SMART FARM

Souvik Paul | Soumitra Das | Adriraj Chaudhuri | Balbir Singh

Electronics Club, IIT Guwahati

Introduction

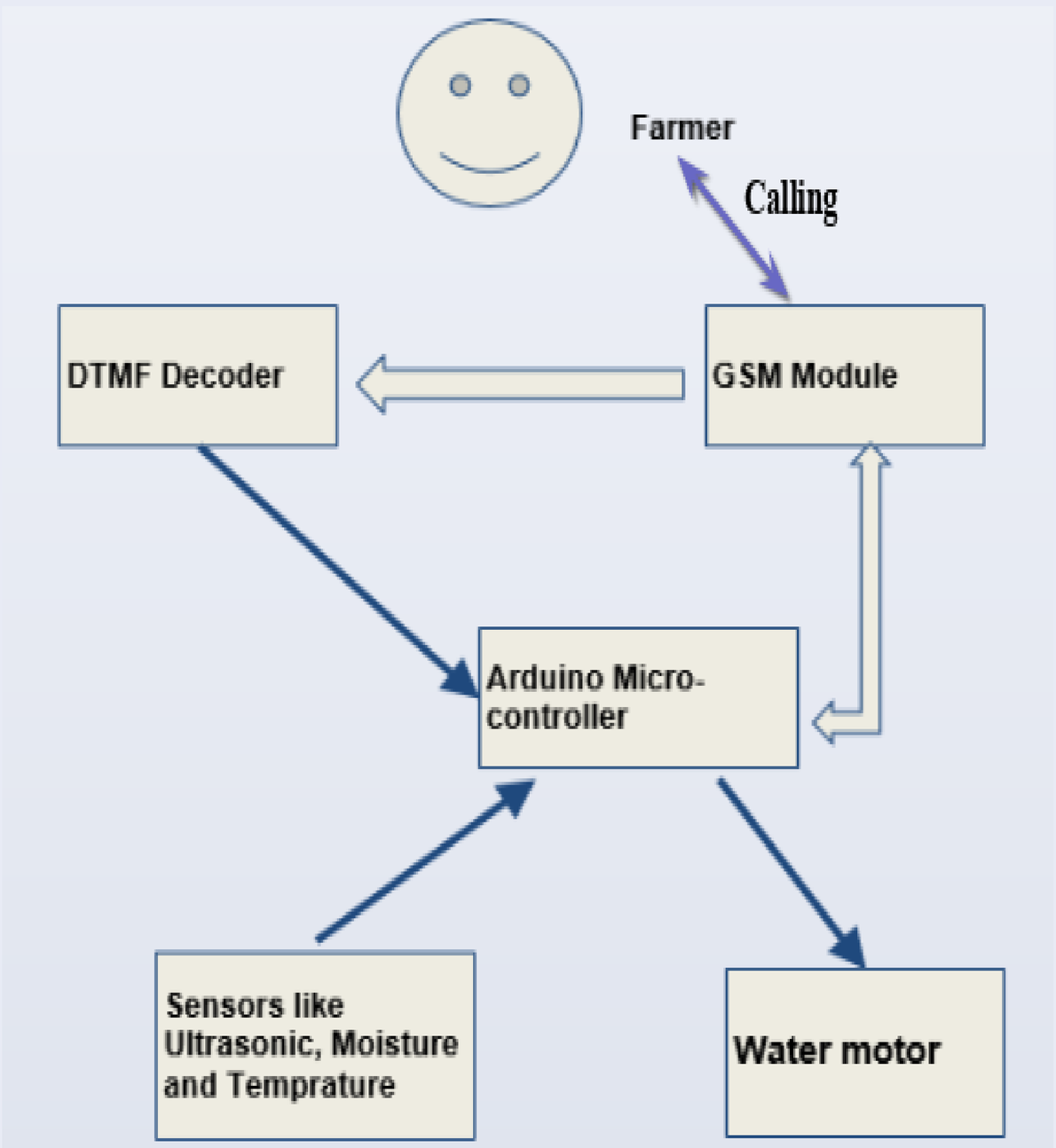
One of the major problem that the farmer's face is the time and labour invested in the irrigation and monitoring of fields, irrigational pumps, etc.

Farmers have to travel to their far off situated farms just to ensure that the power supply is available for irrigation, the water pumps are working correctly, the field is getting properly irrigated and there is no risk of fire, etc.
It results in huge wastage of human labour and in low yields per capita labour force.
Thus, there is urgent need to mechanise the agricultural operations so that wastage of labour force is avoided and farming is made convenient and efficient.

We have designed an interactive voice response system that will help farmers via their phone to:

- Control the irrigation pumps of their farms,
- Alert them about the power supply in the farm,
- Give information about soil temperature and soil moisture level (which will decide the irrigation process),
- Alert them about any intruders strayed into the field, and a multitude of other functions that will allow the farmer to leave his fields unattended to pursue alternate work.

Block Diagram (Functional)



Working

- Whenever farmer calls to the mobile number present in GSM module, the Arduino automatically picks up the call. A pre-recorded voice message then gets automatically played on the call that asks the caller for different input (numbers , 1-7) based on the desired operation to be performed. The DTMF decoder connected to GSM module will decode the entered number into 4 bit binary number and it will send that binary number to Arduino.
- Thus, the caller can control various operations of the farm without being physically present at the farm.
- The voice message has an advantage over other means of instruction as it can be easily understood by the farmers and can hence use the technology effectively. The call gets disconnected after one input instruction is given.

Applications

- Interactive voice response to control water level using flow meter (self-designed)
- Checks status of moisture and appropriately waters the crops.
- If there is any fire accident, the farmer will be notified. An alert will also be sent to fire station.
- Checks if there is a deficiency in water levels using a moisture sensor
- Has safety trip for when there is a power cut.
- Field edges are protected using Ultrasonic sensors.
- Farmer is alerted in case there are any intruders.
- Better storage as we are increasing security

Future vision

- The GSM system can be synchronized with the online database that contains information about the weather update (climatic conditions) and topographical factors of the particular location, and thus can automatically process the need to irrigate the fields (based on the data of probability of rain, humidity and other such factors).
- A pH sensor can be used to test the chemical nature of the soil, and the data so collected can be put together with data from the online database (about the topography and climatic conditions of the place) to predict the adequate level of irrigation, correct crop selection for the location, adequate amount and nature of manure or fertilizers needed. Thus, the crop yield can be improved.

References

1.DTMF Decoder: https://www.instructables.com
2. GSM: https://www.instructables.com