Remote Health Monitoring and Alert System

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Overview

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Motivation

- We are living in a crippling fear of the deadly pandemic
- At any time, hospitals can and are getting overcrowded with patients

Figure: A mosque in India turned into COVID centres amid virus surge

Motivation

- A cheap, automated monitoring system for patients at home is an urgent necessity
- Patients with stable condition need not be at the hospital if they have this device

Our Vision

- A device
  - Wireless, Portable or Wearable
  - Constantly measures blood oxygen level of a patient
  - Sends alert to local hospital when oxygen level is too low

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Health Monitoring

- **Heart Rate**
  When arteries expand due to the pumping of the heart, the tissue between the LEDs and the photodiode will increase thus increasing the light absorption.
- **Oxygen Saturation**
  There are two wavelengths of light(660(RED),940(IR)).When the lights fall on the finger,oxygenated hemoglobin absorbs more IR. On the other hand,deoxygenated hemoglobin absorbs more red light.The difference helps to calculate blood oxygen level.

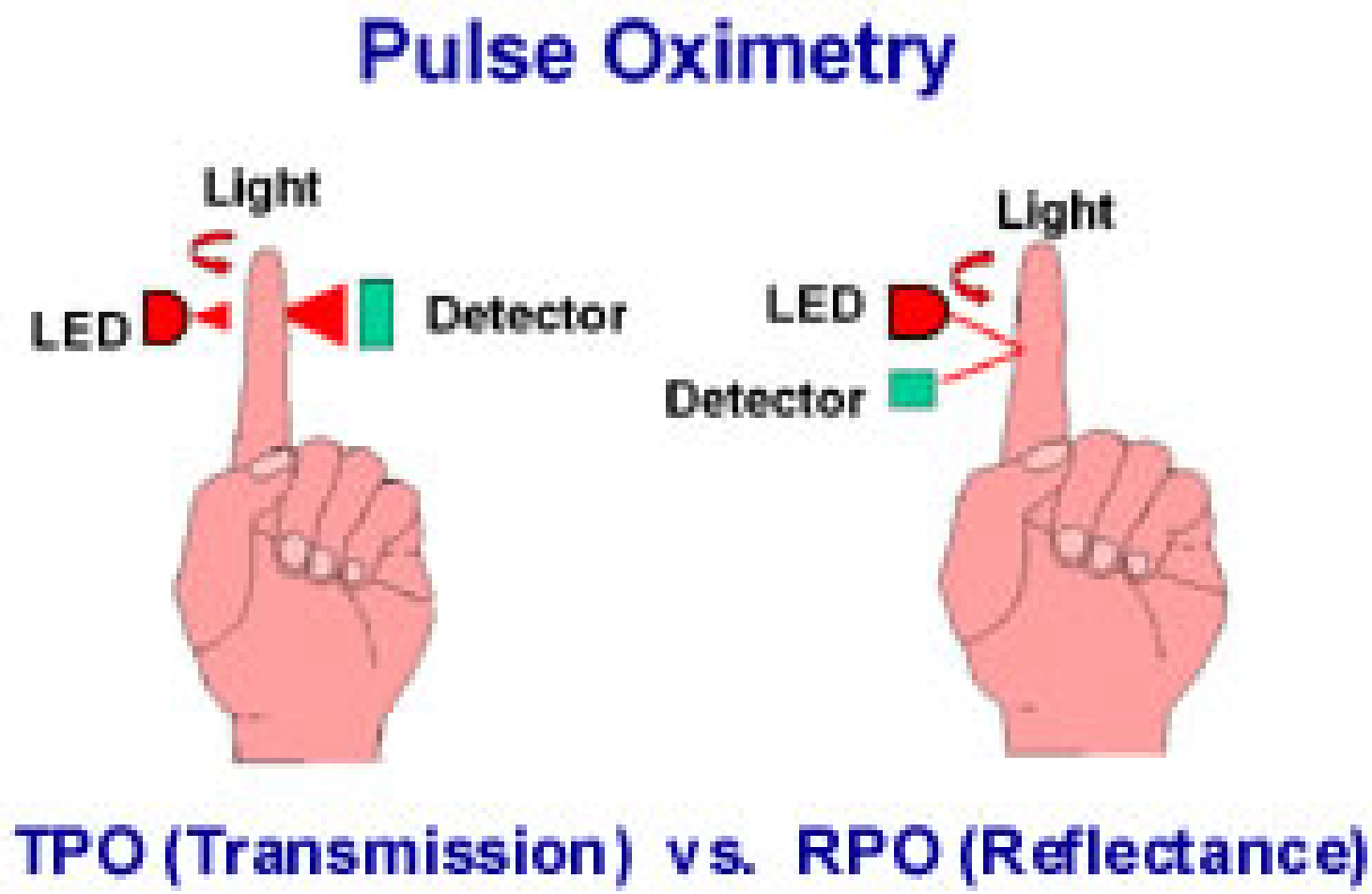

Figure: Transmittance oximetry vs Reflectance oximetry

Health Monitoring

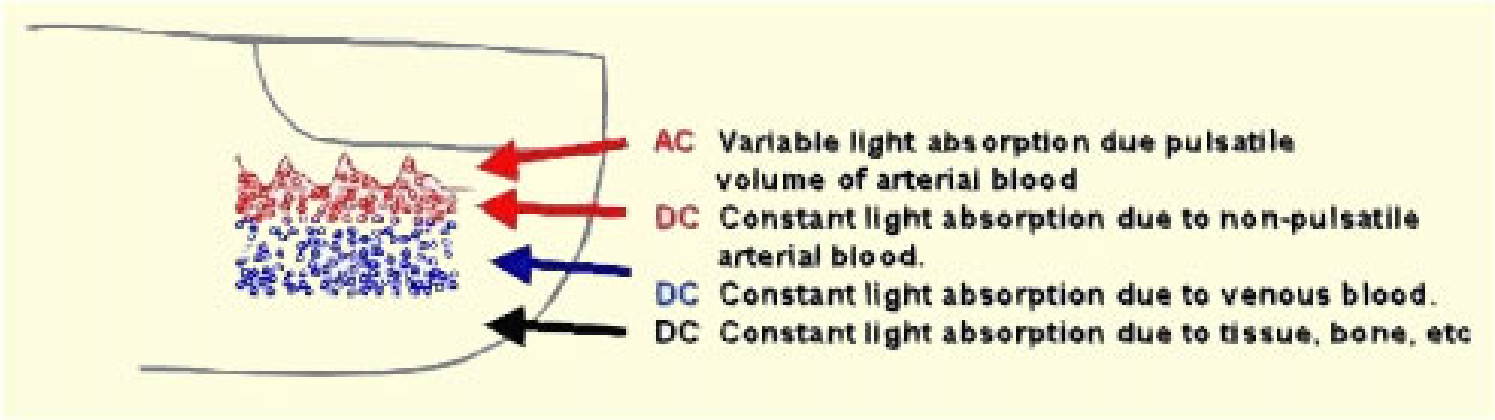

Figure: Absorption of light due to multiple components in finger

Health Monitoring

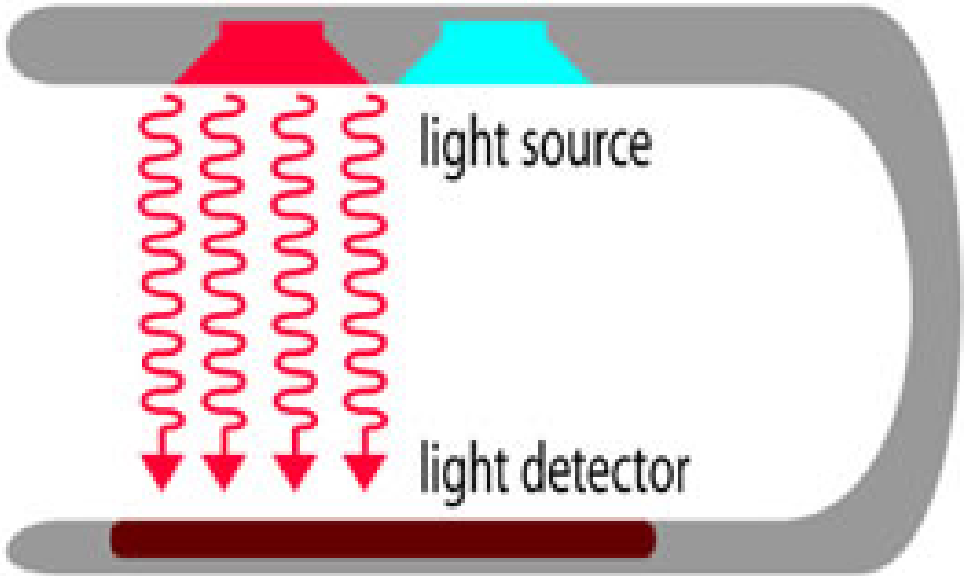

Figure: Emission of Red and Infrared LED on the light detector via the finger/tissue

Health Monitoring

- We will be using the MAX30102 module for measuring heart rate and blood oxygen saturation levels. It will be interfaced with an Arduino Uno. We will also use an LCD display for displaying the health parameters.

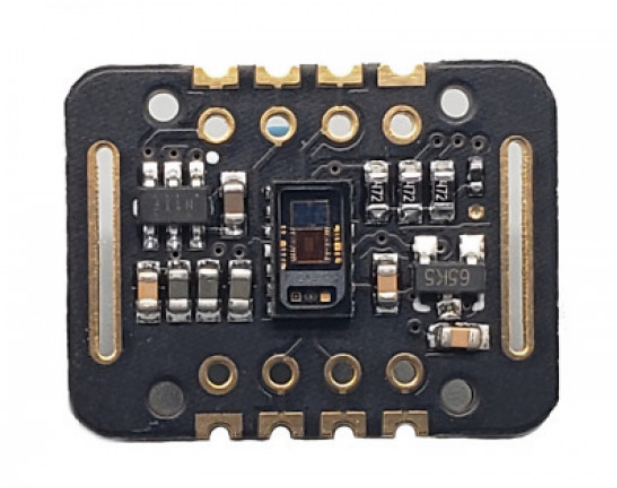

Figure: MAX30102 Pulse Oximeter and Heart Rate Sensor Module

Alert System

- If there is any anomali in the heart rate and blood oxygen saturation level,a phone call to emergency contacts will be initiated by a GSM module which will be connected with Atmega32.

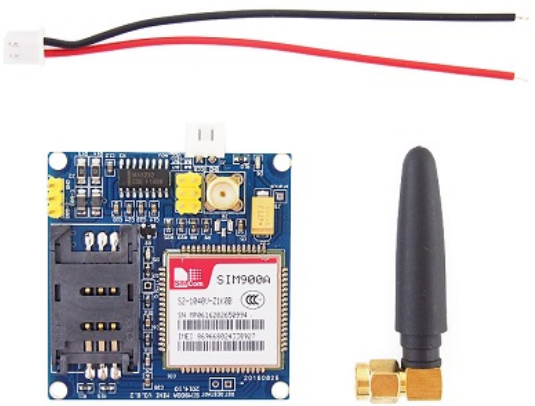

Figure: SIM900A GSM

Wireless Connection

- The two modules mentioned above will have a wireless connection using bluetooth module. Which will make the hardware for health monitoring portable.

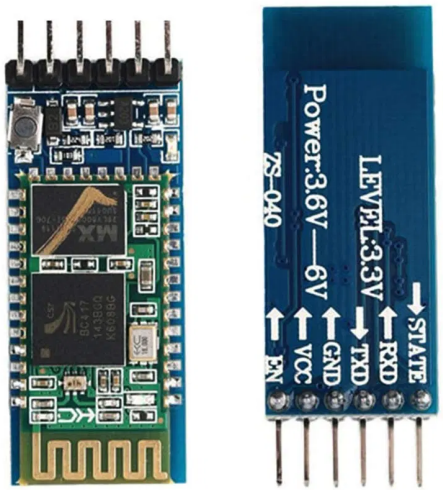

Figure: HC-05 Bluetooth Module

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Necessary Components

1. Pulse Sensor/Heartbeat Sensor Module (MAX30102)
2. Arduino uno
3. ATmega32
4. GSM module (SIM-900a)
5. Bluetooth Module (HC-05)
6. 16x2 LCD monitor
7. Push Button
8. LED
9. USBASP/USBISP
10. Breadboard
11. Jumper Wires
12. Resistors

Figure: AtMega32

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Putting It All Together

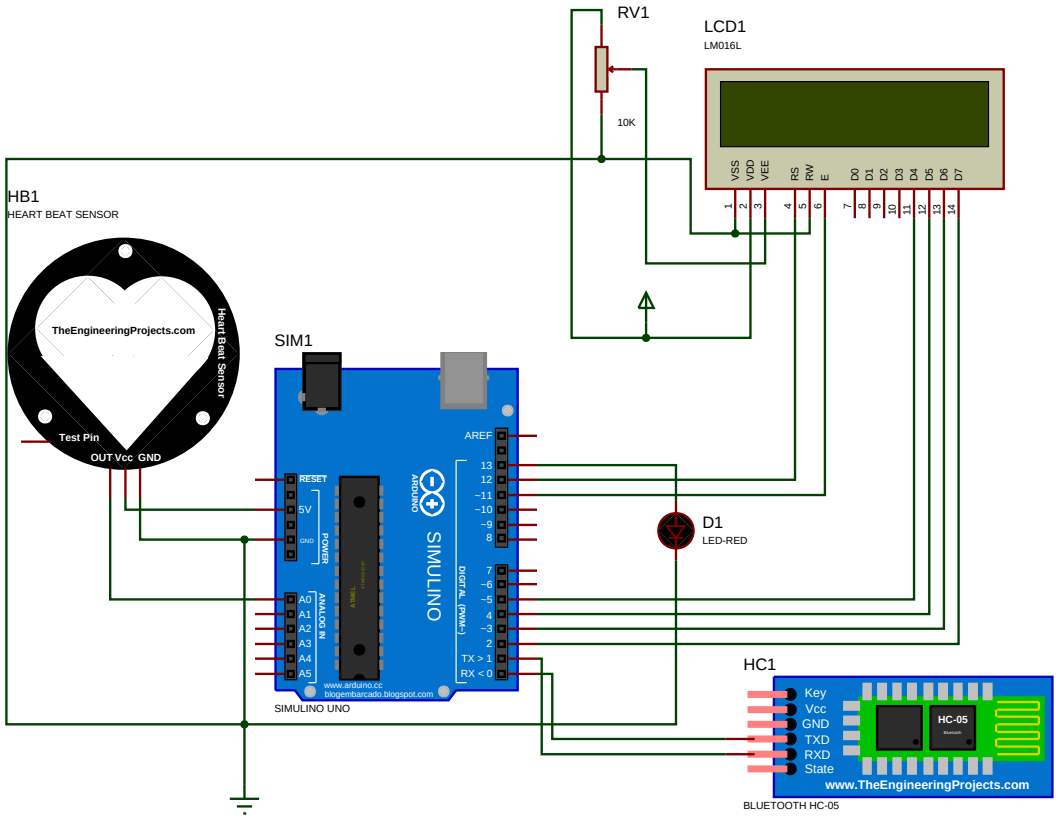

Figure: Health Monitoring Module

Putting It All Together

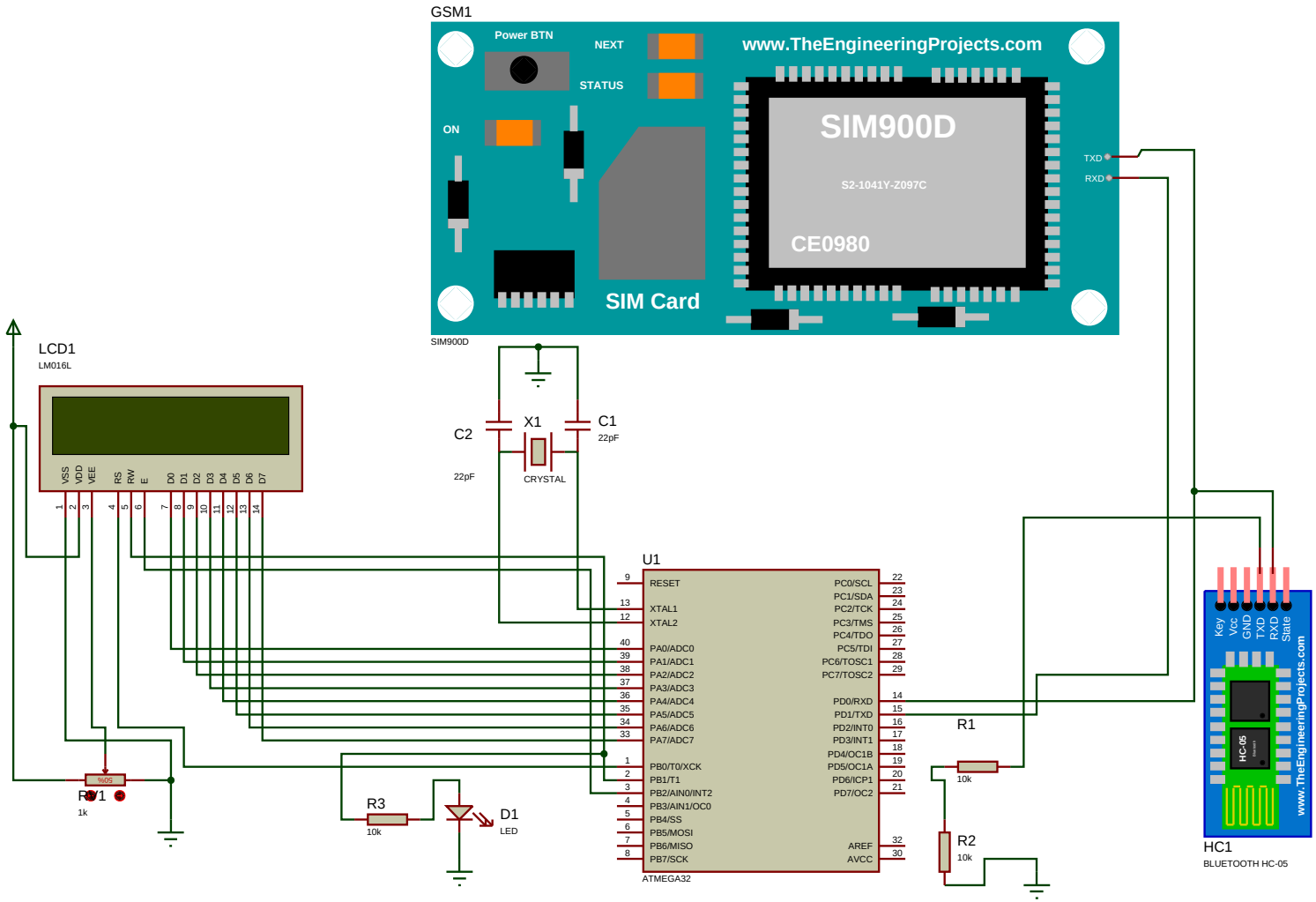

Figure: Alert System Module

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The End