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Automatic Hospital Management System

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ABSTRACT

This project explains about patient monitoring system which is a web application designed to aid medical professionals keep track of their patient's health, activities and environment. The increase in the elderly population will put a strain on the current healthcare system in India. A system such as this will reduce this strain by allowing nurses and doctors to efficiently keep track of multiple patient's status. This project provided shows how HCI principles and methodologies are achieved between users and computers, to further explain how the methods are being used to create the application's user interface

Keywords— Smart hospital Prototype, gsm, UI Design, Patient Monitoring, Human Computer Interface, Data Collection System, sensors.

INTRODUCTION

The elderly population in India is increasing every year putting more pressure on the healthcare industry to provide for them. If more tools are developed for taking care of this growing demographic than we can reduce the strain on the health-care system. Through advancements in Internet of Things technology several methods have already been developed for this new issue. We will be developing a smart-hospital monitoring application. This application will primarily be for critical patients to aid them in their duties by providing valuable information about their health in daily routine.

The readings taken daily are sent to doctors and enable them to suggest the medicine and physical exercise routine that enable them to improve the quality of life and overcome such disease.

The application type will be a data collection system. For this project we will be using sensors: motion, door, temperature, heart rate, etc. This data will then be analyzed and presented to the user in the form of charts and summaries. There will also be a provision to send data to concerned Doctor in case of critical emergencies.

We can make when Doctor, nurse and receptionists clicks the button, doctor can create the medical reports, nurses can add medical information, and receptionist can schedule an appointment through this app.

METHODOLOGY

The plan we prefer to do is not only to help monitor the patient's health while asleep but also when we get out of bed. The main idea of the system is to transfer information to a continuous patient monitoring through a PC user interface.

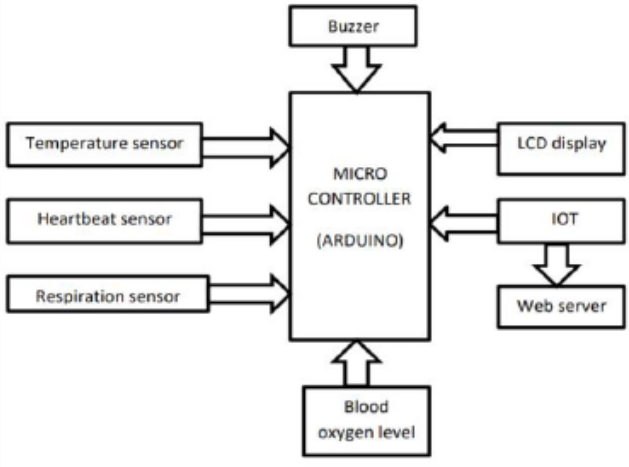
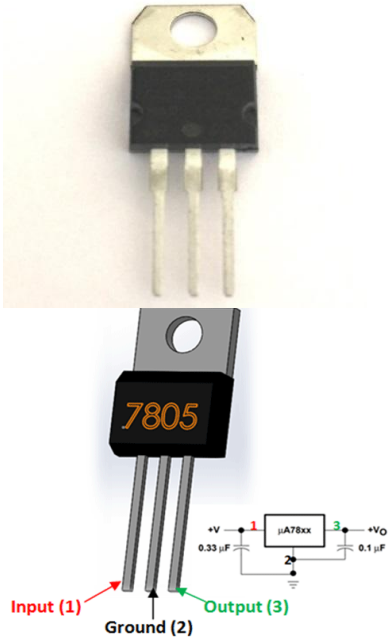


Figure1: Block Diagram of setup

Such a system will always receive important body parameters such as temperature, heart rate and can be compared to a predetermined distance and if these values exceed a certain limit, it will notify the doctor immediately. In this system the microcontroller is used to transfer data. Connected to gsm which provides information to the doctor or caregiver. Patient health data is stored on the pc website. The doctor can easily access the patient's health at any time on the PC. The LCD and buzzer are also connected to a small controller so that patients can monitor their health status live. In an emergency it will automatically notify the doctor and the patient's concerns via SMS. In such a case the patient will receive immediate medical attention and will save time and energy from relatives, who may not always be close to the patient.

2.MODELING AND ANALYSIS

1) REGULATOR IC 7805



Features

• 5V Positive Voltage Regulator

• Voltage Minimum Input is 7V

• Maximum Input Voltage is 25V

• Operating current (IQ) is 5mA

• Internal Thermal Overload and current short circuit

limit protection are available.

- Junction The maximum temperature is 125 degrees Celsius
- Available in TO-220 and KTE package

Voltage regulators are very common in electronic circuits. They provide a constant output voltage for a varied input voltage. In our case the 7805 IC is an iconic regulator IC that finds its application in most of the projects. The name 7805 signifies two meaning, "78" means that it is a positive voltage regulator and "05" means that it provides 5V as output. So our 7805 will provide a +5V output voltage.

The output current of this IC can go up to 1.5A. But, the IC suffers from heavy heat loss hence a Heat sink is recommended for projects that consume more current. For example if the input voltage is 12V and you are consuming 1A, then (12-5) * 1 = 7W. This 7 Watts will be dissipated as heat.

1) LIQUID CRYSTAL DISPLAY(LCD)

Features of 16×2 LCD module

- Operating Voltage is 4.7V to 5.3V
- Current consumption is 1mA without background light
- Alphanumeric LCD display module, the description can display words and numbers
- It consists of two lines and each line can print 16 letters.
- Each letter is made of a 5 × 8 pixel box
- Can work in both 8-bit and 4-bit mode
- It can also display any custom charactersAvailable in Green and Blue Backlight
- Available in Green and Blue Backlight

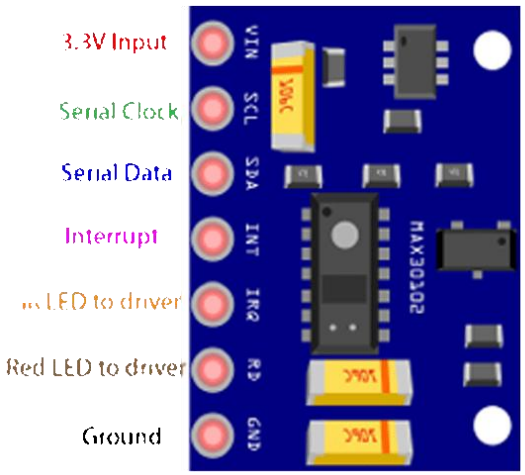
Brief Description on LCD modules

LCD modules are widely used in many embedded projects, the reason being cheap price, availability and system friendliness. Most of us would encounter these indicators in our daily lives, either in PCOs or in calculations. Appearance and PIN have already been shown above now let's get a little technical.

The 16 × 2 LCD is so named because; has 16 columns and 2 rows. There are many combinations available such as, 8 × 1, 8 × 2, 10 × 2, 16 × 1, etc. but the most widely used is the 16 × 2 LCD. Therefore, it will be (16 × 2 = 32) with 32 characters in total and each letter will be made 5 × 8 Pixel dots. One character and all his pixels are shown in the picture below.

Now, we know that each character has 40 pixels (5 × 8 = 40) and 32 characters will be (32 × 40) 1280 pixels. In addition, the LCD should also be instructed about the location of the pixels. So it will be a busy task to manage everything with the help of MCU, which is why it uses Interface IC like HD44780, installed behind the LCD Module itself. The function of this IC is to locate Instructions and Details in the MCU and to process them to reflect the relevant information on our LCD screen. You can learn to use the LCD using the links mentioned above. If you are an advanced editor and would like to build your own library to use your Microcontroller with this LCD module you will need to understand that the HD44780 IC is working and the instructions for which its data can be accessed.

MAX30100 - Heart Rate Oxygen Pulse Sensor



Description of MAX30100

The MAX30100 is a multi-function sensor used in many applications. It is a heartbeat monitor and pulse oximeter. The sensor consists of two Light Emitting Diodes, a scanner, and a series of low-frequency signal processing devices to detect heart rate and pulse oximetry.

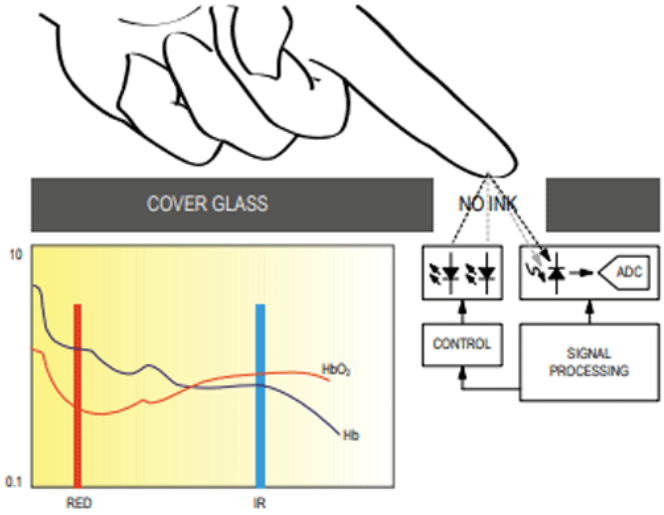
Features of MAX03100

Here are some features and specifications for the Max03100 Heart Rate Oxygen pulse sensor specification.

- Effective Voltage - 1.8V to 3.3V
- Current input - 20mA
- Combined Ambient Light Combined
- Maximum Sample Capacity
- Ability to Extract Fast Data

Working of the MAX30100 Oximeter

The sensor contains a pair of Light-emitting diodes emitting monochromatic red light at wavelengths of 660nm and infrared light at wavelengths of 940 nm. These wavelengths are preferred especially as at this wavelength they are supplemented with oxygen and deoxygenated hemoglobin has very different absorption properties. As shown in the graph below, it can be seen that there is a difference between HbO2 (oxygenated Hb) and Hb (deoxygenated Hb) when it is below these wavelengths.



Sensor part:

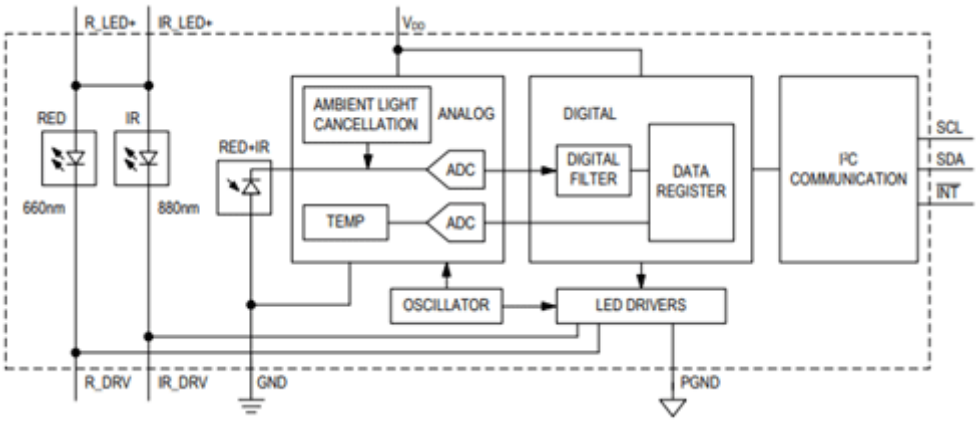
There are two sensor components, an output diode, and a photoreceiver. As the photodiode emits light, it falls on a finger that should be placed slightly. The light emitted is absorbed by oxygenated blood and all light is reflected on a finger and falls on a detector whose output data is processed and read through a micro-controller.

Connecting MAX 30100 Module to a Microcontroller

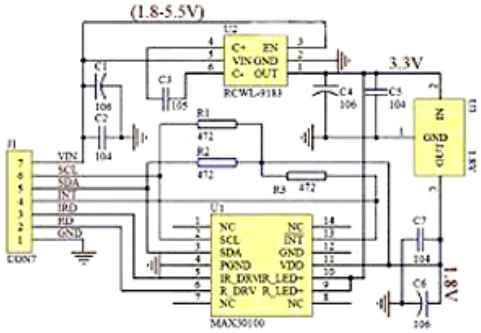
show the connection from the MAX30100 to the Arduino microcontroller below. The pulse oximeter uses the I2C communication protocol to communicate with a small controller. Communication is very easy and you can easily make your own Ardunio oximeter.Vin is connected to Arduino 3.3V port as the operating voltage of the module is 1.8V-3.3V. The lower oximeter terminal is connected to the bottom of the Arduino. As part of the communication protocol, the two SCL and SDA anchors are connected to Arduino's A5 and A4 pins, respectively. The INT pin in the module is also connected to the microcontroller's Digital Pin 2 to check that the heartbeat is being properly monitored.

Functional Block and the Circuit Diagram of MAX30100 Module

Below is the active block of the MAX30100 module. The module contains two LEDs (IR and RED) for both wavelengths, as well as a scanner to detect the light received.



The output from the photodiode is sent to an analog-to-digital converter where digital data is sent from the filter to the digital data register. Data can be collected from the register and can be sent to a sub-directory via the I2C communication protocol.



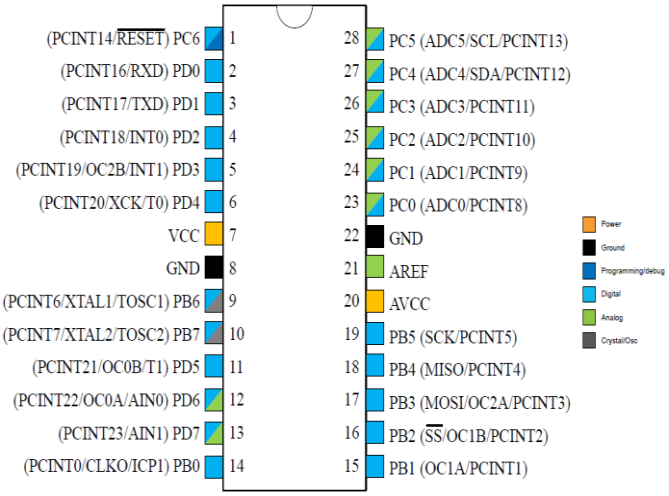
The image above shows the internal rotation of the MAX30100 module and can be used as a reference circuit when designing your custom module.

Applications of MAX30100

Here are some of the applications where the MAX30100 can be used:

- Oxygen medical measuring machines
- Wearable Devices
- Eligibility Assistant Systems

ATMEGA328P(ARDUINO) – 8 Bit Microcontroller



ATMEGA328P (ARDUINO) is a small controller from the 'AARDUINO (ATMEGA328P) 16F' family and developed by MICROCHIP TECHNOLOGY. It is an 8-Bit CMOS Microcontroller with nano-Watt technology. This little controller is popular among hobbyists and engineers because of its features and cost.

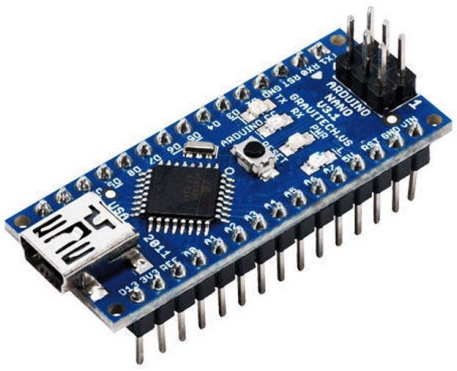
ATMEGA328P (ARDUINO) Microcontroller Overview

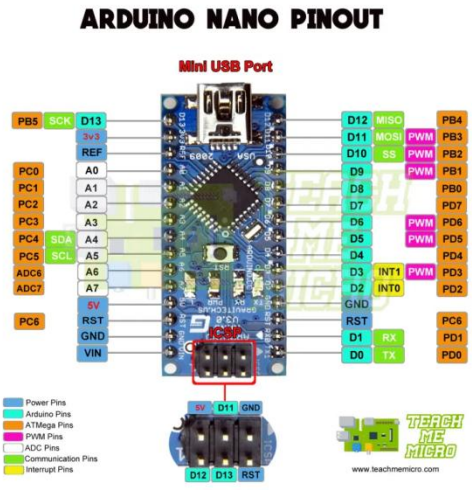
ATMEGA328P (ARDUINO) is a great little controller for testing and improving applications because it has a cycle of rewriting bright memory. And there is plenty of tutorials and support available online. The controller has 16KBytes flash memory sufficient for most applications. With 24 adjustable input / output PINs to handle 20mA current (direct LED driving power) the system can communicate with multiple peripherals easily. With Watchdog timer reset automatically the controller can be used to upgrade permanent installation applications.

How to Use ATMEGA328P (ARDUINO) Microcontroller

Like any other microcontroller, the ATMEGA328P (ARDUINO) needed to be configured before the chip could operate. So in the operation of ATMEGA328P (ARDUINO), we first need to save the appropriate program file to the FLASH memory of the controller. When power is enabled, the controller uses this code stored in FLASH memory to create a response.

Arduino Nano





Arduino Nano is another popular Arduino development board that is very similar to the Arduino UNO. They use the same Processor (Atmega328p) and that is why they can both share the same program.

RESULTS AND DISCUSSION

The aim of the project was to develop a system that would be able to collect the patient's important patient readings and then be screened in the clouds to alert doctors or people who are concerned about their health. This has been achieved by building an immersive sensory-based system to transmit key signal learning to cloud management provided by the AWS IoT phase. This reading is documented and can be accessed by a web interface to provide a symbolic representation of information or by an information analysis module to determine patient sensitivity. analysis performed on the accelerometer and gyroscope data to determine sleep state. Sensory studies are used to monitor any changes in the condition and in the event of a change in condition, a new condition is sent to AWS Ioot using MQTT.

CONCLUSION

With the wide use of GSM, this work is concentrated to execute the wireless technology to establish a system which would communicate through SMS for better health. wireless communication rules the whole world in various fields, mainly in health care sectors. Hence the present work is done to design smart patient health tracking system using an PIC microcontroller. In this, pulse rate sensor is used to detect the heart beat and temperature sensor to read the temperature and sends the data to the PC. This information is also sent to the LCD display, so patient can easily know their health status.

During critical situations to alert the doctor, the warning message is sent to the doctor’s phone and at the same time buzzer turns to alert the care taker. The doctor can view the sent data by logging the pc. Hence continuous patient monitoring system is designed.

REFERENCES

[1]. Real time wireless health monitoring application using mobile devices, International Journal of Computer Networks & Communications (IJCNC) Vol.7, No.3, May 2015, Amna Abdullah, Asma Ismael, Aisha Rashid, Ali Abou-ElNour, and Mohammed Tarique

[2]. Secured Smart Healthcare Monitoring System Based on Iot, International Journal on Recent and Innovation Trends in Computing and Communication Volume: 3 Issue: 7, Bhoomika.B.K, Dr. K N Muralidhara

[3]. Zigbee and GSM Based Patient Health Monitoring System, 2014 International Conference on Electronics and Communication System (ICECS-2014), Purnima, Puneet Singh