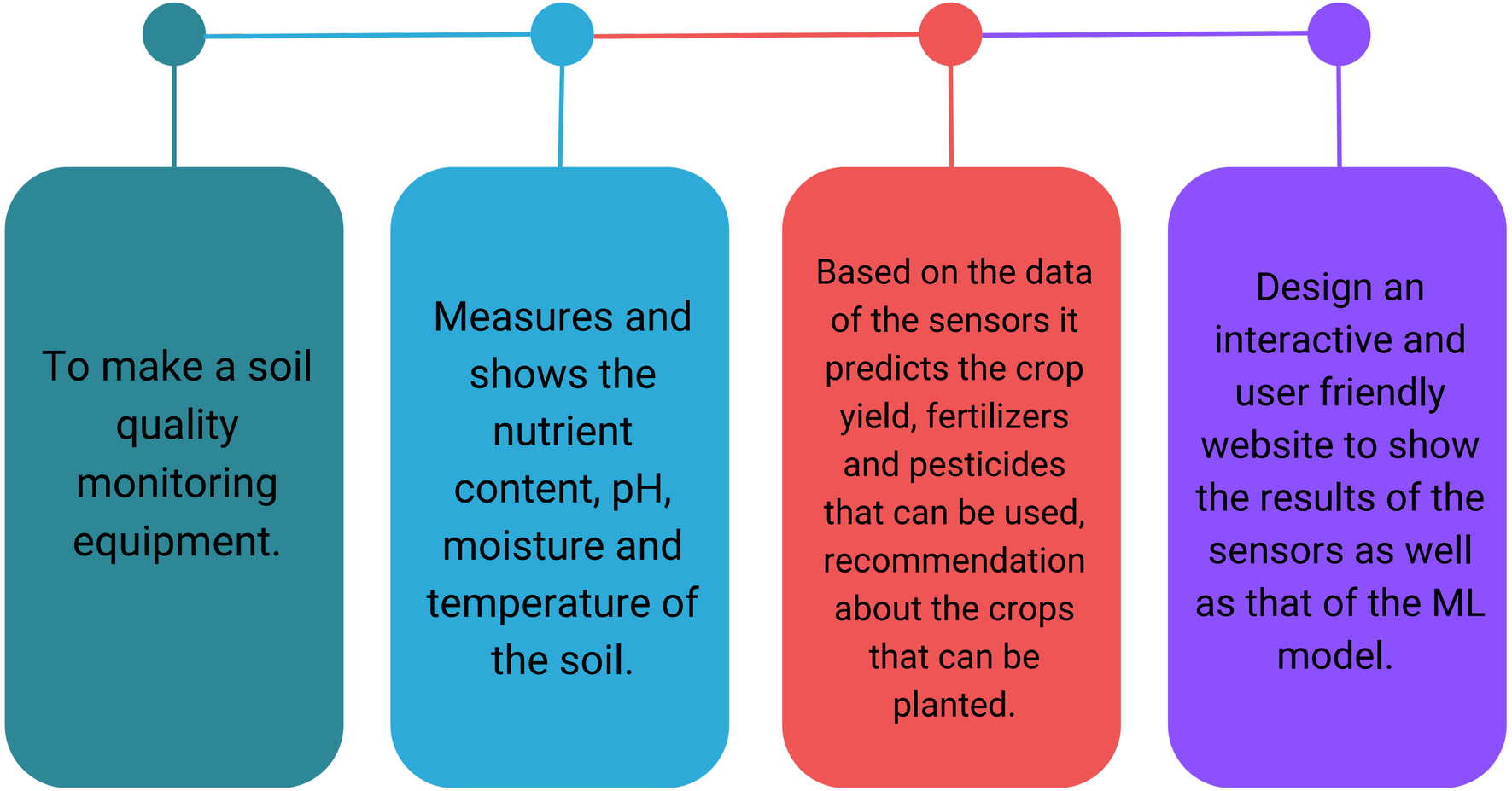
NATIONAL INSTITUTE OF TECHNOLOGY
JAMSHEDPUR

TITLE OF THE PROJECT:

SMART SOIL TESTING AND MONITORING EQUIPMENT

Objectives


To make a soil quality monitoring equipment.
Measures and shows the nutrient content, pH, moisture and temperature of the soil.
Based on the data of the sensors it predicts the crop yield, fertilizers and pesticides that can be used, recommendation about the crops that can be planted.
Design an interactive and user friendly website to show the results of the sensors as well as that of the ML model.

Methodology

RESEARCH AND DESIGN:
Research about the related technologies and designing the basic prototype.

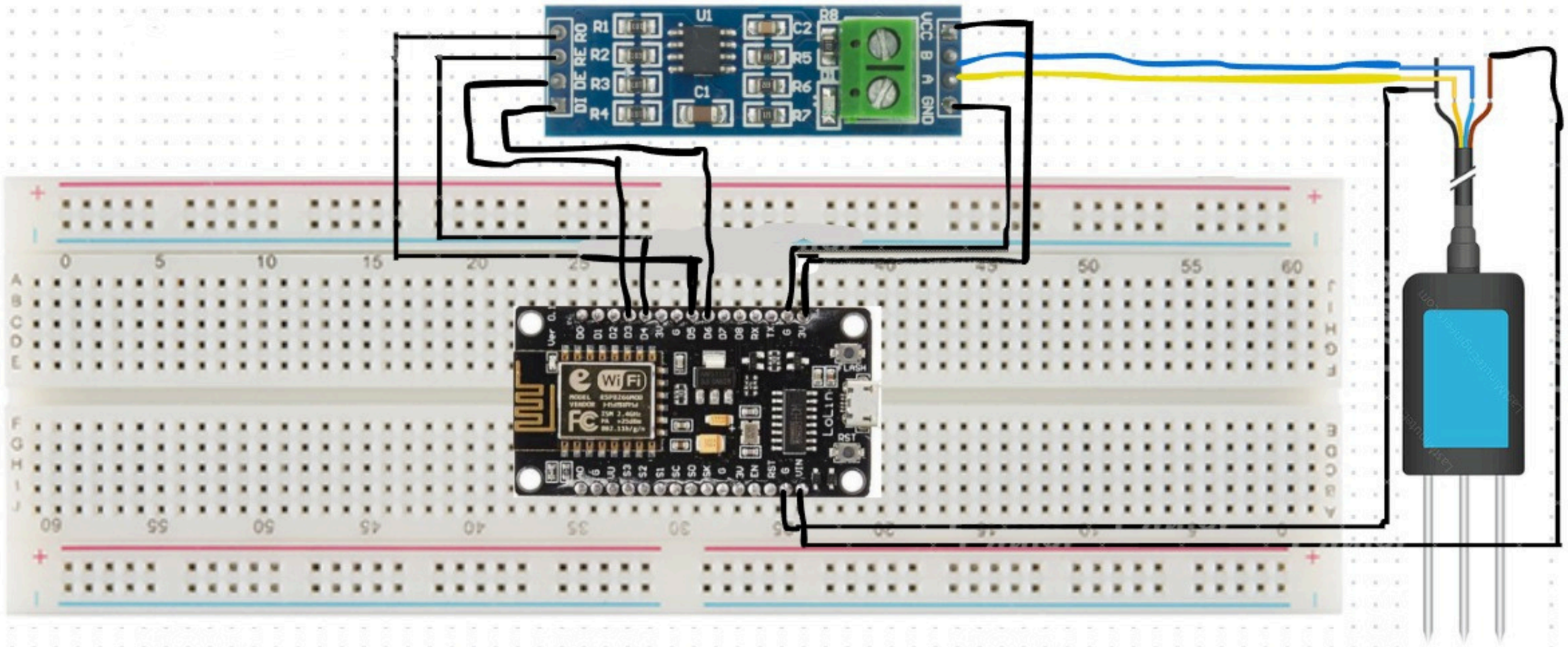
HARDWARE DEVELOPMENT:
Designing the hardware by integrating all the sensors with the microcontroller.

SOFTWARE DEVELOPMENT:
Implementation of ML algorithms for prediction of crop yield, fertilizer recommendations etc. Designing a web interface for viewing the output from sensors and ML model.

BASIC PROTOTYPE DEVELOPMENT:
The hardware and software will be integrated together to create a basic prototype of the model.

TESTING AND INCREASING ACCURACY:
The device is tested with different soil types. Sensor calibration and better ML algorithms will be implemented to increase the accuracy of the model.

CIRCUIT DIAGRAM



Budget Estimation:

AREAS OF FUNDING REQUIRED	PRIZE /-
SOIL NPK SENSOR	8000
SOIL PH SENSOR	2000
SOIL MOISTURE SENSOR	250
SOIL TEMPERATURE SENSOR	250
SOIL 7 IN 1 SENSOR	21000
MISCELLANEOUS	5000
TOTAL ESTIMATED COST	36500/-

Current Status Update:

Sensor Research and Selection:
Till date we have researched about few sensors and modules like soil moisture sensor , soil pH sensor, nutrient sensor(NPK sensor) for nitrogen, phosphorus and potassium content of soil. These sensors will help us analyze important parameters of the soil and the data from these sensors can be fed to the ML model.

Database Planning:
Planning the integration of a centralized database system to store and manage sensor data, AI model outputs, and other relevant information. Choosing a Perfect Data Base for our Project like PostgreSQL for structured data or MongoDB for handling unstructured or semi-structured data on the basis of Scalability and Performance.

Web Dashboard:
Planning to make an user-friendly dashboard for farmers to easily operate and understand it. Identifying key features, functionalities, and visualization tools like charts and tables to present sensor data, AI insights, and decision support tools in an intuitive and user-friendly manner.

AI and ML Module Design:
Developing designs conceptual algorithm. for ML/DL Research ongoing by ML team on certain algorithms namely CNN,GANs,autoencoders, RNNs,a central PID and transformer networks etc. These algorithms will be used for extracting spatial feature,enhancing training datasets,compressing data,capturing any long term pattern,managing a multiple processes simultaneously and yeild prediction etc respectivel.

DETAILS OF THE TEAM

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Mentoship details:

Under the guidance of:

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