**Kisaan: A Farm-Monitoring System**

**Group 4**

1. **Members:**

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1. **Project Idea:**

With rapid technological development, traditional occupations such as farming have greatly benefited. Modern irrigation systems, fertilizers and harvesting methods have changed the agricultural landscape. With increasing automation in our day-to-day lives, the need for a remote monitoring system arises on the farm as well.

Kisaan is a farm-monitoring tool which provides a facility to monitor farm-data. Irrespective of farm conditions and terrain, Kisaan provides you with all the necessary information about your farm.

1. **Features:**

* **Independent of terrain type:**

The mobile robot runs on overhead mounted tracks which can move independently. This provides it with the ability to cover your entire farm bypassing all terrestrial obstacles. Kisaan calculates its distance from the ground and stops descending only when it is sufficiently close to the ground. This ensures crops are not harmed while maintaining accurate readings.

* **Cost-effective:**

In present farm sensor market there are setups where to monitor the condition of the farm hundreds of sensors are scattered throughout the farm which consumes a lot of power and not to say is extremely expensive. Compared to this Kisaan only uses one set of sensors to scale the length of the entire field. Since the sensors are on one robot, they can be easily replaced in case of any failure.

* **Automatic Monitoring:**

Farmers may not be present on the field everyday. Kisaan has an automatic mode where the bot will traverse the entire field and collect the data at points specified by the grid.

* **Manual Monitoring:**

If the farmer wants to monitor a specific part of his farm, he can send Kisaan directly to that part to collect data.

* **Reliability:**

Data is logged and piped all the way to external servers - logs are consistent, and appropriate data-validation is present at each layer.

* **Fault Recovery:**

In case of any fault in power supply Kisaan has mechanisms to recover its position and resumes its work from that point only - avoiding redundant work.

1. **Material Required:**

1. Stepper Motor (28BYJ-48) - 4
2. Stepper Driver (ULN003) - 4
3. Ultrasonic Sensor (HC-SR04) - 1
4. Grove Temperature and Humidity Sensor (DHT11) - 1
5. Grove Air Quality Sensor - 1
6. Raspberry Pi 2 - 1
7. Arduino Mega 2560 - 1
8. LEGO MindStorms Kits - 3
9. Constant DC Voltage Source - 12V max
10. **Installation:**

Run the following commands to do the necessary installation on the Raspberry Pi

sudo apt-get install mosquitto

sudo apt-get install mosquitto-clients

sudo pip install paho-mqtt

1. **Running tests:**

Upload “automatic.ino” to the Arduino board.

Start “demo\_server.py” on the Raspberry Pi.

Provide input either through the web interface or the “coords\_input.py” tool.

Choose mode (manual(0) or automatic (1)) and input the x, y, and z coordinates as required.

In manual mode, Kisaan will move to that specified position and will take all the sensor readings. In automatic mode, Kisaan will traverse the entire grid repeatedly.

All sensor readings are transmitted by the Arduino, forwarded serially to the Raspberry Pi, and this sends it further to the PC from where it is published under the topic “Sendor\_Data” on the local network (For proxy reasons, this doesn’t work on IITG\_WIFI network, mobile hotspot has to be used).



**Data Flow Diagram**

**7. Hardcoded Values:**

1. The size of the grid on which the robot moves was calibrated according to wheel size and motor rotation.
2. The step values in the automatic traversal are also fixed.
3. The threshold distance upto which the probe descends has been hardcoded to a particular distance found by trial and error.
4. The time for which the probe remains down has also been hardcoded.