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Research paper

Automated Prescription of Alcoholic Content to Dipsomaniac

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Abstract

Alcohol addiction is an exponentially increasing dreadful disease. Alcoholic beverage is a drink that leads to greater risks of human health related problems. The consumption of alcohol is spring up as a serious issue. It makes a great difference on , both "how much you drink on any day" and "how often you have a heavy drink," The risk of developing alcoholism is not caused by a single gene, but rather numerous genes that interact with one another. Need of this paper is to reduce alcohol consumption by controlling and monitoring. Here we uses Sensors which response to a human physical stimulus and transmit a developed impulse. The interpreted data from the sensor is analyzed and used for prescribing the amount of liquor to the dipsomaniac person. The digital statistics is remotely maintained in the cloud repository. Through this alcohol sales, addiction can be controlled and avoid illegal sales. The intention of this paper is to monitor the health condition of a person.

Keywords: *Body temperature sensor, Heartbeat sensor, Blood pressure sensor, FID reader and tag, Microcontroller, GSM and GPS.*

1. Introduction

Around 33% of people in the world consume alcohol frequently. The moderate consuming rate of alcohol for an individual per year is 6.2 liters. The excessive alcoholism leads to many deaths around the world. A survey in 2009 found that the net effect of alcoholism causes 3.8% of all global deaths. The long term use of alcohol causes damages to every organ system in the body. It includes

- Cancer - Continuous alcoholism can increases the risk of cancer.
- Cardiovascular disease- Continuous consumption of alcohol results in deadly condition which causes blood clot and weakens the heart muscle.
- Immune system- Too much of consumption can weaken our immune system and makes our body system get easily affected to any other disease.
- High blood pressure- Alcohol can increase the blood pressure which leads to health problems such as heart and kidney disease.

In Russia, 20% of men and 6% of women consumes alcohol moderately. The consuming rate of alcohol especially by men in recent years causes more than half of the deaths. The early deaths occurs in Russia because of consuming too much of liquor. In 2012, the WHO found that the 30% of the deaths is due to over consumption of alcohol and consuming rate exponentially increases.

A governmental report from Britain has found that there were more than 8000alcohol-related deaths in 2007, lower than 2006. The alcohol-related death rate was 13.3% in 2007, compared with 6.9% in 1991. The Global Status Report on alcohol and health 2014 says that in India, 30% of peoples consume alcohol regularly. Some 11% percent are moderate to hard drinkers.

The average Indian consumes alcohol per year is 4.3 liters and the average rural Indian alcohol consumes alcohol per year is 11.4 liters. The Australian National Health and Medical Research Council (NH&MRC) has provided guidelines for safe daily drinking limits. The recommended maximum drinking for men is 4 standard drinks per day and for women is 2 standard drinks per day. More than the recommended drinking is known to cause harm and leads to many health related problems as it contains 10 grams of alcoholic agent in a standard drink.

The health problems due to over consumption of alcohol are based on short term and long term effects in the body. The effects depend only on the amount of consumed alcohol. The short term effects include loss of memory, lack of coordination and slowed breathing. The long term effects depend on the quantity of consumed alcohol. It can affect the brain by changing the behavior of the individual. It also reduces the thinking ability of a person because the consumption of alcohol reduces the communication between the nerves in the brain. The long term drinking can cause damages to brain, liver, heart and pancreas.

This system is proposed for monitoring alcohol consumption and reports it to the concerned person remotely. This system consists of microcontroller, RFID reader and tag, GSM and GPS. The tag is issued to every dipsomaniac person. Using their tag, the product is supplied to the person. Three sensors are used to monitor the health condition of a person. The sensors used in this system are body temperature sensor, blood pressure sensor and heart beat sensor. The body temperature sensor allows you to measure the temperature of a body. It is important to measure our body temperature.

The body temperature sensor is applied on the skin surface and it indicates the temperature in degree after reaching the steady state.

The average normal body temperature is 37°C. Some studies have shown that the normal body temperature can have a wide range from 36.1°C to 37.2°C. Heart rate sensor is the device is used for recording the electrical activity of the heart over a period of time using electrodes placed on the skin. The normal heat beat range is 60 to 100 beats per minute. The blood pressure sensor is used for detecting the pressure of a person. These sensors are then interfaced to a microcontroller that reads the data from the sensor and transmits the resulting data.
The data from the sensors are used for prescribing the amount of liquor. The digital data is maintained and stored. The GSM module extracts the location from the GPS and send message to the respective mobile number. Through this alcohol sales, addiction and illegal sales can be controlled. The section 2 explains the related work of the system, section 3 includes system specification and further sections describe the system implementation and results.

2. Related Work

Temperature and heart beat monitoring system using IoT [1] is built up for gathering patient information. Body Area Network (BAN) is developed for gathering required details about a patient. The gadgets collect information from sensors and transmit it to the remote gadgets. The gathered data is stored and the patient health condition is maintained in the database and the information is refreshed effectively.
In health monitoring system [2], wireless network is used to forward measurement through a gateway towards cloud. Different wireless communication technologies can be used for (i) connecting the IoT device as local networks, and (ii) connecting these local networks to the internet. The connectivity technologies are NFC, Bluetooth, zigbee, cellular network etc. In this paper, cellular network connectivity is used because of its widespread mobile networks like 3G and LTE provide reliable high speed connectivity to the internet. However, they have a high power consumption profile and they are not suitable for local network communication. There are many issues involved in this work, in which an intensive research activity takes place. This review [2] is focused on the healthcare monitoring area to appreciate the scale of the problem and the recent approaches to face it. Only some of the recent and representative works are presented in order to show the intensiveness and variety of research developed in this area. A final subsection is added, which summarizes the contributions to this work.
The proposed framework enhances this health monitoring by means of leveraging the computing capabilities of modern wearable's and other IoT devices for computing advanced medical applications. The main idea is to get some devices (sensors and wearable's) of the BAN can take part in the application processing and to provide a high level information to the medical staff's devices to perform further data analysis.
David Kinnamon [10] built electronic bracelet for monitoring of alcohol lifestyle which is used for monitoring the alcohol lifestyle through the detection of EtG (Ethyl glucuronide). It is a metabolite of ethanol which is used to determine the consumption rate from human sweat. EtG has the ability to determine the alcohol consumption more than 24 hours after light consumption and four days after heavier consumption. The concentration level from EtG was tested on individual sensors which are compared to ensure the consistency of electrodes. The detection levels corresponds to an equivalent consumption of 1-10 standard drinks of buffered saline and greater than 1 standard drink of human sweat. The wearable instrumentation demonstrated based on the level of buffered saline. This approach is the direct monitoring of ethanol in the human sweat.

3. System Specification

3.1. Temperature Sensor

A temperature sensor is a device which is used to measure the temperature of a person. LM35 is a precision IC temperature sensor with its output proportional to the temperature in °C. With LM35, the temperature can be measured more accurately. The operating temperature ranges from -55°C to 150°C.The average body temperature of a person is 97°F (36.1°C) to 99°F (37.2°C).
Features:

- Suitable for remote applications
- Low cost due to wafer-level trimming
- Operates from 4 to 30 volts
- Less than 60 Micro ampere current drain

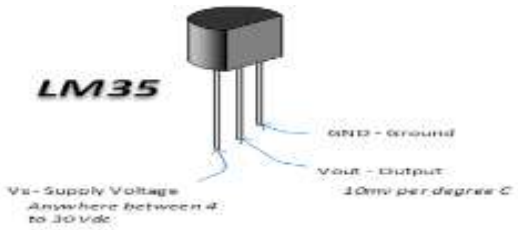

Fig. 1: Temperature sensor

3.2. Heartbeat Sensor

The Heartbeat is the process of recording the electrical activity of the heart over a period of time. It is used to assess the electrical and muscular functions of the heart. The AD8232 is a cost effective board used to measure the electrical activity of the heart. This electrical activity can be charted as an ECG or Electrocardiogram and output as an analog reading. The average heart beat rate of a person is 50-90 bpm.
Features:

- Fully integrated single-lead ECG front end
- Low supply current: 170 μ
- A 2-pole adjustable high-pass filter
- Accepts up to ±300 mV of half-cell potential

Fig. 2: Heartbeat sensor

3.3. Blood Pressure Sensor

The Blood Pressure Sensor is a non-invasive sensor designed to measure human blood pressure. Pulse rate is also reported. The BP Series is ideal for high-volume, disposable medical applications. Measure systolic pressure (high), diastolic pressure (low) and heart rate. Fully compatible with Arduino and microcontroller. Measurements are displayed in the 16 x 2 Character LCD Modules.
Features:

- Reading ranges from -30 to 300 mmHg
- Low cost
- Compatible with all automated equipment

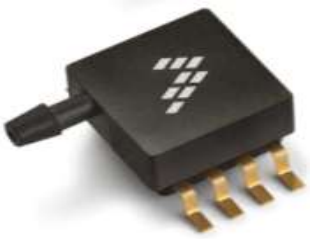

Fig. 3: Blood pressure Sensor

3.4. RFID Reader

Radio Frequency Identification Reader (RFID Reader) is a device used to gather information from an RFID tag. Radio waves are used to transfer data from the tag to a reader. EM18 RFID reader module can be directly interfaced with the microcontroller using USART communication. It will read the tag number and give output via TX terminal.

Features:

- Cost-effective and compact size
- Direct interfacing with UART, PC is possible using RS232
- Excellent read performance without an external circuit

Fig. 4: RFID reader

3.5. Microcontroller

A microcontroller is a computer present in the single integrated chip. This single chip contains the processor, non-volatile memory for program, volatile memory for input and output, and I/O control unit. The PIC16F876A/877A devices have 8K words x 14 bits of Flash program memory. In case such a situation arises, it activates the actuators to perform a controlled operation.

Features:

- Low cost
- Analog comparator
- 2 wire serial interface
- Real Time Counter with separate oscillator

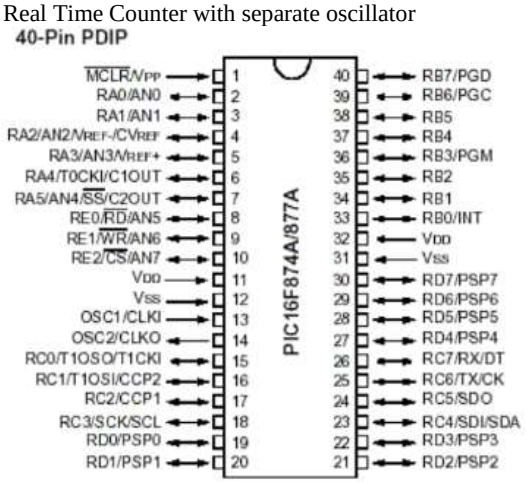

Fig. 5: Microcontroller

3.6 LCD Display

LCD (Liquid Crystal Display) screen is a display module which is connected with microcontroller to display the data from the sensors. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

Features:

- Single power supply
- Built in controller
- Display mode and Backlight variations.

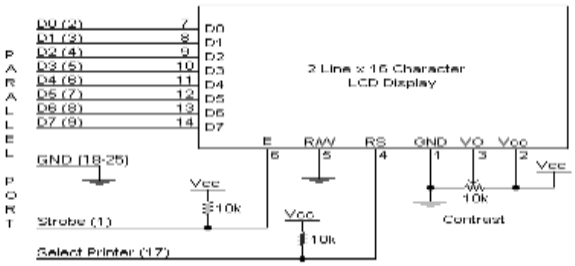

Fig. 6: LCD display

3.7. GSM

Global system for mobile communication (GSM) is a cellular network which connects different cells. The coverage area of cell may vary according to the implementation environment. SIM900 delivers performance for voice, SMS, Data, and Fax in a small form factor with low power consumption.

Features:

- Low cost
- GSM / GPRS MODEM using SIMCOM – 300 Module
- RS 232/ Interface DB Port
- Power and single LED indication

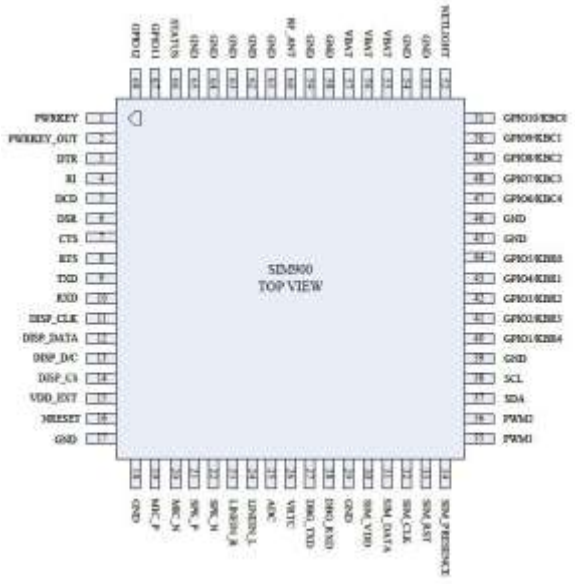

Fig. 7: GSM module

3.8. GPS

Global positioning system (GPS) is a radio navigation system that allows the user to determine their exact location. The NEO-6M GPS module is a well-performing complete GPS receiver which provides a strong satellite search capability. It is mainly used to find the exact location.

Features:

- A complete GPS module with an active antenna integrated, and a built-in EEPROM to save configuration parameter data.
- Built-in 25 x 25 x 4mm ceramic active antenna provides strong satellite search capability.
- Equipped with power and signal indicator lights and data backup battery.
- Power supply: 3-5V; Default baud rate: 9600bps.

Fig. 8: GPS module

4. Proposed System

Alcohol consumption is the major problem faced by many people nowadays. In today's world, many accidents are caused by the consumption of alcohol. The alcohol consumption rate among the population increases exponentially. In this system, we are going to reduce the alcohol consumption based on the health condition of a person.The main objective is to design a real time monitoring system for dipsomaniac person by measuring the temperature, pressure and heart rate. The system consists of sensors, RFID reader and tag, GSM and GPS. The sensors are a device which is used to detect and transmit the obtained result.

The sensors used in the system are temperature, heart rate and pressure sensor. The readings from the sensors are obtained and displayed in the LCD. RFID tag is issued to every dipsomaniac person, without the RFID tag people cannot able to buy the drink either in legal or illegal method. As a human citizen he has to register for RFID tag and hold that tag for daily or monthly or yearly consumption. This way of using ID system is to track the consumption of drink and to monitor and keep reducing the alcohol drinking system.

In figure 1, it shows the architecture of the system. Architecture diagram is the formal name given to the pictorial representation of the system architecture. A system architecture can comprise system components, the expand systems developed, that will work together to implement the overall system. The ID system, sensors, GSM and GPs are the components used in this system. Dipsomaniac person should have a tag to purchase the product. This ID system is valid only for three times a day, after that the ID becomes invalid.

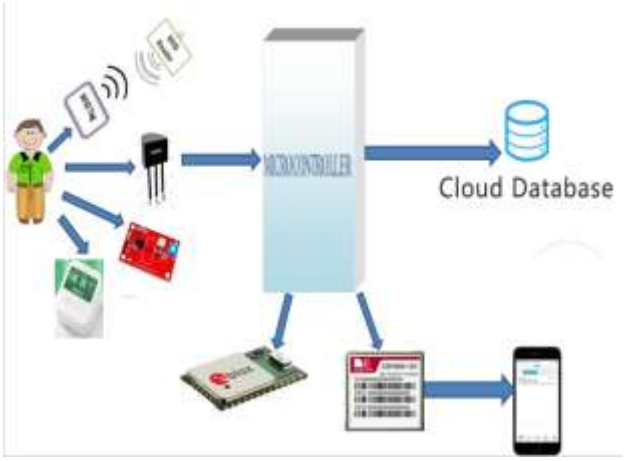

Fig. 9: System Architecture

The information in the tag is person name, address and phone number. The temperature sensor is used for determining the person temperature and heartbeat sensor is used to record the activity of the heart for a period of time. These sensors are interfaced to the microcontroller which transmits the data. The data obtained from the sensors are send to the shop and the details of a person are displayed.

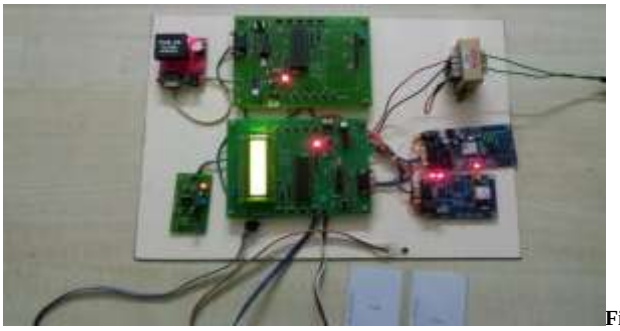

Fig. 10: Hardware implementation

Fig. 11: Reading displayed in the LCD

In figure 10, it shows .the hardware part of the system. The process of this system is, first the person have to use their tag and the health condition is determined based on the readings from the sensors. The heart rate and pressure is compared for each and every person to determine the consumption rate of a person. In figure 11, it shows the readings in the LCD screen. The LCD (Liquid Crystal Display) is used for displaying the person name with their readings obtained from the sensor.

In the software part, it consists of admin which is used to monitor and send the quantity of the product details to the shop. The data from the sensors are send to the shop and the owner in the shop prescribe the amount of alcohol based on the health condition of a dipsomaniac person.

Fig. 12: Home page

The data are stored in the cloud repository and the database is common for all the shops in the particular location. Once the product is supplied, the information are send as a message to the person using GSM module. The message includes the readings from the sensor, the product purchased and the location of the shop using GPS module which extracts the exact location of the shop. Using this system, the alcohol consumption rate is reduced and it can also avoids illegal sales. Through this, sales can be controlled and monitored. In figure 4, it shows the message received. The message is send to the person's mobile number.

Fig. 13: SMS Message

5. Implementation of the System

Figure 14 shows the login page for admin and shop. The admin will supply the product quantity to the shop which will be maintained in the cloud repository.
Once the product is supplied, the quantity of the product in the admin page is reduced by one.

Fig. 14: Login page

Fig. 15: Quantity of the Product

Fig. 16: Stock Maintenance

This system framework stores the information by IoT specifications at regular intervals and refreshed it into the database. A specialist in the shop will be able to view the dipsomaniac details and a product is supplied based on the comparison of previous data.

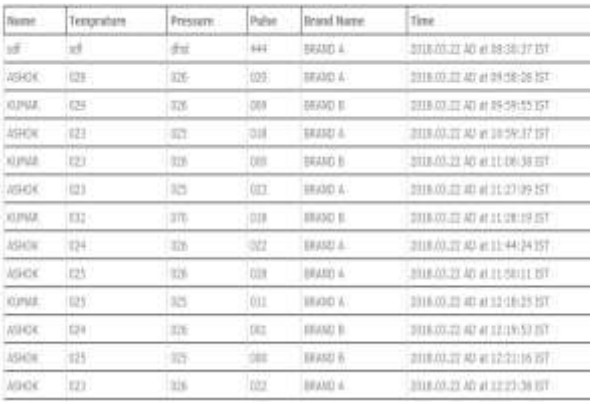

Fig.17: Cloud Database

The data are stored in the cloud repository which is used for comparison of data among the users. The quantity of the product is maintained and evaluated by the specialist. Therefore, this system can monitor and avoid the illegal sales of the product supplied.

6. Conclusion

The alcohol consumption rate can be reduced and it can avoid illegal sales. The intention of this system is to monitor the health condition of a dipsomaniac person. Using this concept, the addiction can be controlled and monitored. An innovative method to control alcohol abusing system. It will reduce the consuming rate of an individual. This system improves the government treasure and avoids the illegal access of the product supply and sales. It males fully computerized access in shops. The access will provide more security to the sales and this system assembles the information such as temperature, heart beat and pressure and refreshes the database. This method reduces the amount of consumption and the measured data is sent to family member.

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