IoT based Smart Trolley for LPG Gas Monitoring and Leakage System

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Abstract

During the last decades, Android with IoT app development became an area of concern. IoT is an ongoing platform for all upcoming technology in the IT world. Humanity is now becoming smarter with the new arrival of technology in the field of Science and Technology. Security-related appliances are now a crucial aspect. IoT is the server-client environment that allows data communication between all the devices connected with a network. Gas leaks can be hazardous to health and the environment. Leaks of natural gas into the atmosphere are especially harmful due to their global warming potential. Thus it is necessary to have a high-level mechanism to detect and prevent methane leak, especially for home applications. Smart Trolley for LPG gas monitoring and Leakage System is the best solution that detects methane leakage within a fraction of seconds. Along with fire detection, the trolley is the equipment for data reading.

Keywords: - *HX711, Flame Sensor, Gas Sensor, Firebase Database, Security, Home Appliance, Load Cell, Arduino, ESP8266*

INTRODUCTION

Smart trolley for LPG gas monitoring and leakage system is IOT based solution for detecting and preventing methane gas and its causes. Smart trolley contains two major sensors: the gas sensor for LPG gas leakage and the flame sensor for fire and smoke detection.

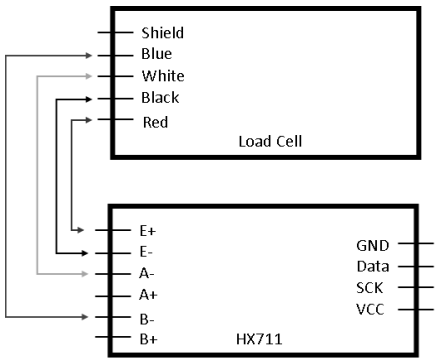
The LCD display is connected with both the sensors, which displays the reading of the weight of the LPG gas cylinder. ESP8266 will send the data to the firebase database server, and the android mobile app will retrieve and display that data to a user. If any unsecured activity performs like fire, the system will alert both server and client-side applications. Smart trolley is a portable one that contains all the hardware devices. There is a big chance of fraud in manual LPG gas cylinder delivery as the weight of the cylinder may not be the same as mentioned reading. In such cases, customers are unaware of the reading, so this kind of IoT-based application helps them.

LITERATURE REVIEW

As the system is based on IoT, sensors play a crucial role in data reading. There are so many sensors available in the market. Among them, the Gas sensor and Flame sensor will use in this project. For database connectivity, HC05 and ESP8266 used. ESP8266 always connect with WIFI so that portability can be achieved in the ESP8266 wifi Module. For data display also there are various LCDs available as 16X2, 8X2, 4X4, 2X2. The load cell is responsible for weight measurement. The operating voltage of all the hardware and sensors are 5V, and the operating frequency is 9600.

ARDUINO Connectivity

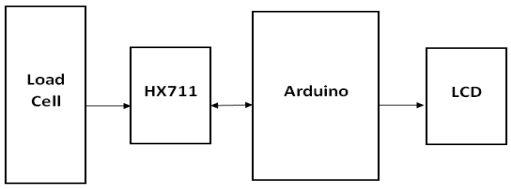
For hardware and software connectivity, there are various boards available. Among all, Arduino is the best board to communicate with hardware and software. There are mainly two types of sensor pins.1.Analogue 2.Digital.



ALGORITHM

1. start
2. maxfs=0
3. maxld=100
4. minld=10
5. do
6. read data : fs=Flame Sensor
7. read data : ld=HX711
8. lcd: 1
9. out:lcd<- fs,fd
10. if fs>max(fs)
11. do
12. alert buzzer:fs
13. end
14. if ld<min(ld)
15. do
16. alert lcd display:HX711
17. end
18. out:fs.firebase
19. out:ld.firebase
20. end:loop
21. stop

BLOCK DIAGRAM



Block Diagram – Arduino with HX711

LIMITATION

The accuracy of the sensor needs more attention for data reading. Internet connectivity is required for both Mobile applications as well as ESP8266. It works with a wifi module only which requires data connectivity. Load cell works with a low amount of weight.

FUTURE SCOPE

The future is all about mobile applications with database connectivity. Advance features like data analysis and maintenance are possible using various methodology and algorithms. Advanced sensors will make positive outcomes of data reading as well as data traversing on the web. Load cell performance can be improved by connecting HX711 with high voltage and frequency.

CONCLUSION

Fire detection and prevention is the critical element for home appliances as well as industrial firms. Arduino-based LPG Gas monitoring is done by sensors like flame sensor and gas sensor. The reading of the data can be displayed on LCD. Firebase connectivity with the server allows data transformation between a database and a mobile application. Anyone can check the reading of the system from any corner across the globe.

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