

TECHSOW

INTEGRATED CROP AND SOIL HEALTH MONITORING SYSTEM

Guided by :

Prof. Divya Sunny
Assistant Professor
Dept. Of CSE

Team Members:

Juna Teres Martin (SJC20CS073)
Afna Ayshu Jaffin (SJC20CS006)
Nimitha Joy (SJC20CS095)
Rese Raju (SJC20CS105)

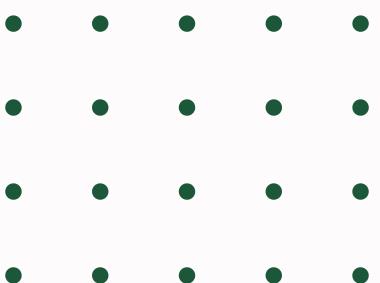


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Problem Statement

Inappropriate fertilizer application methods, common plant diseases, and inadequate soil health procedures present farmers with significant hurdles in maximizing agricultural yields while controlling expenses. The environmental sustainability of conventional farming practices is reduced and expenses rise as a result of the wasteful use of fertilizers. Crop yields are lowered by inaccurate application, which also wastes resources.



LITERATURE SURVEY

S.NO	Title	Inference
1	EARLY DETECTION OF MAJOR DISEASES IN TURMERIC PLANT USING IMPROVED DEEP LEARNING ALGORITHM	Improved YOLOV3-Tiny simplifies turmeric disease detection, eliminating steps for precision. Efficient deep learning offers accurate diagnosis of plant diseases.
2	PACKAGE OF PRACTICES RECOMMENDATION : CROPS 2016	Accurately determined the specific NPK and nutrient requirements for diverse crops. Obtained comprehensive data on fertilizer quantities and related details.
3	NAVIGATION SYSTEM OF THE AUTONOMOUS AGRICULTURAL ROBOT (JOURNAL)	Utilizes a Simultaneous Localization and Mapping (SLAM) model for autonomous rover driving, integrating a Lidar module to enable obstacle detection and navigation.
4	DETECTION OF NITROGEN, PHOSPHORUS, AND POTASSIUM (NPK) NUTRIENTS OF SOIL USING OPTICAL TRANSDUCER	The optical sensor, comprising LEDs and a photodiode, tailored to nutrient absorption bands, effectively measures soil NPK levels. Integrated with an Arduino microcontroller, it provides digital readings, enabling precise evaluation of soil content.

Objectives



Disease Detection



Soil NPK Content Analysis



Micronutrients Analysis



Soil PH analysis



Fertilizer Recommendation System

REQUIREMENT ANALYSIS

Functional Requirements

Image Processing for Disease Detection:

- The app should be able to capture and process images
- Implement machine learning models to analyze plant images and detect diseases accurately.

Fertilizer Calculator:

- Provide a user interface to select a specific crop.
- Retrieve NPK values for the selected crop from a database.
- Calculate the amount of fertilizer required based on the selected crop and its area.

Functional Requirements

Rover Control:

- Enable remote control of the rover's movement through the app.
- Receive data from rover sensors (pH and NPK) in real-time.

Soil Micronutrient Measurement:

- Analyze pH and NPK values received from the rover sensors.
- Determine soil micronutrient levels based on the collected data.

Fertilizer Recommendation:

- Provide recommendations for fertilizers based on the analyzed NPK values.
- Suggest specific fertilizers and quantities needed to balance nutrient deficiencies.

Non-Functional Requirements

Performance:

- The app should process and analyze plant images quickly to provide instant disease detection feedback.
- Rover control commands should have minimal latency

Reliability:

- The disease detection model should have a high accuracy rate.
- Rover sensors should provide reliable and accurate pH and NPK values.

Scalability:

- The app should handle an increasing number of users and connected rovers without significant performance degradation.

Non-Functional Requirements

Usability:

- The user interface should be intuitive and user-friendly.
- The app should provide clear and understandable recommendations.

Compatibility:

- The app should be compatible with various devices and screen sizes.

Maintainability:

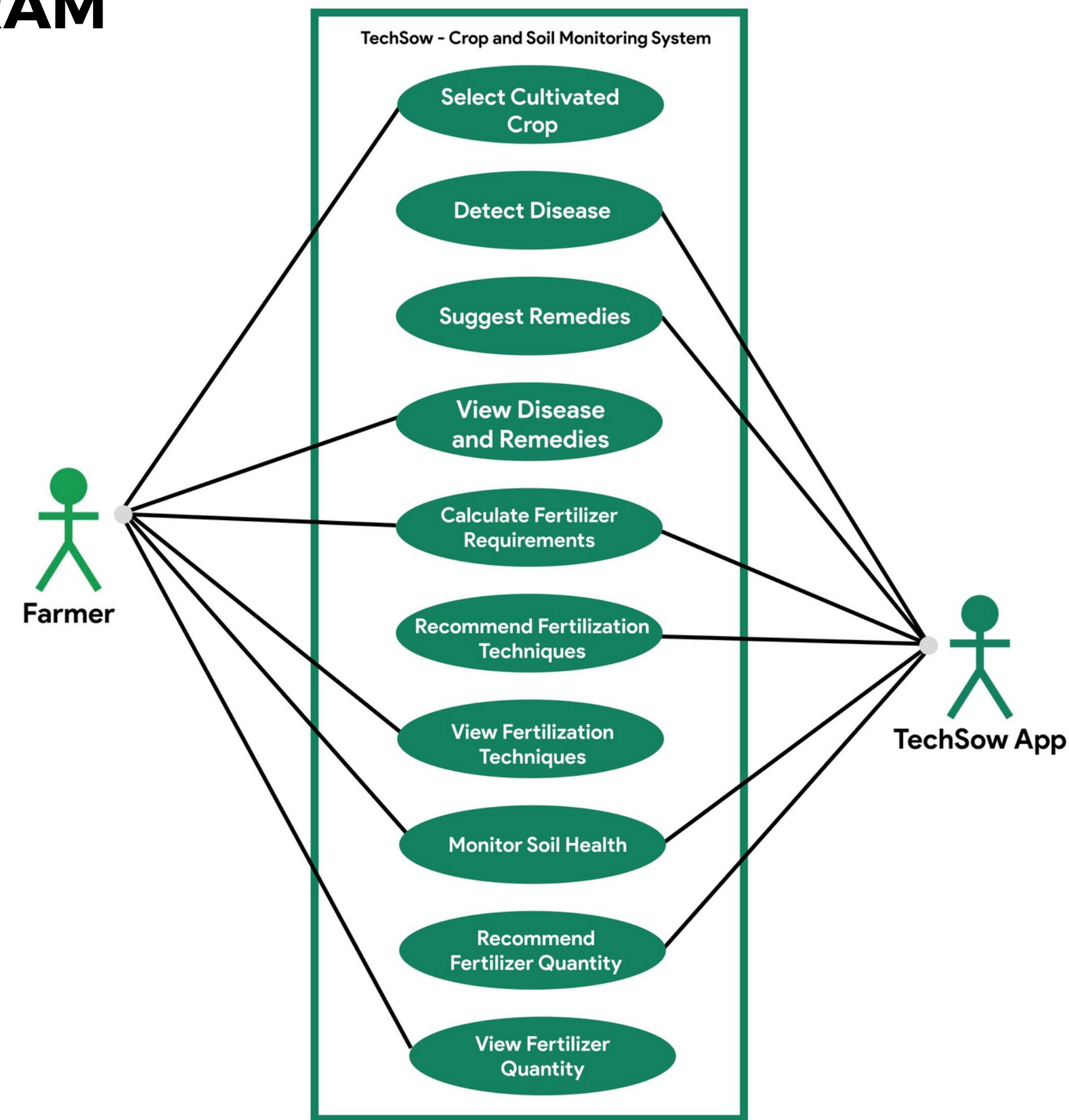
- Design the app with modular and well-documented code for easy maintenance.
- Mechanisms for updating the disease detection model and fertilizer database.

Integration:

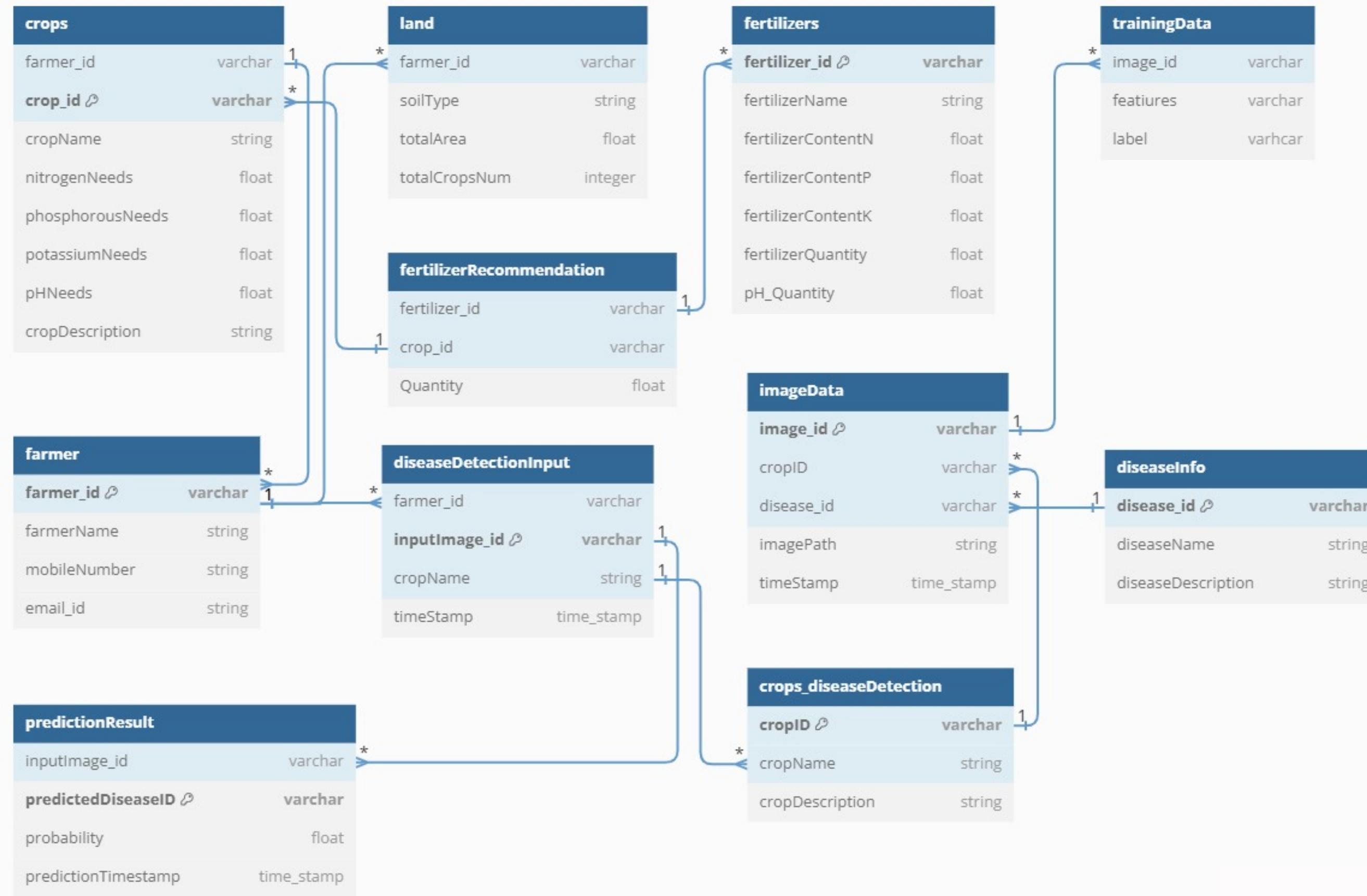
- Ensure seamless integration between varoius features
- Integrate with external databases

DESIGN

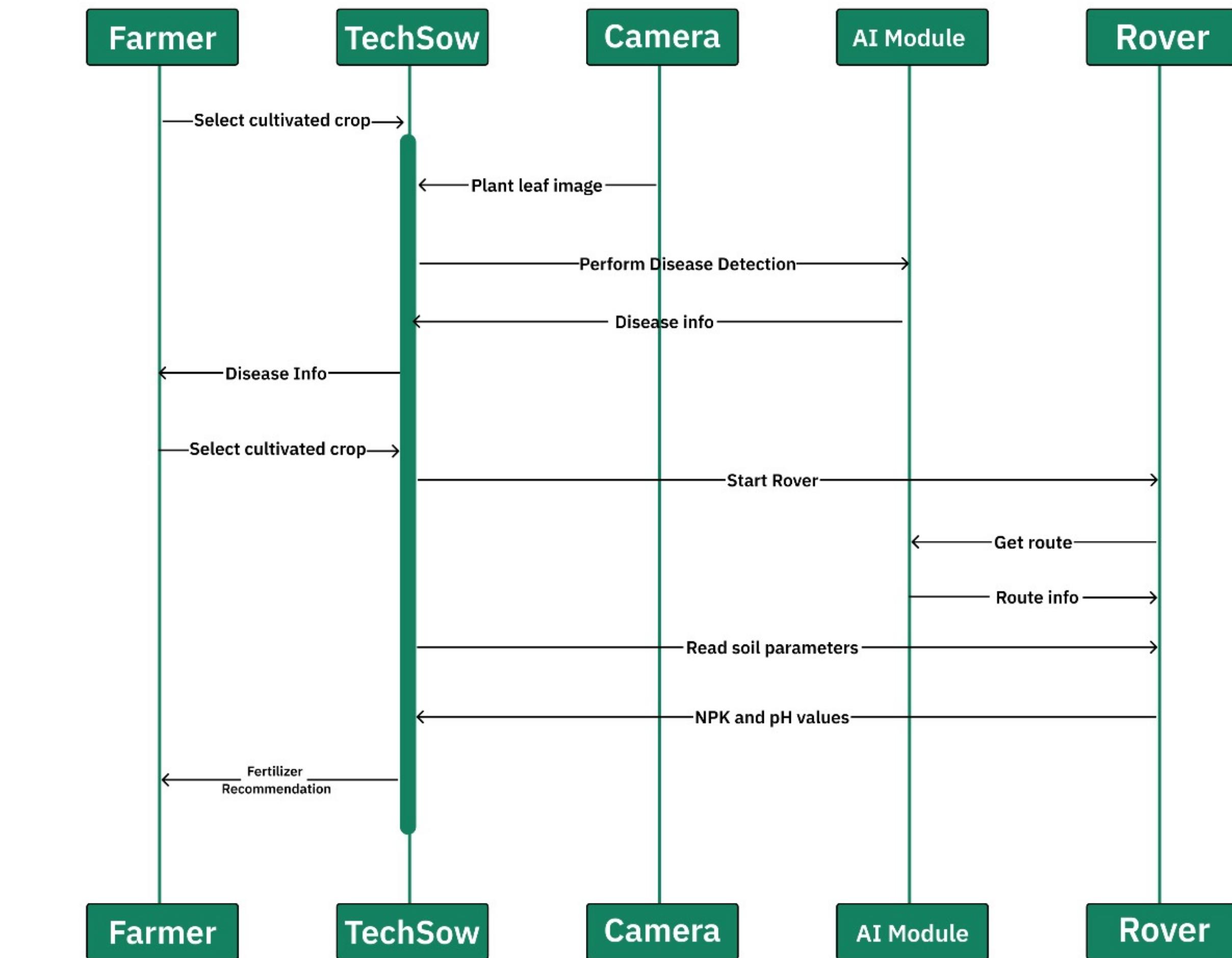
USE CASE DIAGRAM



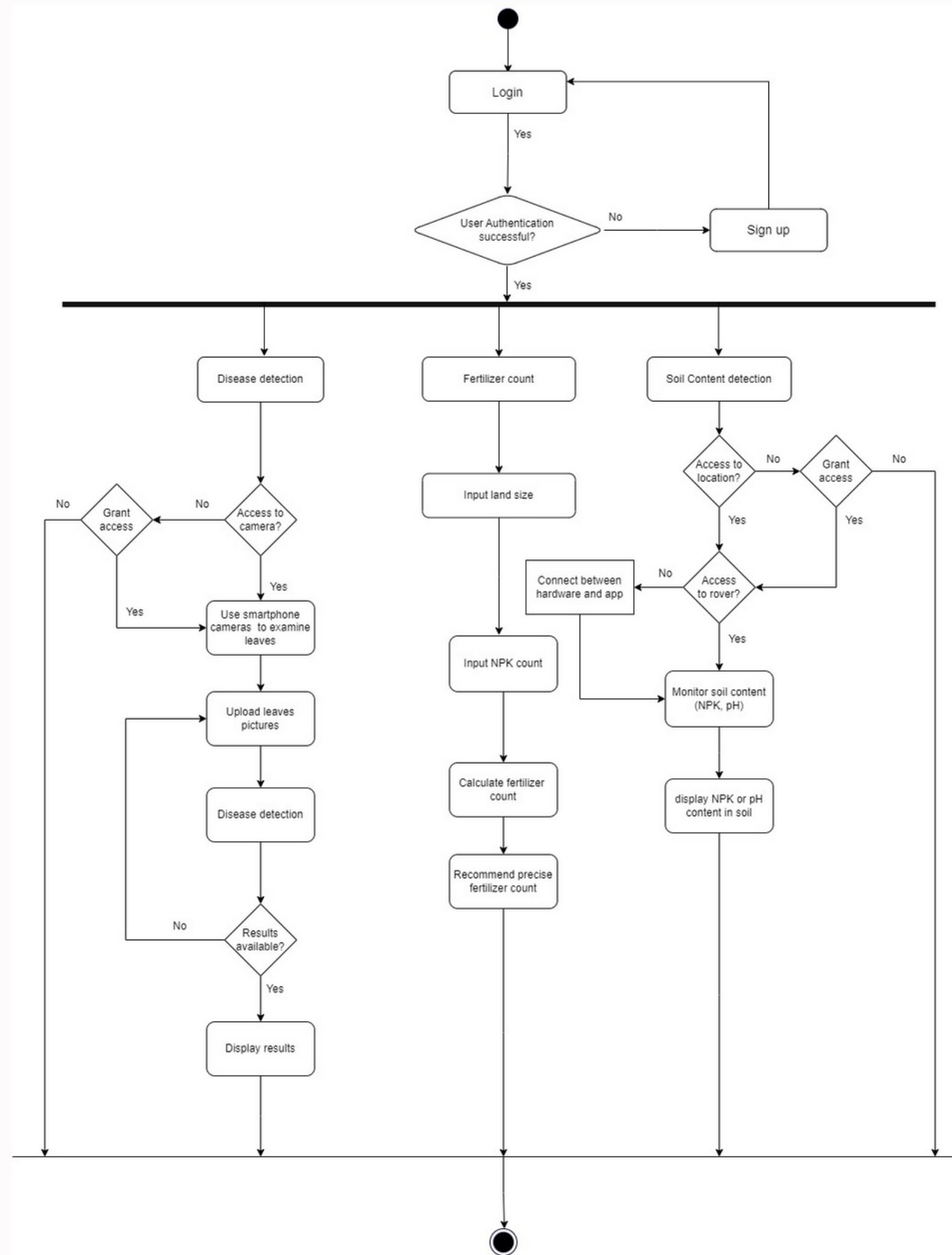
SCHEMA DIAGRAM



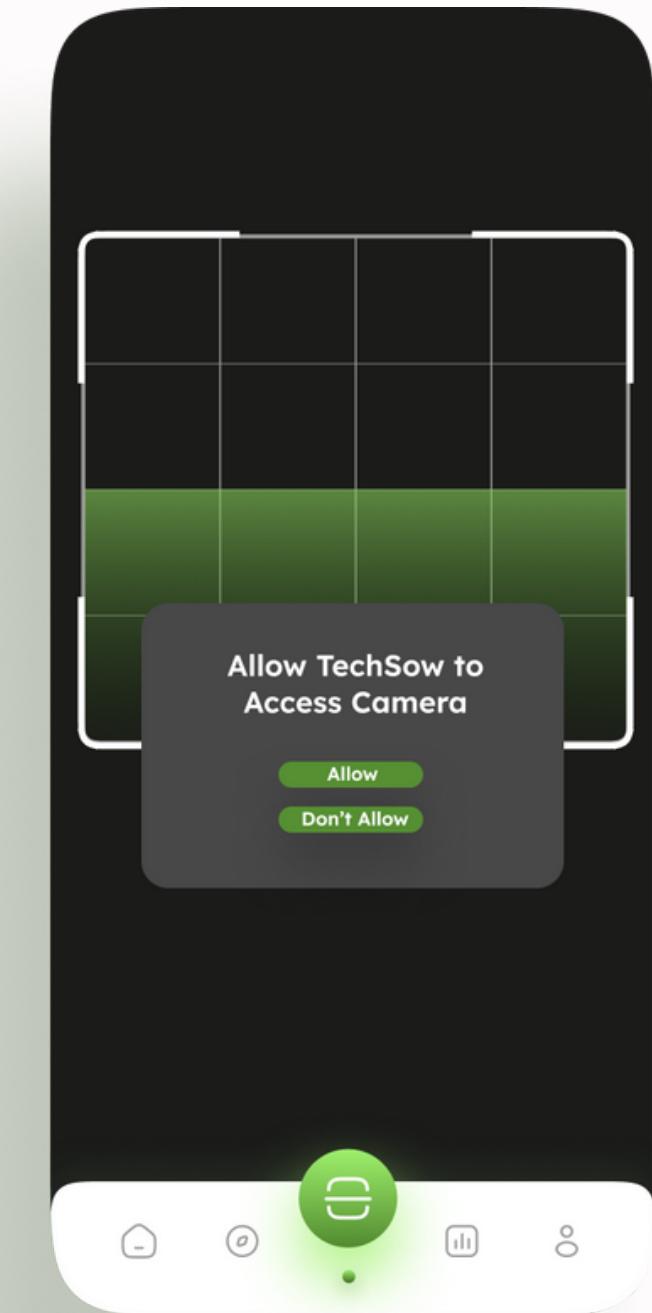
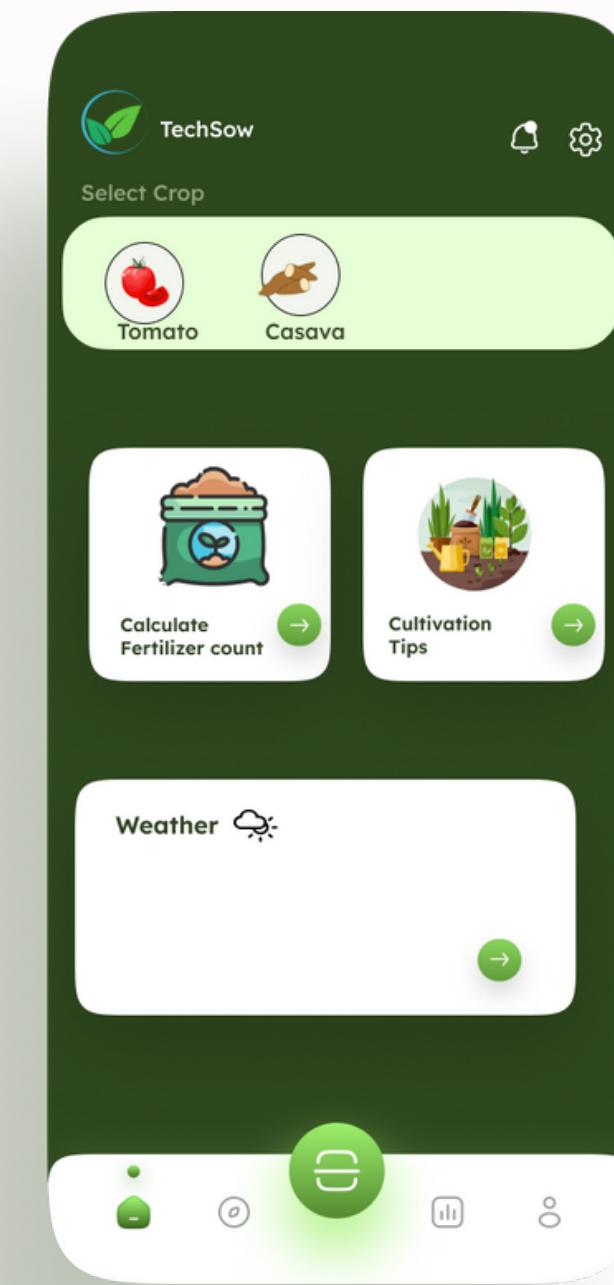
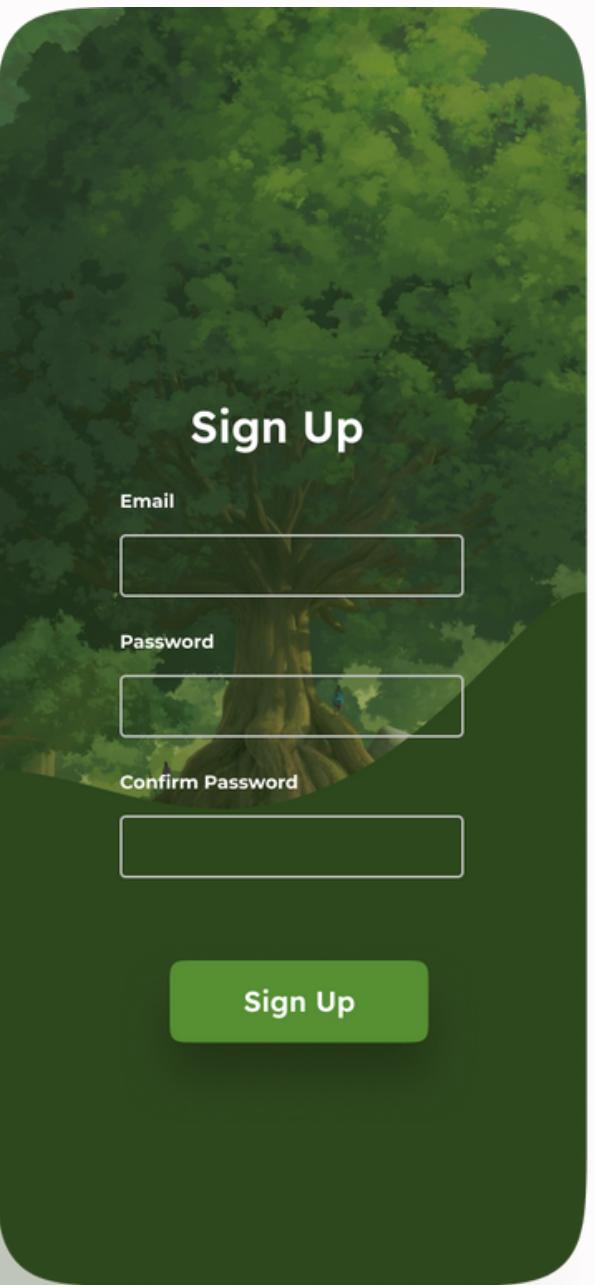
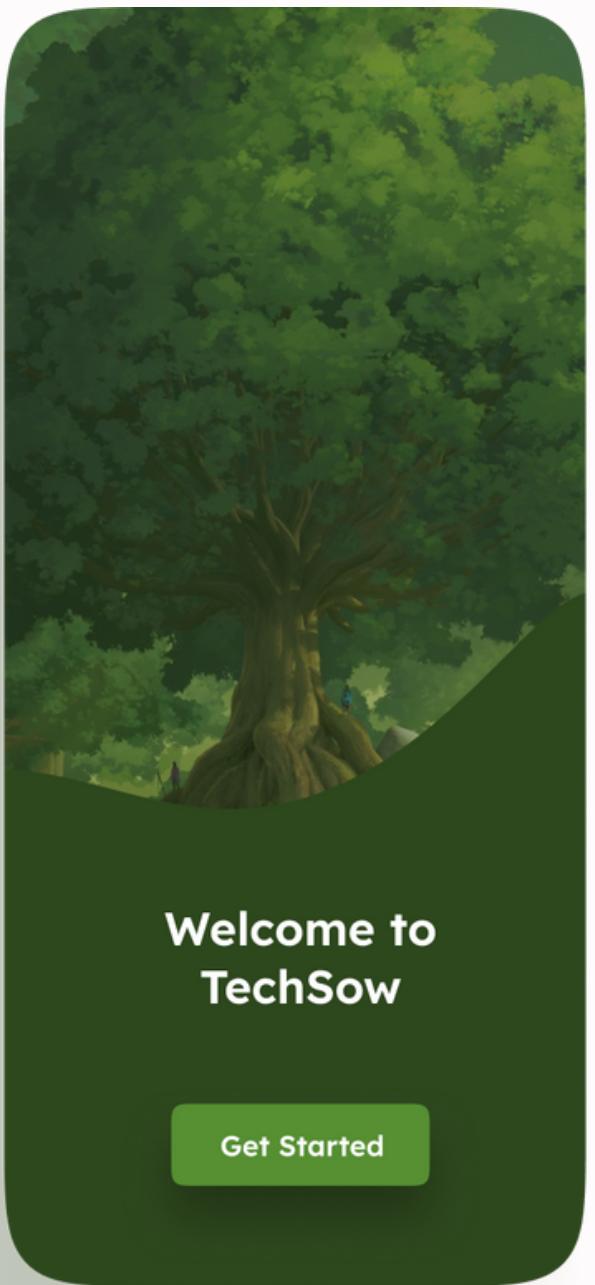
SEQUENCE DIAGRAM



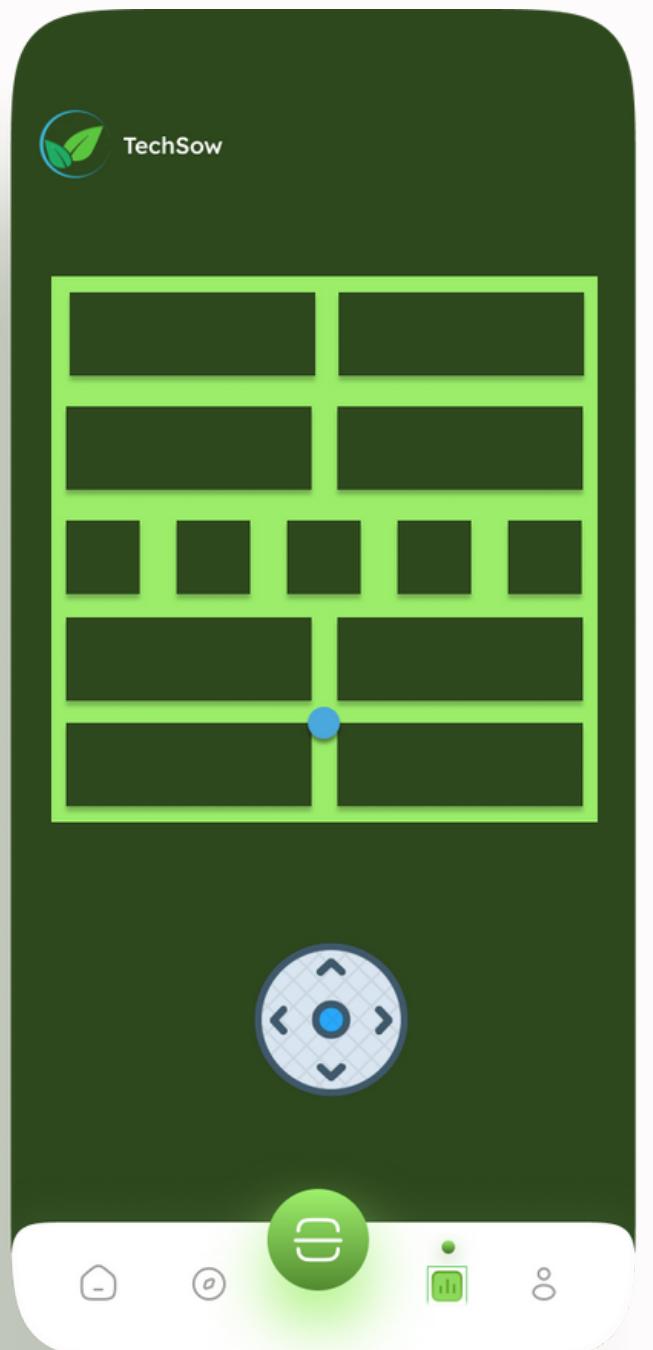
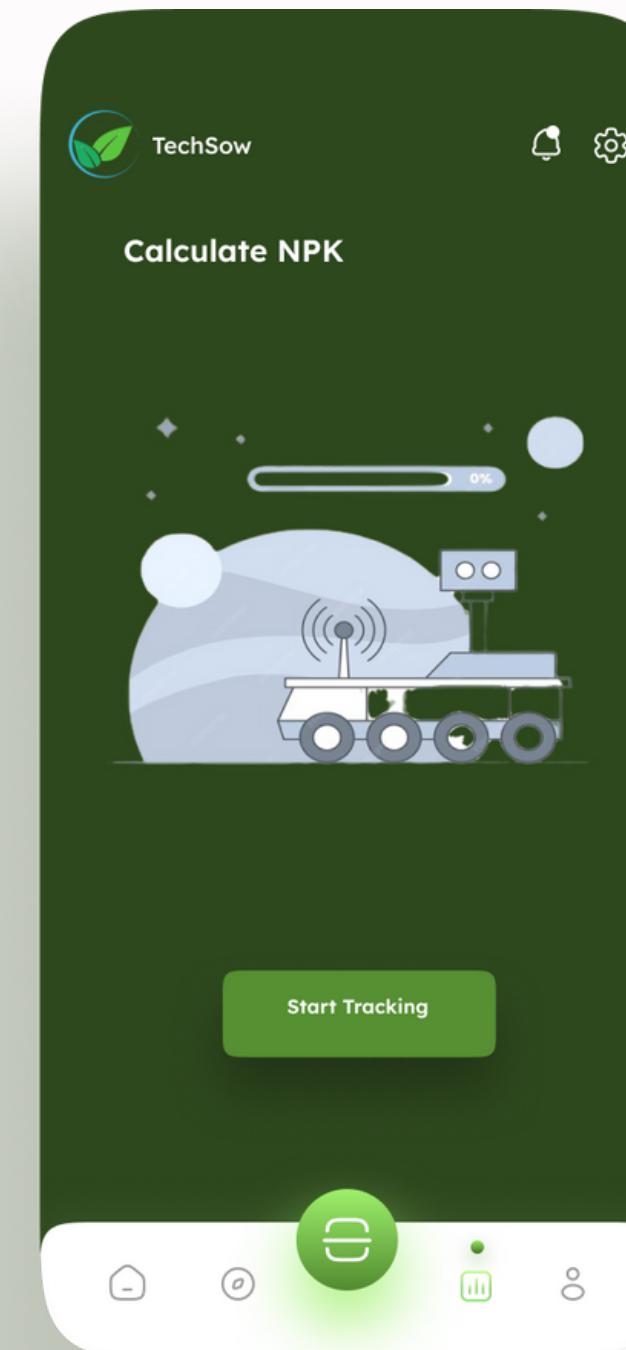
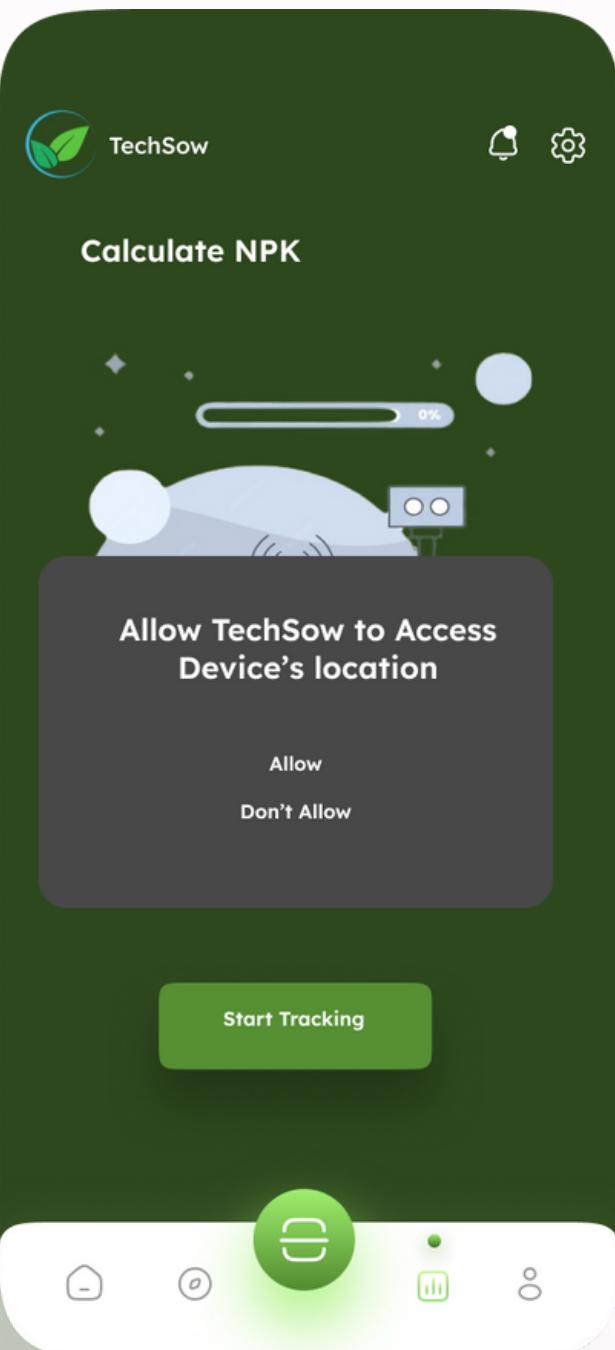
ACTIVITY DIAGRAM



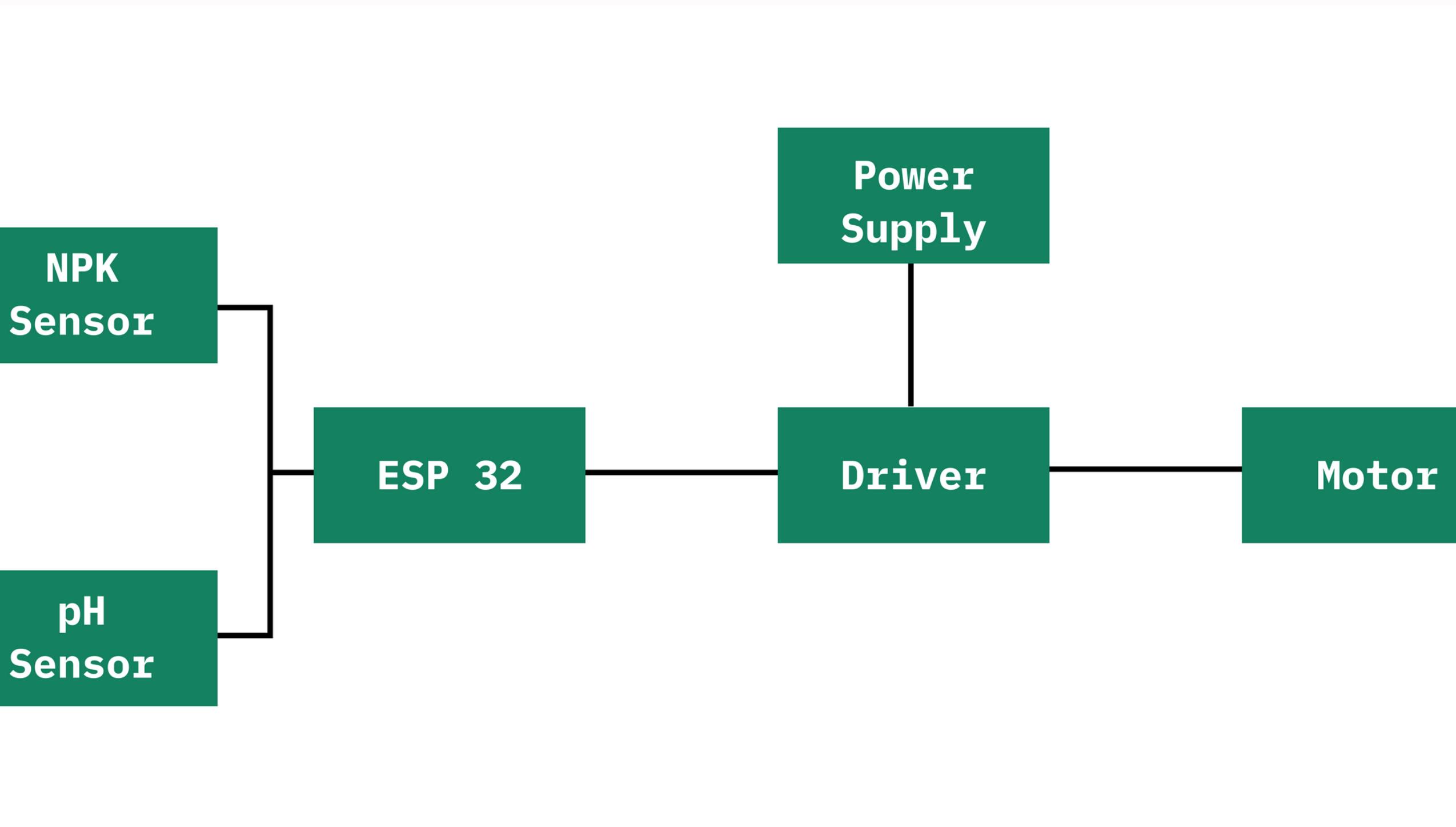
UI DIAGRAM

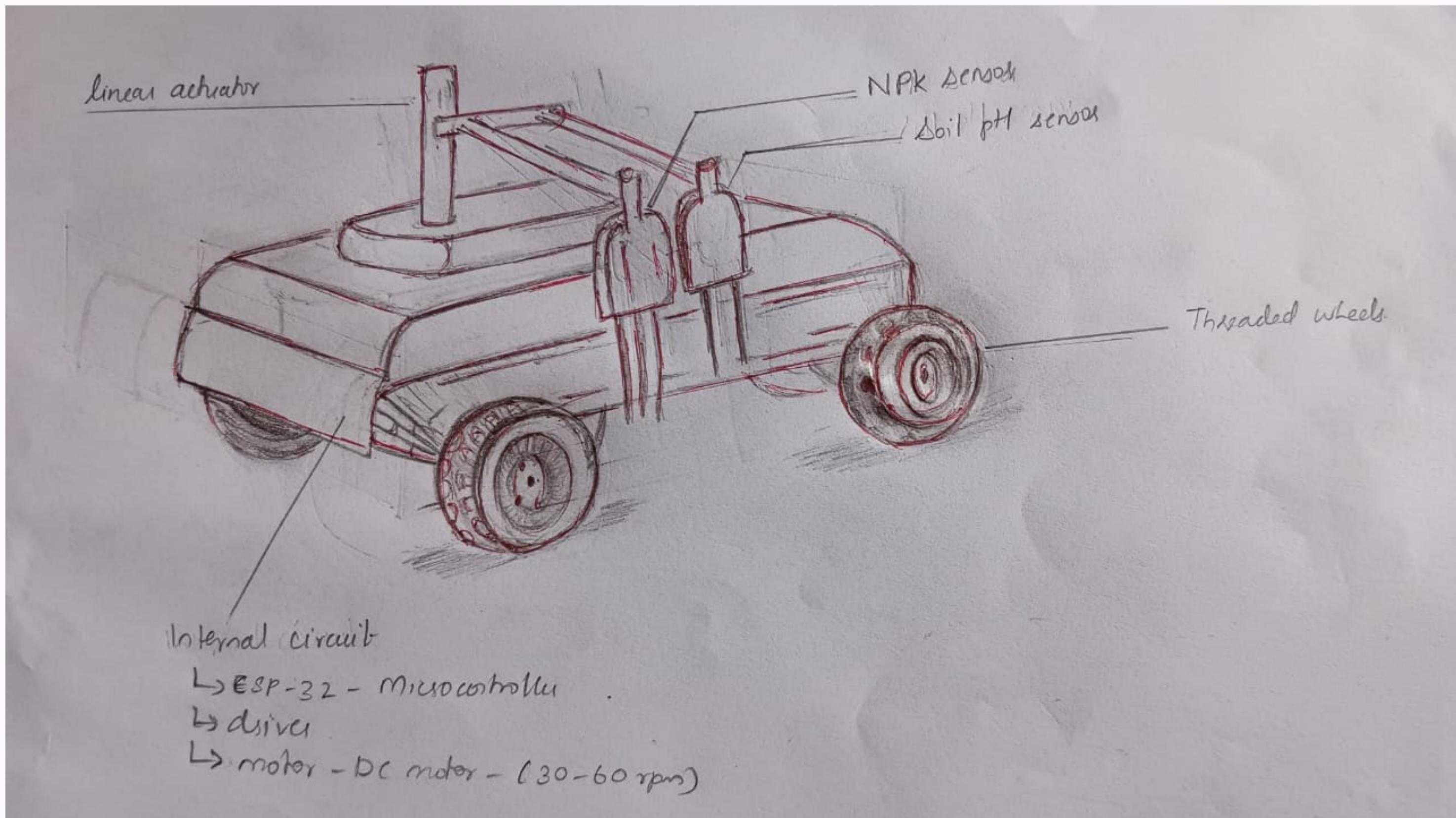


UI DIAGRAM



BLOCK DIAGRAM





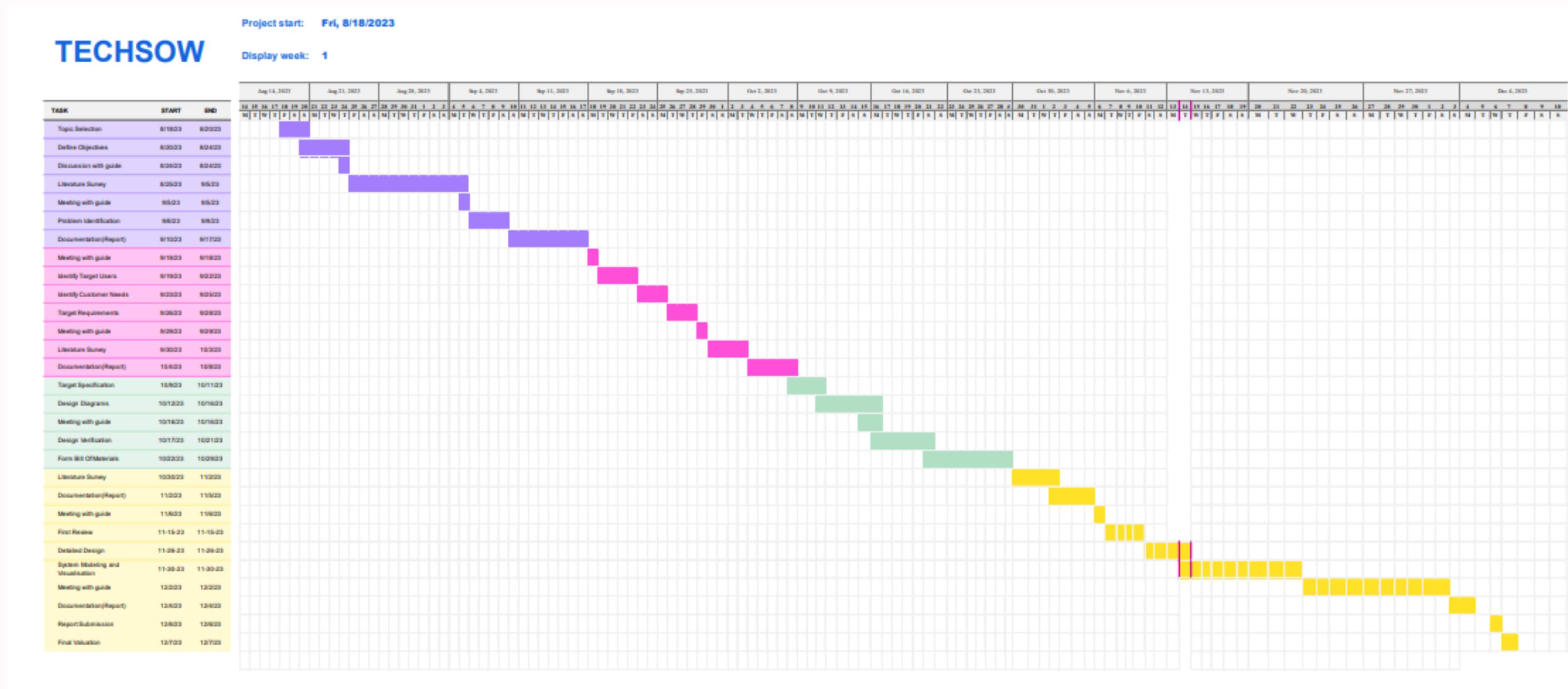
TOOLS USED

Sl.no	Tools	Links
1	Github	https://github.com/JunaTeresMartin/TechSow
2	Google Drive	https://drive.google.com/drive/u/0/folders/1pkqjYDdmciXLZ3q7XGgwJ_mAn0dK23Gg
3	Google Docs	https://docs.google.com/document/d/1qrrLSbF9Zg6jEq_qJWCD2gKxxcHskU0sQuS5EAGnu5A/edit
4	Figma	https://www.figma.com/file/hA1UoMFfrF1vgnx1qYA9DY/Plant-App-UI-Design-(Community)?type=design&node-id=0-1&mode=design&t=SqiE1t2AvdxSAw90-0
5	Canva	https://www.canva.com/design/DAFuz4GQMcQ/kcyNFMqjZdxqxifelCYVzg/edit
6	Draw.io	https://app.diagrams.net/
7	Notion	https://www.notion.so/TechSow-Main-Project-4a3e34242c184916b145fbc405b9b502?pvs=4

COST ESTIMATION

Components	Cost (INR)
ESP 32	5500 - 6500
DC MOTOR	3500 - 4000
NPK SENSOR	9500 - 12500
PH SENSOR	600 - 700
ROVER & BASIC STRUCTURE	10000 - 15000

GANTT CHART



CONCLUSION

The background of the slide is a photograph of a rural landscape featuring rolling green hills and fields. A dark green rectangular box is positioned in the center-left area of the slide, containing the conclusion text.

In conclusion, addressing the challenges faced by farmers in soil nutrient content detection and disease identification is imperative for sustainable agriculture. Innovative solutions leveraging technology can revolutionize farming practices and enhance crop yield while conserving resources. Empowering farmers with accurate information is key to ensuring a resilient and productive agricultural future.

THANK YOU