Team Name : _____Code Breaker_____

	Name	Branch and Semester	Contact Number	Email- ID
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Note:

1. One can participate either as a part of a team or an individual basis. Switching teams is not allowed.
2. The uploaded ideas will be screened to go to the second round.
3. Judging : competition entries shall be judged, or winners selected based on the following criteria
   - Is the problem worth solving
   - How innovative or novel is the idea
   - Scientific accuracy
   - Social impact
   - Scalability
4. Decisions of IIC JSSSTU in respect of all matters to do with the competition will be final and no correspondence will be entertained.
5. In second round, the selected teams will have to present their idea in front of the jury panel.
6. Payment of INR 50 should be made to the UPI ID **anju.marina.lobo@oksbi** and submit the transaction ID above.
7. Idea should be submitted in **.pdf** format.

Abstract:

Groundwater is an essential component for the survival of human life and it's the major drinking source in both urban and rural areas. Detection of groundwater ranges from some rudimentary methods to high end technologies like 'proton magnetic resonance'. We have presented a different approach for the groundwater detection which would produce accurate results and would also determine the amount of groundwater present under the ground.

The first strategy is to test the resistivity of the soil by using geophysical principles. We use a '**Wenner array**' electrode configuration in which we place four highly conductive electrodes (graphite or copper electrodes) inside the soil at a certain depth and fixed distance from each other.

We will connect the outer two electrodes to a battery and measure the current passing through the inner two electrodes. The amount of current flowing will be proportional to resistivity of the soil in between the two electrodes. If the resistivity is less then it would mean that the soil has some water content beneath it and it might to some extent indicate the presence of groundwater.

For the actual confirmation of the groundwater beneath the soil we use a sensor called '**GPR sensor**' (ground penetrating radar sensor) which actually emits microwaves and detects it(similar to ultrasonic sensor). Microwaves have an unique property of penetrating through anything like ground or concrete but are absorbed by the water molecules and we use this property of microwaves to detect the groundwater. GPR then emits the microwaves into the ground which will not interfere with the soil or rocky terrains but get absorbed only when there is a presence of water.

The frequency depends on the region and it may vary with different regions.This will slowly decrease the intensity of the reflected microwaves which would indicate the presence of groundwater. We can also estimate the amount of groundwater present by actually calculating amount of decrease in intensity of the received signal as it would be directly proportional to amount of groundwater present.

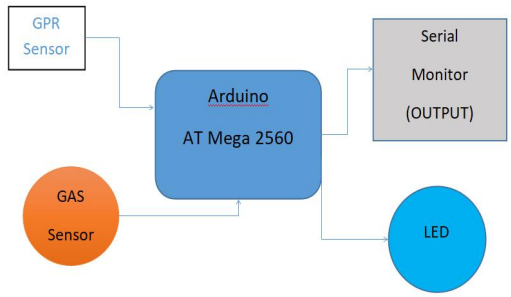
Introduction:

Groundwater is the major source of drinking water in both urban and rural areas. It is the major vital source for agricultural and industrial sector. Being an integral part of hydrological cycle, its availability depends on the rainfall and recharge conditions and its been the one only source for uncontaminated source of water.It is present beneath Earth's surface in soil pore spaces and in the fractures of rock formations. It is stored in between the pores or gravels of the porous or sedimentary rocks present in the subsurface region of the earth. The water is considered uncontaminated because and pure because the porous layers act as natural aquifers for filtering the dirt particles.The underground water consists of large amount of co2 content which releases to the atmosphere when we extract the ground water.So detection of large amount of co2 from underground can also be used to detect underground water. Our idea is to detect ground water by 3 methods. 1.using **GPR sensor**. 2. using **Wenner array technique** 3. by detecting the amount of co2 release while **bore welling** to get ground water.

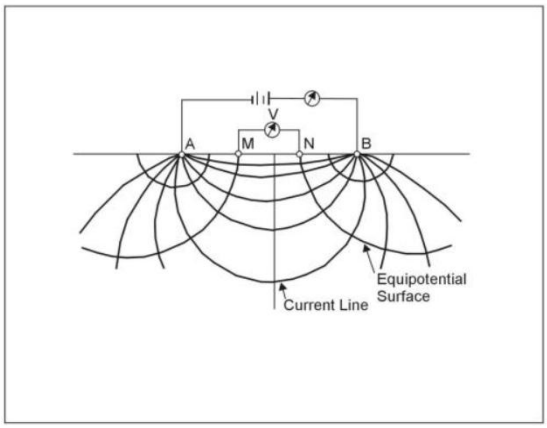
Motivation :

The main motivation is due the myth practice of rural people to appoint an astrologer to find for ground water area. This practice has caused for the bore welling of many wells which do not contain water, and due to this people leave those wells without closing them completely ,these have caused a lot of deaths of children out there since due to slipping into those unclosed wells'. According to data obtained from the Department of Rural Development and Panchayat Raj, 138 out of 176 taluks in Karnataka have very low groundwater levels. Of these, the worst affected are Bagepalli, Chikkaballapura, Sidlaghatta, Bangarpet and Kolar. It is very difficult for the geologists to analyze the groundwater based on the geography of the region as this would not work in metropolitan cities like Bangalore as everyplace is covered with buildings and there is no place for conventional soil testing methods.

Methodology :



Block Diagram Of GPR Sensor Interfacing with Arduino



Wenner array method of detection of ground water

This is done using low cost conductive electrodes.

Social Impact:

As we have mentioned the problems faced by the society (mainly rural people), this method will be proved the most efficient till date.Since it is of low cost the people need not consult an astrologer for the ground water detection . It is also very much usefull as even the common people can use it . Since it is very easy to use or handle common people would not face any difficulties in using. This method is also eco-friendly it doesn't harm the nature in any way.If this method is implemented , children death in rural areas will decrease rapidly.

Market Survey :

Target market and customers: This product would be more appealing to the farmers in rural areas as they are the ones who mostly need bore wells for growing crops and for other farming purposes. Most of the rural people follow rudimentary methods (even some superstitious things) for ground water detection and they cannot afford for high end technologies

like 'proton magnetic resonance investigations' which are highly sophisticated and costly in India, hence this would hit the rural markets and can be beneficial over there.

Customer expectations: Customers would expect a product that is of low cost price and would produce correct results and also which would consume less time for generating accurate results. This product will satisfy all these expectations.