database can be accessed from any computer or mobile phone over the internet on a particular link provided with the IoT module. This helps in keeping a updated record in a faster and more convenient way. Also, the same data is sent to a particular doctor's or the hospital's common mobile phone as a text message through GSM module. The expert/doctor analyses the detailed data and prescribes accordingly.
The time spent in going to a medical shop and buying medicines has also been scrapped through AMC. The counter provides with a programmed system consisting DC motors, which rotates when the doctor replies back with his/her mobile phone a specific code for a particular medicine and that medicine drops out in the Medicine dispenser box.
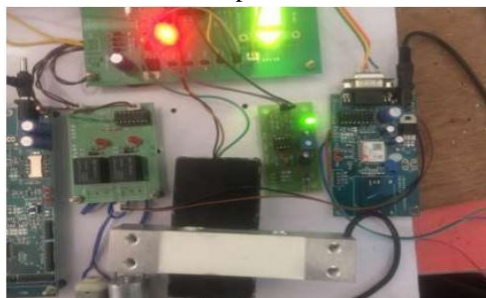

Image 1: Working Model

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III. RESULTS AND CONCLUSION

The proposed system works accurately and saves a lot of resources including time and money. This project represents the Automated Medical Counter (AMC) which does not require doctor's help in the hospitals. So it is not necessary to wait for the doctor to perform basic mandatory tests. This technique will be widely used in the future.
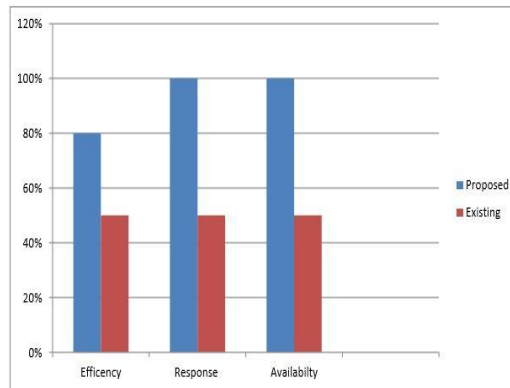
Graph 1: Existing and Proposed system comparison based on *Efficiency, Response and Availability*.

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