

## Mini Project Summary

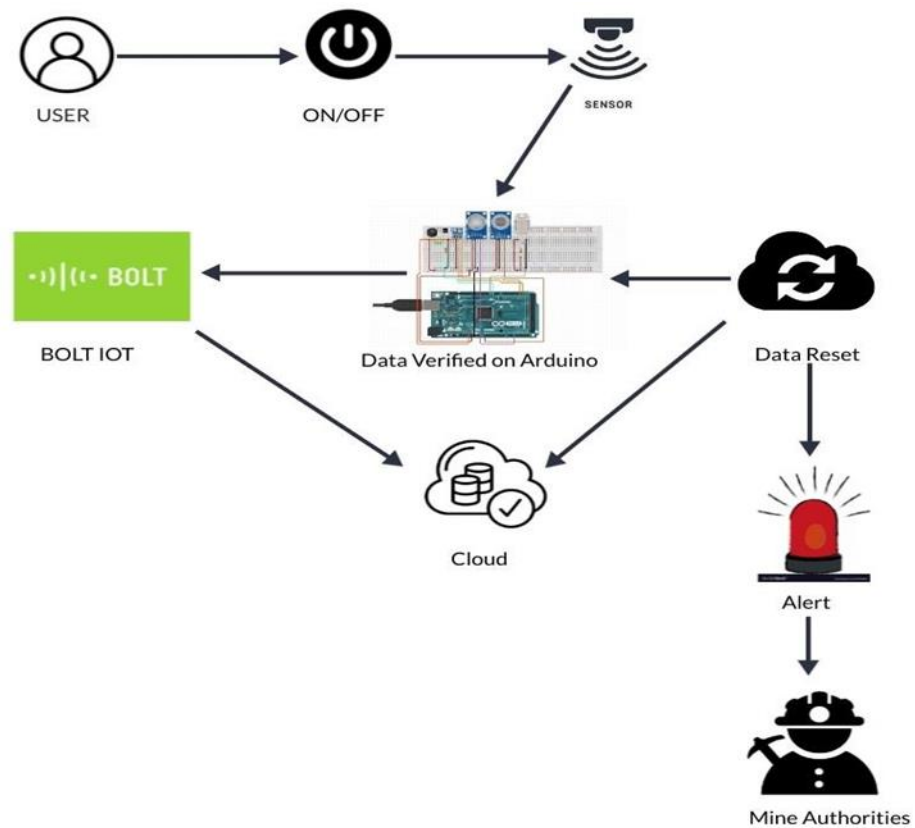
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| <b>Project Title:</b>                             | Mine Surroundings Analyzer: Mines Environment Analysis & Gas leakage alert using Z-Score Analysis  |
| <b>Session:</b>                                   | 2020-21  |
| <b>Group Members:</b>                             | Mr. Himanshu Saha, Ms. Shweta Lanjewar, Ms. Vijayalaxmi Yelchalwar, Ms. Namrata Thakre (VI Sem IT)   |
| <b>Guide Name:</b>                                | Prof. Mayuri Kawalkar  |
| <b>Technology Used (Software &amp; Hardware):</b> | <ul style="list-style-type: none"><li>• SOFTWARE: - JavaScript, HTML, Bolt IOT App, Bolt Cloud, Arduino IDE, Visual Studio.</li><li>• HARDWARE: -MQ-9, MQ-135, BMP180, DHT-11, Bolt IOT Wi-Fi Module &amp; Arduino Mega.</li></ul> |
| <b>URL of Project (Github Id If any):</b>         | <a href="https://github.com/MasterSaha/Mine-Surroundings-Analyzer.git">https://github.com/MasterSaha/Mine-Surroundings-Analyzer.git</a>  |

### Abstract:

Today safety of miners is a major challenge. Mining industry has been always ranked among those that have the foremost dangerous working environments. Mining activities release harmful and toxic gases successively exposing the associated workers into the danger of survival. Miner's health is at risk mainly due to the toxic gases which are fairly often released in underground mines. Mine Surroundings Analyzer system takes environmental parameters like temperature, humidity and toxic gases. All this is done using Z-Score analysis. This technique also provides an early warning, which can be helpful to all authorities or miners present inside the mine to save lots of their life before any casualty occurs.

*Key Words— Internet of Thing, Mine Surroundings Analyzer, Z-Score*

### System Architecture:



**Fig 3.2 System Architecture**

The primary focus of the system is to provide authorities/miners the detail of the environment in mines with the environmental parameters which can safeguard their life if any hazardous condition occurs. The above architecture describes the complete view of the system and its usage in the perfect manner.

### Modules Implemented:

- Module 1- Study of Z-Score Analysis for sensor values and implementing it provisionally using Arduino.
- Module 2- Integrating the “Module 1” with Bolt IOT.
- Module 3- Integrating “Module 2” with an User Interface.

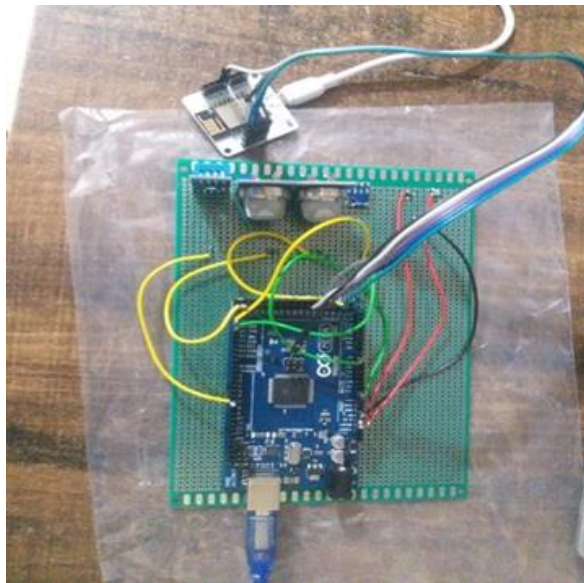
**Steps to run Project:**

- 1.) Connect all wires to the circuit properly.
- 2.) Check if all the sensors connected properly with Arduino. 3.)  
Switch on the circuit.
- 4.) Compile and verify the Arduino sketch. 5.)  
Upload the code on Arduino.
- 6.) We get the dataset on the console after uploading the code.
- 7.) Connection with Bolt IOT
- 8.) Deploy the configuration and check the final result.

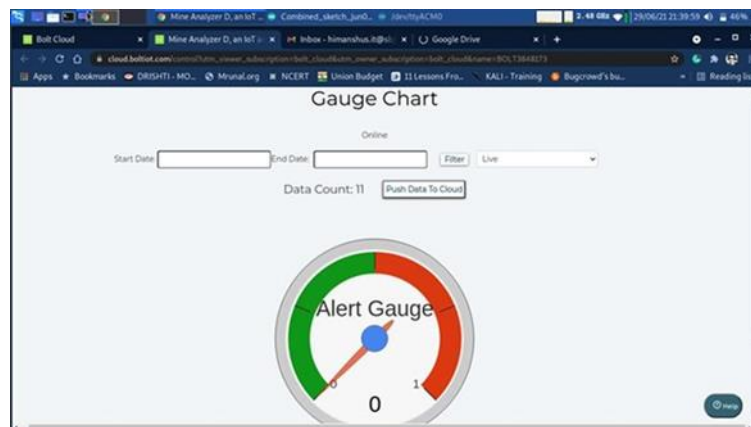
**Future Scope:**

1. This project can be used in various chemical industries & factories.
2. By using other advanced sensors all possible safety issues could be monitored such as gases, dust, vibrations, fire etc. Threats. Also, all the underground operations can be Monitored out from the ground Stations.
3. In future, the work can further be extended for other minerals extracted for commercial purpose in India and safety levels at sites can be improved.
4. With the growing innovations future work of this experimentation may include, more development of the system.
5. Important data can be communicated through this system making it feasible where wired communication is a hindrance.
6. New developing communication technologies can be used for highspeed data transfer in integration with smart sensors for sensing the mine conditions. Also, more Advanced IOT enabled systems can be developed for more advanced functionality.

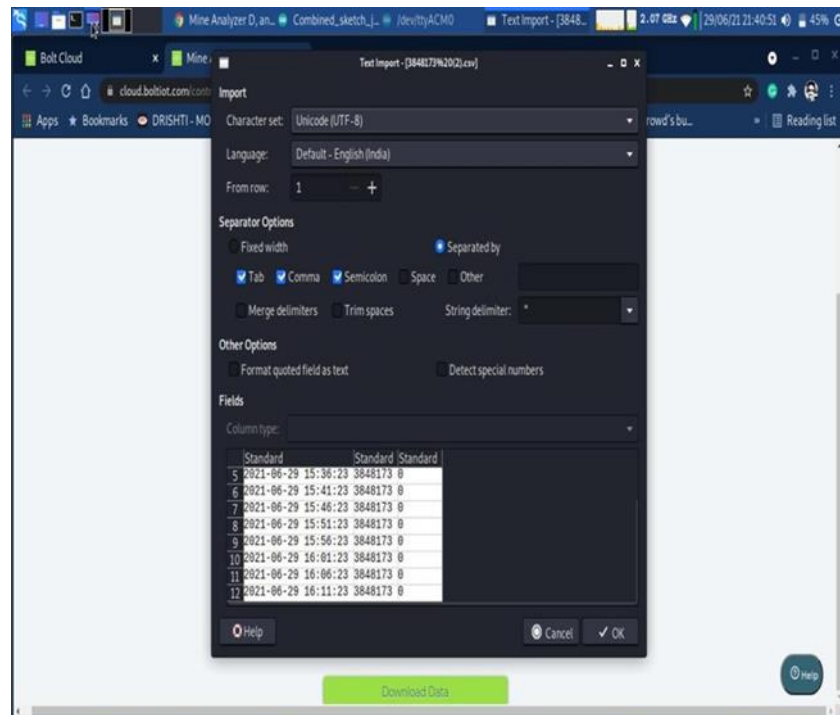
### Photos If Any:



This the circuit for the system.



This is the chart showing whether the flag is high (1) or low (0) depending on the Surrounding.



This is the final result which is passed to cloud from Arduino.