INTELLIGENT MEDICINE MANAGEMENT SYSTEM AND SURVEILLANCE IN IOT ENVIRONMENT

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Abstract. Medicine management based on Internet of Things (IoT) has great potential in medical field. We propose a surveillance security and maintenance for medicine in IoT environment. The proposed platform has an intelligent medicine security box that gives update of the medicine room and alerts when trespassers are prohibited. The medicine box is wirelessly connected to VNC viewer application. It is an android Application which runs through raspberry pi and it gives timely updates about medicines by the sensor connected to it. The surveillance camera capture the image of the person enters the room. If any person enters the room it automatically gives an SMS alert.

Keywords-Medicine monitoring, Surveillance security, SMS alert system.

1. Introduction
In existing system there is no proper maintenance for medicine, only LED indication is possible is existing system. There is no sensor in medicine monitoring in existing system. In heath monitoring there is availability of sensor, so I took the concept and applied in medicine monitoring. We propose a new medicine monitoring, surveillance security and SMS alert for medicine management system in the Internet of Things environment which is used for checking the authenticity of pharmaceutical products and intruders. The security scheme is efficient with respect to computation and communication cost.

The raspberry pi is connected with BMP180 to monitor pressure and temperature of the medicines, it also check the availability of the medicine’s in medicine box by measuring pressure. PIR sensor will check the human are entered are not. The Temperature sensor, PH level sensor, Gas sensor, Liquid level sensor are used to monitor the status of the medicines. By this concept we get more advantages like live streaming is possible, we can receive the details through email, we can check Medicine stock availability, etc. The existing system is health monitoring shows the health conditions of a person continuously with some sensor. It can be used as home healthcare services and hospital management. We use sensor for medicine management and security purpose of the medicine.

According to World Health Organization (WHO), the commonly counterfeited drugs are antibiotics, anti-materials, hormones and steroids, and now anticancer and antiviral drugs are also included in the list. The counterfeiting of medicines causes the serious threat to the society like fake medicine, expiry date of medicine, manufacture defect in medicine etc. Due to this human beings get affected and the future generation will also get affected.
BMP180 is connected with Arduino to monitor weight of the medicines, it will check the availability of the medicine’s in medicine box. PIR motion sensor, PH level sensor, Gas sensor, Liquid level sensor, Vibration sensor, Light sensor are used to monitor the status of the medicines and connected in raspberry pi. It can be used in Hospital Management Systems, material maintenance based applications, stock room maintenance..

2. Related Works
According to the author G. Subhramanya Sarma (et.al) [1] proposed health care and in addition of sensor for a person safety to this monitoring person use for travelling and elderly peoples. They had many drawbacks like healthcare is done but the medicine cannot be maintained. Healthcare Applications are used by the general public so it must be developed with utmost care and security features [1a]. Enhanced Authentication Scheme provides protection against replay and password-guessing attacks [1b]. The author Moeen Hassanalieragh (et.al) [2] implies IOT application enabled for smart phone and connected health care is a particularly important one but the cost is too high for this process. The healthcare applications can also be provided as web service so that it will be platform-independent [2a]. The IoT has played a crucial role in agriculture also. Raspberry Pi has been used for monitoring Agricultural activities [2b]. Author K. Natarajan (et.al) [3] proves IoT application connecting various objects together through to form a complete system but the system is not well defined. The author Jezna G Jose (et.al) [4] a modern healthcare IoT platform with an intelligent medicine box along with sensors for medicine monitoring is proposed here. Health care services based on Internet of Things have great potential in medical field. More delay occurred while transmissions of data. The author A. J. Jara (et.al) [5] proves for getting sensor values Zigbee can transfer sensor values effectively but when there is a need of continuous data transmission zigbee cannot be used. According to The author Suryadevara (et.al) [6] wireless sensor can be carried anywhere by the person but some medicine cannot be carried everywhere with sensor. Wireless sensor for home based safety of elderly person. This H. Cheung (et.al) [7] proposed anti counterfeiting systems for find the fake medicine like drugs and impure medicine. They 1st processed by placing Computers in Industry, to check the medicines. Author S. H. Choi (et.al) [8] proposed the security system for the anti counterfeiting medicine by maintaining in the stock room under the surveillance. This system is used hospital management. The author B. Yang (et.al) [9] proposed tracking system for medicine like "RFID tag data processing by tracing anti-counterfeiting" by this process medicine is secured in outdoors. Then author S. Coyle (et.al) [10] proposed sensor in health care IOT platform, like Biological sensor to shows the variation in human beings by sensors. Author Kim (et.al) [11] proposed an application-level technique for anti-counterfeiting medicine which employs a RFID reader available to a consumer’s device. According to author Gipsa Alex (et.al) [12] proposed a medicine box in IOT with LED and buzzer. Through this concept we propose medicine box with different types of sensors..

3. Proposed System
Raspberry pi is used as the controller for the system and it accesses the direct power supply. Gas sensor detect there is any gas leakage in room. PIR motion sensor every person enter the room, PH sensor detect the impurities and level in it. Water Level Sensor detects the level of the liquid. Vibration sensor detect the vibration occur in the room. All the sensors are connected in raspberry pi. Arduino is also connected through raspberry pi for power supply. BMP180 is used measure the temperature and pressure of room. A DC motor is fixed for the security purpose by detecting a person by PIR motion sensor the motor work, if a intruder enter the room motion sensor detect the person and automatic door shutting system work.

Python program is stored in a SD card and placed in raspberry pi. The python program has been created for the senor level that had to maintain for a medicine. In our process we can measure only one medicine at a time, medicine level, state has been entered in the program.
4. Pin Connection
Water level sensor is connected in 3.3volt pin. DC motor is connected in 5volt pin and GPIO2 pin. Buzzer is connected in GPIO3 pin and GPIO4 pin. PH sensor is connected in GPIO26 pin, GPIO13.
pin and GPIO6 pin. Vibration sensor is connected in GPIO5 pin. PIR motion sensor is connected in GPIO7 pin. Light sensor is connected in ID_SC pin. Gas sensor is connected in GPIO12.

5. Pin Configuration
For sensors power supply is given according to the Pin configuration.

![Pin Configuration](image1)

![Arduino](image2)

Arduino is connected in raspberry pi for power supply. Arduino is getting 5volt from raspberry. It is only used for BMP180 connectivity. It is used for ADC (Analog to Digital convertor).

![BMP180](image3)
It is connected to the Arduino. BMP180 it will calculate the pressure and temperature at a time of the medicine box.

BMP180 has default weight when we give pressure on BMP180 weight value will automatically increase. If it is default value then the box is empty. The program code is stored in raspberry pi so it will be fully automatic.

A PIR detector is a motion detector very effective in enhancing home security systems. The sensor detect the person passing by through infrared race, it is simply sensitive to the infrared energy emitted by every living things. When a person walks inside the room, the sensor detects the person and captures the picture of the person. If the person is an intruder it gives an alert.

PH Sensor is used to detect the liquid state of the medicine in correct PH level or not. If the PH level is not in correct range, it will automatically show in system screen.

Gas sensor is used to detect any leakage in gas medicine around the box. It also detect there is leakage is oxygen cylinder or smoke. It is connected to raspberry pi with 5volt power supply.

Level of liquids and other fluids are detected by level sensor. Such substances include liquids like water, oil, slurries, etc. It also measures the settled solid medicine inside the liquid. Level sensors measure the level of the medicine which is already entered.
We use LDR module as light sensor. It is used has some medicine should be maintained in dark room without light. If there is light presented it gives us automatic notification.

![Fig. 10. Light Sensor](image)

It is for security when the box is kept in room. So anybody like child touches the box it gives us alert. It will alert with a sound.

![Fig. 11. Buzzer](image)

We use DC motor for security purpose. It any intruder enter the motion sensor detect the person gives us notification and automatically closes the door. It is a 12 volt DC motor. DC motor is connected to relay and from relay connected to raspberry pi.

![Fig. 12 DC Motor](image)

Relay is used for switching purpose. It is mainly used for motor. DC motor needs more than 5volt. Hence, it is connected to relay.

![Fig. 13 Relay](image)

We use Logitech webcam C100 camera for security purpose as surveillance of the medicine box and the stock room.
6. Implementation

VNC viewer is an android application which support Raspberry pi, in raspberry pi we have constructed a python program and saved in a SD card. The steps of implementation are given below:

STEP 1: sudo python ma.py is the command for executing the temperature and pressure sensor.

STEP 2: sudo python main1.py is the command for executing the light sensor, smoke sensor, liquid sensor, vibration sensor, PH sensor, PIR motion sensor.

STEP 3: sudo python objectsms1.py is the command for message alert system.

STEP 4: 192.168.43.88;8081 is the web cam Ip address used for online monitoring.

Nowadays there are so many anti counterfeiting of medicines causes the serious threat to the society like expiry date of medicine, manufacture defects of medicine etc.
Through this human get affected and the future generation affect through them. There are so many hospitals with no proper maintenance of medicine and in home power medicine (like act rapid, paracetamol, etc) are kept in front of children. For the safety of a person we propose advance security system in medicine maintenance.

7. Conclusion & Future Work

The proposed scheme utilizes the Internet of things (IOT) and is suitable for mobile environment, which also provides efficient IOT update phase. The scheme is efficient with respect to computation and communication costs. By this process we get so many results than existing project. Advantages we can receive the details through email, we can check Medicine stock availability, live streaming is possible. Through this we process advance.

In future work, for one medicine monitoring we can do multiple medicine monitoring at a time by connecting more raspberry pi and to connect all raspberry pi some system has to be taken. It gives more utilization in medicine management. It reduces the human work in hospital management and security.

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