|| 26- 28th March, 2021 ||

INTER IIT TECH MEET'21

IIT Guwahati

MID PREP EVENT

(250 Points)

AgroBot Design Innovation Challenge

The agro-based industry is regarded as the sunrise sector of the Indian economy because of its large potential for growth, employment, and income generation. Farmers must meet the changing needs of our planet and the expectations of regulators, consumers, and food processors, and retailers. Cost-effective, eco-friendly, and easily operable agricultural bots are in demand to give a boost to the economy.

PROBLEM FACED:

MECHANIZED FARMING IN HILLY TERRAIN:

A large part of Indian terrain used for agriculture is uneven and hilly. Mountain agriculture presents different challenges and generates the requirement of innovation to solve practical problems encountered in the daily management of the production process. The design of bots that can be operated in hilly terrain possess different challenges when compared with bots being used on flat ground agriculture with respect to maneuvering, alignment with steep edges, plowing, seeding, and so on.

SEED METERING MECHANISM FOR UNEVEN OR IRREGULAR SEEDS :

Sowing is a crucial step for successful crop production which includes metering, soil penetration, and the correct amount of seed to drop in the right location. In Spite, a lot of research and design is done for seed metering mechanism; plantation of uneven and irregular crops/seeds still possess a grave challenge (for roots such as ginger, turmeric).

TRANSPLANTATION :

During plantation of rhizomes in the soil, (out of say 5) two-three seeds actually germinate which leads to a decrease in the productivity of lands. On contrary, if the plantation is done directly as in saplings form then the losses can be minimized and productivity can be increased. This process of transplantation, of removing a plant from a location and replanting it at another is extremely delicate and fragile. A mechanized transplantation solution for the same can be developed to increase productivity.

WEED REMOVAL :

Weeds are unwanted plants that grow into the soil. Removal of weeds is an extremely laborious job, involving much drudgery. An autonomous weed removal solution can collectively mitigate the problem of excessive herbicide, harmful chemical usage, and labor shortage and difficulties.

PROBLEM STATEMENT:

Each team is required to design an agricultural bot that can provide a solution for one or more challenges faced above. Teams have to provide a CAD model for their design along with their work in simulation. Along with it, they need to present a detailed report for their proposed model.
Any extra feature is appreciable and will be considered for grace marking.

NOTE: SIMULATION IS OPTIONAL

GUIDELINES FOR REPORT:

The report needs to be included with the following section :

1. Name and index of solution/solutions the model is catering to.
2. Concise working of model, elaborate design details and specifications.
3. Hardware components required for actual design and implementation.
4. Cost involved for building the same (along with relevant assumption and bifurcations)
5. Details about Maintenance and replacement of parts.
6. Other features(if any).
7. Why the proposed model is considerable for scalability and realisation.

FINAL SUBMISSION:

1. The report, CAD Model (.STEP form), and video of model simulation need to be submitted.

   DUE DATE: 25 th March (EOD)

2. Presentation (time slot will be given later on to teams who have submitted the report).

EVALUATION CRITERIA:

1. Number of solutions, the model can provide along with its probability of realisation.
2. Clear proposal of the design and its working in report.
3. Presentation
4. Components required during hardware implementation.
5. Innovation in design and novelty of ideas and approach.
6. Cost and amount of hardware required for the actual model.
7. Compatibility and ease of operation in small agricultural lands
8. Cost of maintenance, and replacement of parts.
9. Value added for small and marginalised farmers

CONTACT:

Join Slack Community for your queries: https://cutt.ly/TechMeet9_Slack

A maximum of 6 members in each team.
Presentation will be given by 4 members only.