IoT based earthquake prediction

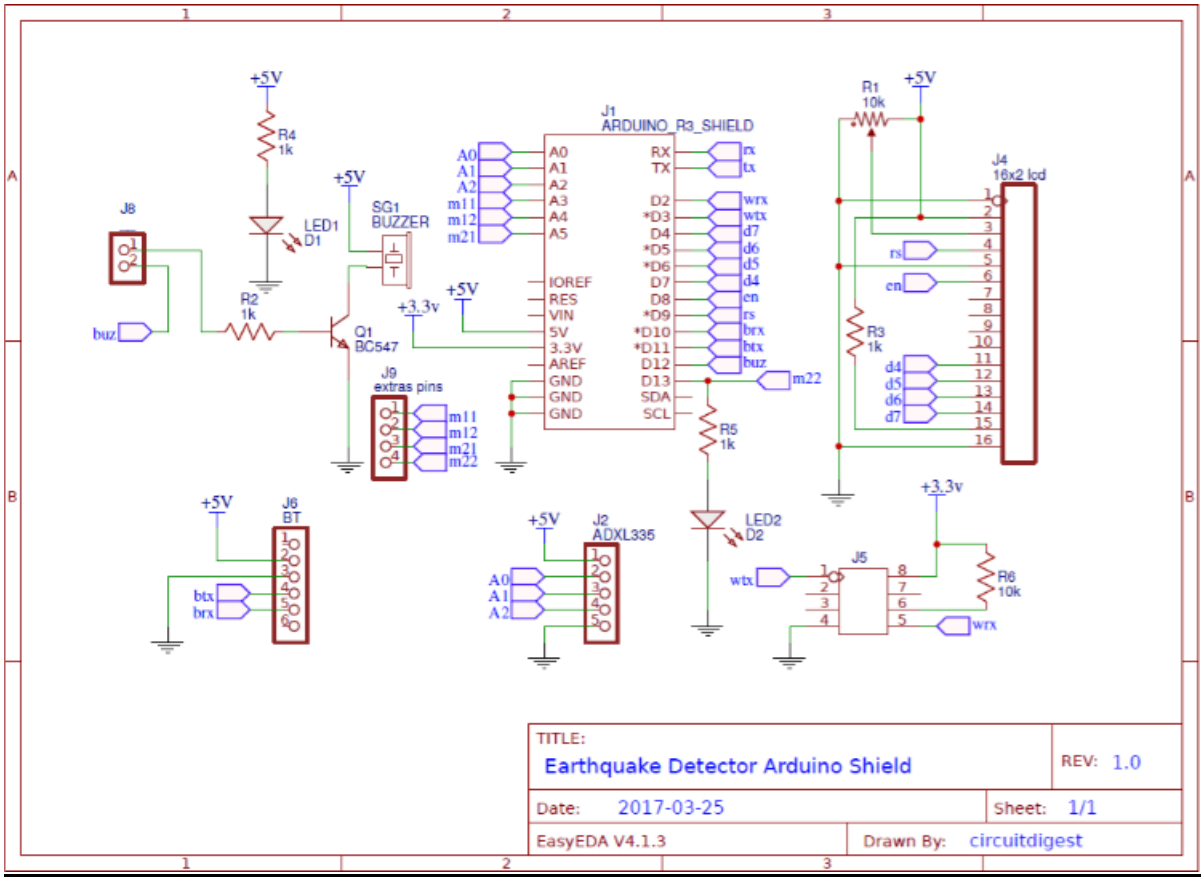
Understanding of problem statement:

As far as my understanding goes regarding this topic, it is a brilliant application of IOT. The advanced technology Internet of Things (IoT) visualizes a worldwide internally connected, networks of smart physical entities. IoT is a promising technology used in several applications including disaster management. In disaster management, the role of IoT is so important and ubiquitous and could be life-saving and that is exactly the topic we are working on which is a typical example of how IOT can be used for disaster management.

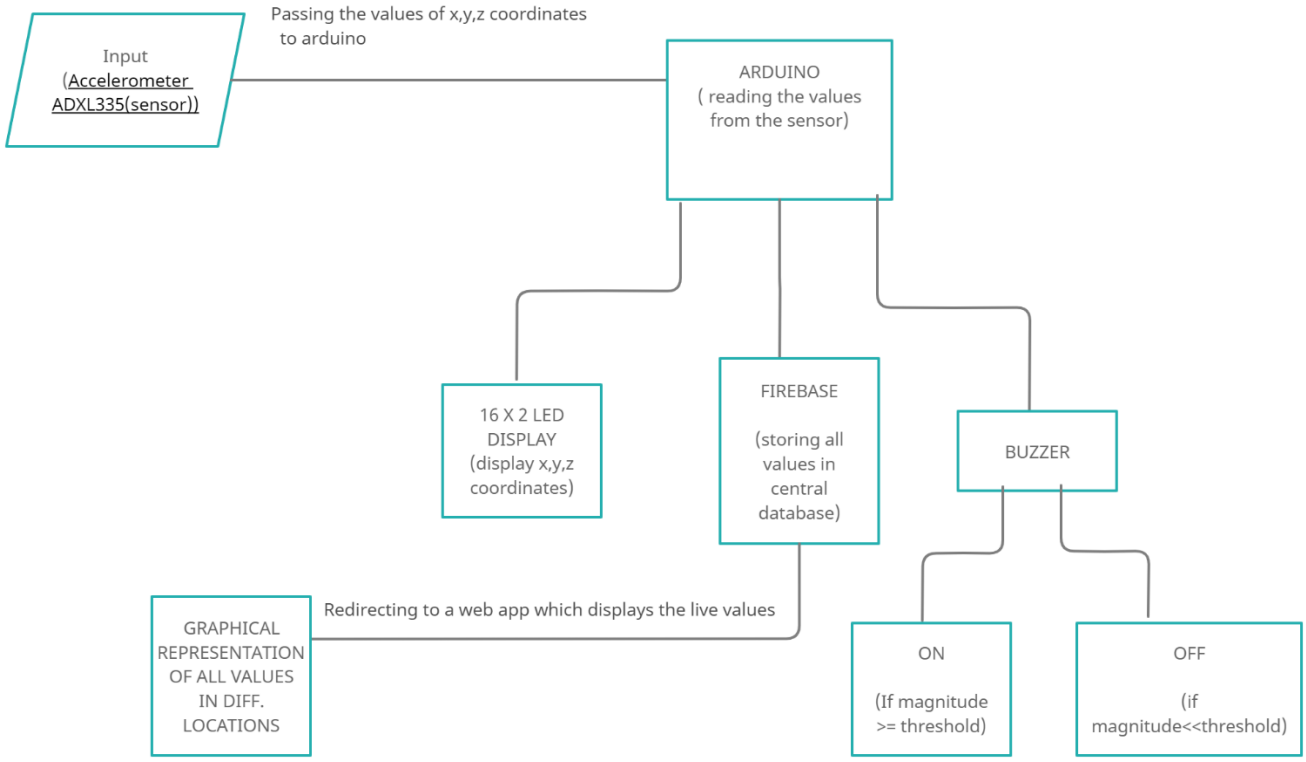
We are particularly concerned with the detection of earthquake (in simple words we are creating a warning system with additional information about the disaster graphically in different places to user portal) where hardware and software are equally playing an important role. The initial process involves sensors like accelerometer or gyroscope gathering their readings followed by Arduino reading the values of the readings from sensor where the coding part is involved.

These readings from the Arduino would be sent to an external user web app where the readings would be displayed in a graphical format. All the readings initially would be stored in one database and the user end can view the graphical part in the web app.

Circuit diagram I skimmed over for a better understanding:



FLOW DIAGRAM:



Hardware and Software required :

Hardware:

Buzzer

Resistor

Transistor

16 X 2 LED (display unit)

Connecting wires

PCB/ breadboard

ARDUINO UNO

USB CABLE B

Software:

Proteus

Arduino ID

ADDITIONS AND UPDATES:

The beeping of buzzer is inefficient for such a major issue and can be replaced by a better amplifying system and in addition to the graphical info on the web app we can display a notification on the user end web app where once the threshold value of magnitude is reached the possibly vulnerable regions can be be provided with helpline numbers or a chatbot which can help the users in a more effective manner.

ADVANTAGES/APPLICATIONS/CHALLENGES

1.The main application of this device would be the user end interface which would be created in the form of a website which shows the potential risk in a

particular area, thus acting as a warning system for general public and not limited to particular parties or authorities .

2.The cost of the setup would is reasonable thus can be effectively used in disaster prone countries like Japan.

3. The threshold magnitudes for x,y and z coordinates in the accelerometer would be a challenge while setting up the system as they may vary for different devices and have to be coded in the Arduino ide accordingly.

4. The warnings can arrive seconds to minutes before strong shaking, and a review of early warning applications around the world shows this time can be used to reduce the impact of an earthquake by many sectors of society.

5. Particularly for crustal earthquakes, warning times are shorter—and possible mitigation actions are likely to be less effective—than often maintained

Conclusion:

Earthquake early warning is the rapid detection of earthquakes underway and the alerting of people and infrastructure in harmful way. We can conclude from this project that how applications of IOT are fruitful in creating such devices that are useful for society particular from the view of disaster management.

t is impossible to complete an exhaustive list of applications and savings generated by a warning system , but the benefits clearly outweigh the costs.

References :

How effective are earthquake early warning systems? - BBC News (first reference gazed upon while understanding this system and its uses)

https://www.researchgate.net/publication/301707251_Benefits_and_Costs_of_Earthquake_Early_Warning. (understanding challenges and advantages of this project)

https://youtu.be/enzoLLuu4KA?list=PLu7Q4MNRyw5B4Db4Mhd-HJgUSrvUL52cE

(understanding of circuit building using ardino and accelerometer)

https://youtu.be/c8UUWkUJu6E

(this video was particularly referred for the verification of LED connections)