**Name(s)**
Parisa N. Khashayar

**Project Number**
**J1011**

**Project Title**
# Microcontroller Based Fire Fighter Assist Unit Using IOT: An Innovative Approach to Rescue the Rescuers!

**Abstract**

**Objectives/Goals**
Wild-land fire fighting can be a dangerous occupation. Heat stress, fatigue, respiratory hazardous issues due to smoke inhalation, and cardiac related events are the top most causes of fatality with fire fighters. The purpose of this project is To create a wearable device to be worn by fire fighters in the field.
1. To detect heart rate, motionlessness, surrounding temperature and gas level.
2. To send the measured data and potential warning to an outside team of responders via text massaging (GSM)

**Methods/Materials**
Sensors such as temperature, gas, motion and heart rate monitor, can be fire fighter's eyes and ears to help detect potential dangerous condition. Using Arduino and the above sensors, and software algorithm, I can monitor the environment as well as the condition of the fire fighter and make quick decision to warn them of danger. Once the sensor detects an abnormal measurement of heat, gas, or movement or heart rate, then it will check to find out the state of other sensors. The truth table in the program will set the threshold for each sensor to decide the presence of danger and issue a warning using (GSM cellular).

**Results**
I was able to repeatedly measure the increase of temperature and gas using a picnic stove as a source. I attached the motion and heart rate sensor to myself and my sister and measured the values while sitting and running several times. Tests show that my device is able to detect measured data from all four sensors accurately. The algorithm I used can collect the fire fighters' heart rate and motion as well as the rapid change in heat and gas surrounding them. The thresholds set in the software can decide in real time and send a text to another mobile phone using GSM.

**Conclusions/Discussion**
The capability of fire fighters to continuously detect, monitor and analyze thermal and environmental threats in real time and quickly respond, is out most important factor to decrease their number of fatality and injury.
I hope to be able to show that even with off the shelf everyday electronics we can put together a portable, battery operated system to help give our fire fighters an upper hand when battling raging fires. This complete unit can be placed inside fire fighter's fire retardant jacket and carried around with minimum effort.

**Summary Statement**
The purpose of my project is to decrease the rate of fatality and injury of fire fighters by using a wearable device that can detect heart rate, motionlessness, surrounding temperature and gas level and send a warning text using GSM communi

**Help Received**
My dad helped me learn C language.