

# IOT Mining Tracking and Worker Safety Helmet

## **Abstract**

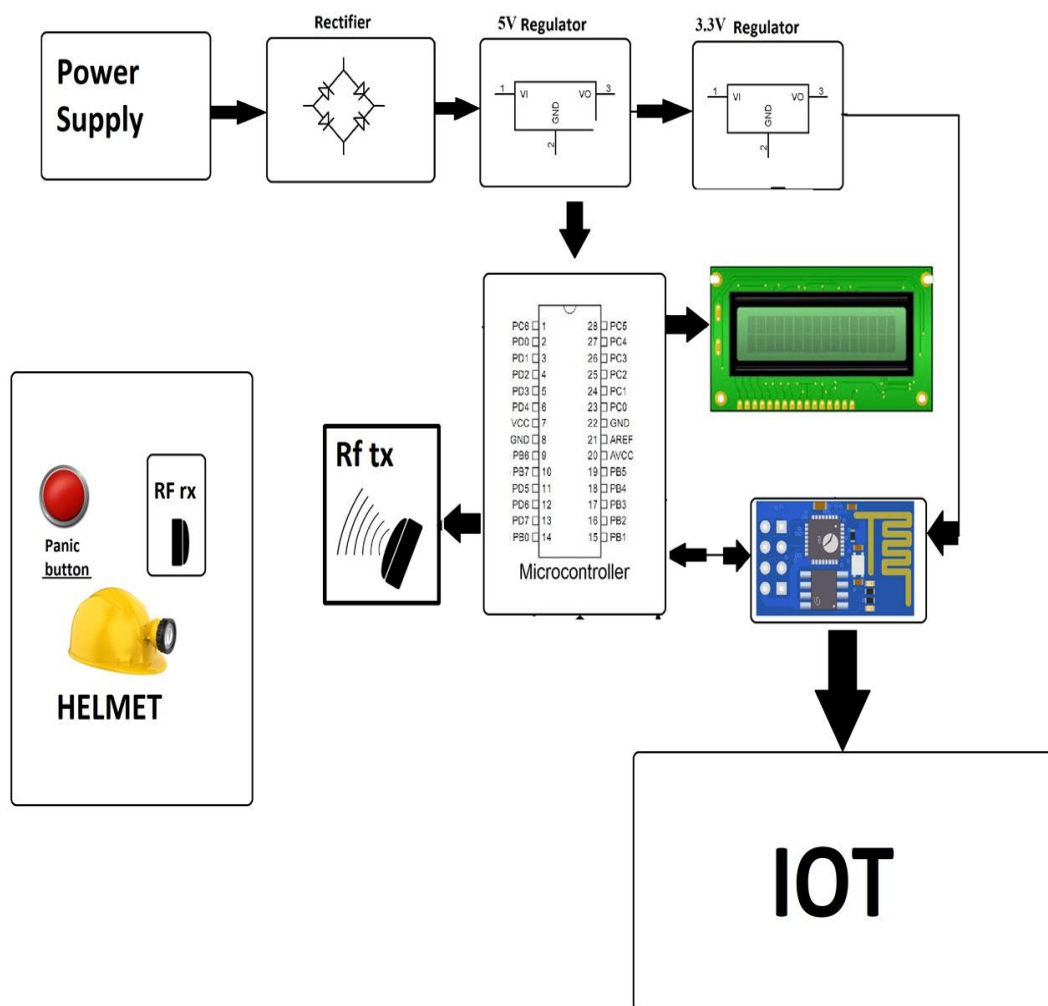
Mining is major requirement to the creation of goods, infrastructure and services which helps the quality, secure and protection of their lives. Working under the earth is much danger for human health and also for life. Frequently the underground environment is much dangerous as lot of earth quakes and tsunamis occur which is very danger to the life. The mines that are deeper are more n more dangerous when ongoing job for mining employees. So here we propose a mining tracking system as well as safety system for the mining industry using microcontroller-based circuit on the worker helmet . There is location-based miners environment mapping using smart helmet. Moreover, each worker helmet circuit is integrated with a panic/emergency button. This button when pressed shows an emergency sign over the IOT web interface about the worker emergency. This can be used for any emergencies like – toxic gas inhalation, cave ins, physical injury etc. Thus, the system ensures mining worker safety using IOT

## **Introduction**

The idea of this project is to give information about the mishap in the underground mines to the ground team which monitors all the activity, so we chose IOT technology. We are using microcontroller as

the heart of the project. Showing the stats alone can't help the ground team to locate the miner in case of any accident. So, we included GPS location in the website which we are displaying so that the help team will have perfect information .About where and when the accident may occur. For this we use GPS module to extract the location of the accident, the GPS data will contain the latitude and longitude values using which we can find the accurate position of the accident place. To run the GPS, we use Microcontroller which has 32-bit RISC processor. The Microcontroller is a very user-friendly device which can be easily interfaced with any sensors or modules and is very compact in size. Now we are clear that the Microcontroller will send the alert the team using the IOT based website by keeping the GPS location on the screen which is obtained from the GPS module. But when should all this be done? When accident occurs, how will the Microcontroller detect the accident? We use a panic button which when pressed will alert the ground team and let them know that they are in need of help. Keeping the extreme conditions of mine in mind we have also added temperature, humidity, air quality sensor and infrared sensor. Also, there is buzzer which will help indicate any extreme conditions to the miner thereby helping him take further steps. IOT mining helmet is a needed and very helpful for the underground miners, as well as for few other purposes. It can also be modified as biking helmet. This helmet can save many lives. There around 700 deaths in the past year due to the accidents in mines, this could be solved by using this smart IOT helmet.

## Block diagram



## Component

## • **Hardware Specifications**

- Microcontroller.
- Wifi Module.
- RF TX RX
- Buzzer
- LCD Display
- Crystal Oscillator
- Resistors
- Capacitors
- Transistor
- Cables and Connectors
- Diodes
- PCB and Breadboards
- LED
- Transformer/Adapter
- Push Button
- Switch
- IC
- IC Sockets

## **Software Specifications**

Programming Language: C

IOT Gecko

## **Advantage**

This system is displaying the parameters on the base station PC and alerting miner, from base station higher authority can monitor everything and provides rescue operation for the miner. Alarm triggers when sensor values cross the threshold level. As we are storing the values of the parameters like temperature, humidity in the PC, the stored values can be used to detect the hazards before

the lost happens . As we are giving the information to the personnel regarding the measures to be taken in case of a hazard, it will be useful for them to save their life before any one comes and help them to come out of the mine. It also provides a technique for tracking the position of the worker which enables the rescue team to provide immediate help in adverse conditions.