Progress Presentation-I

e-Yantra Summer Internship-2018
CNC for GrowBox

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Overview of Project
Overview of Task
Task Accomplished
Challenges Faced
Future Plans
Thank You

Overview of Project

CNC for GrowBox

Objective:-

- Understanding the requirements and analysing the existing GrowBox
- Designing of spray and seeding mechanism
- Monitoring plant growth using IP techniques and ML if needed.
- Complete system integration and testing

Deliverables:-

- Working CNC fixed inside the GrowBox
- IP for XY mapping and plant monitoring
- Documentation of CNC design and IP codes

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Overview of Task

Task No.	Task		Deadline
	Mechanical	**Electronic/Computer Science**	
	Week 1		
1	Understanding the requirements and analysing the existing GrowBox		1 days
2	Modeling/Designing the 1st iteration of the CNC to fit inside the GrowBox	Literature survey on existing IP for plant monitoring and using IP to transform trough dimensions to XY for CNC	4days
	Week 2		
3	Analysing the designs in Ansys, considering all the parameters.	Setting up the base system for image processing on Rpi and ML machine	3 days
4	Designing of spray and seeding mechanism	Testing the system to run minimal problems which may be faced	2 days
	Week 3		
5	Construction of the design and testing of CNC		2 days
6	Interfacing and writing code for CNC		3 days

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Sr.No.	Mechanical	Electronics/Computer Science
1	Finalised all the mechanism for the motion of CNC in all the required direction.	Reading of literature pertaining to image processing.
2	Finished selecting various materials according to there properties suitable for the machine parts.	Detecting of green trough and subsequently boxing the trough in a rectangle to generate a grid which divides the whole trough into plantable free spaces for each plant.
3	Done analysis on the Ansys software to find the required strength of the part and factor of safety.	Installed and configured Rasbian Stretch on provided rasberry pi.
4	Prepared a material requirement list with estimated price for the construction of CNC.	Ardino and OpenCV was installed on the above board.

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Future Plans

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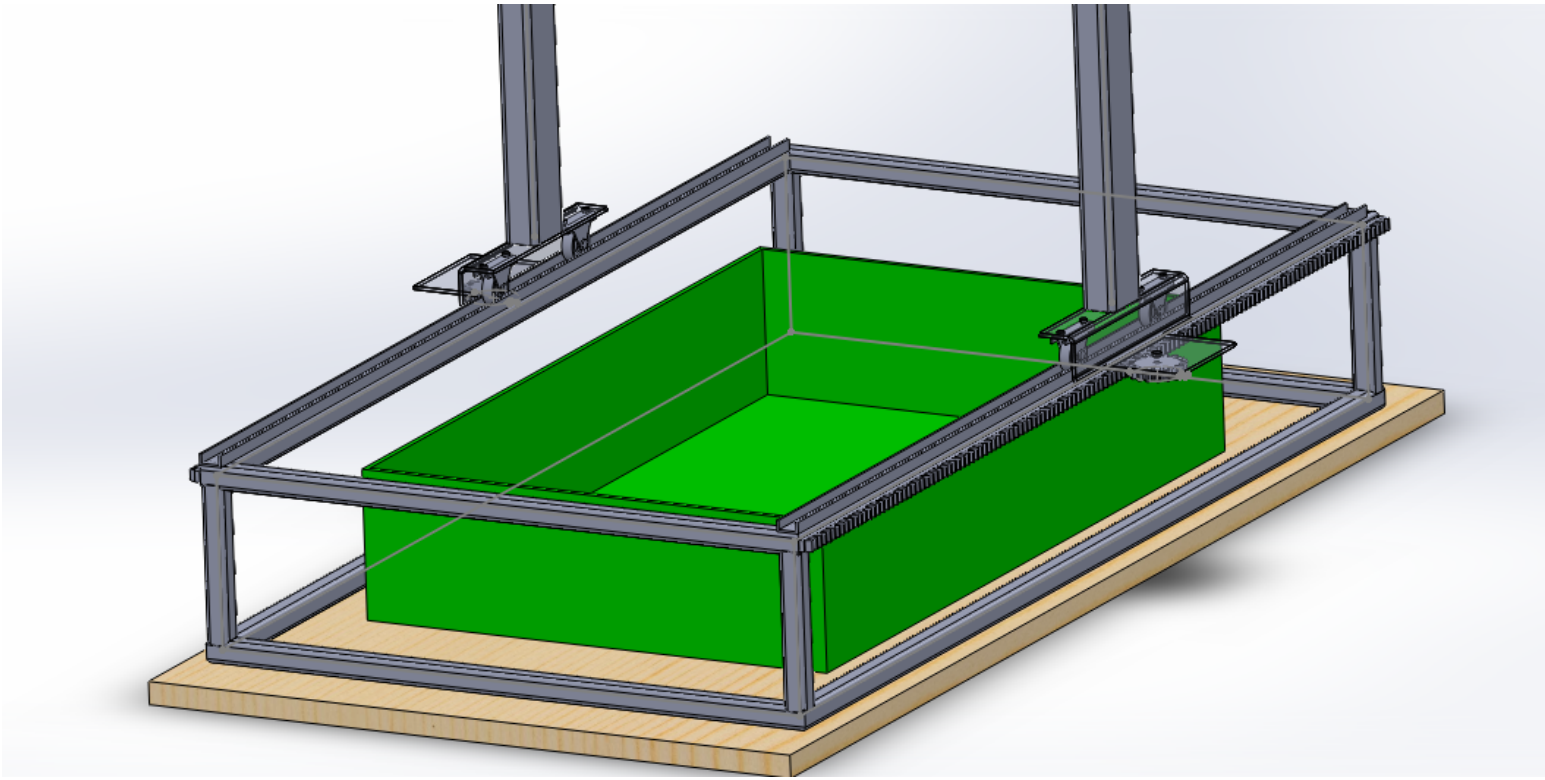

Figure: 1st week x-direction motion

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Future Plans

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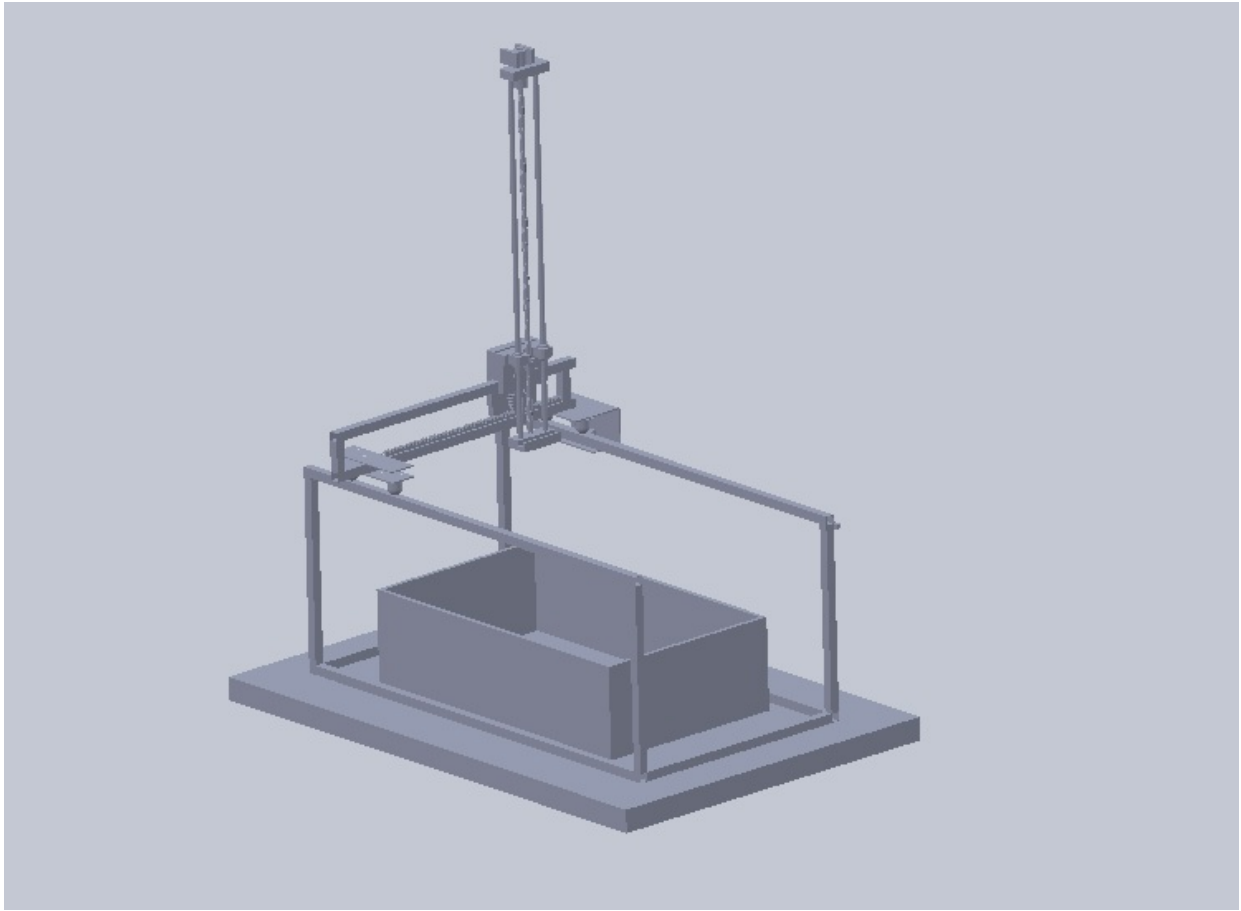

Figure: 1st week all direction motion

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Future Plans

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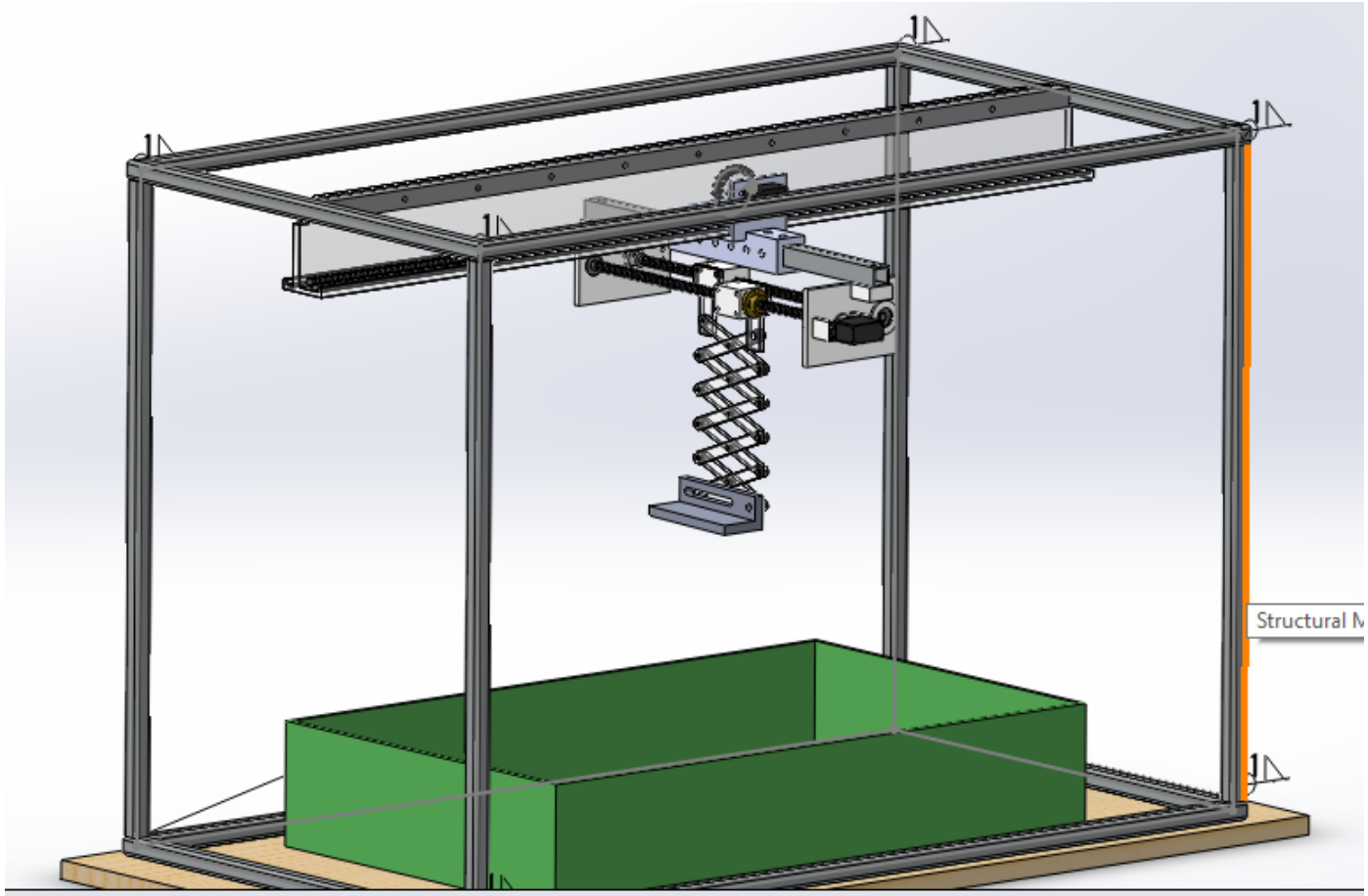

Figure: 2nd week all direction motion

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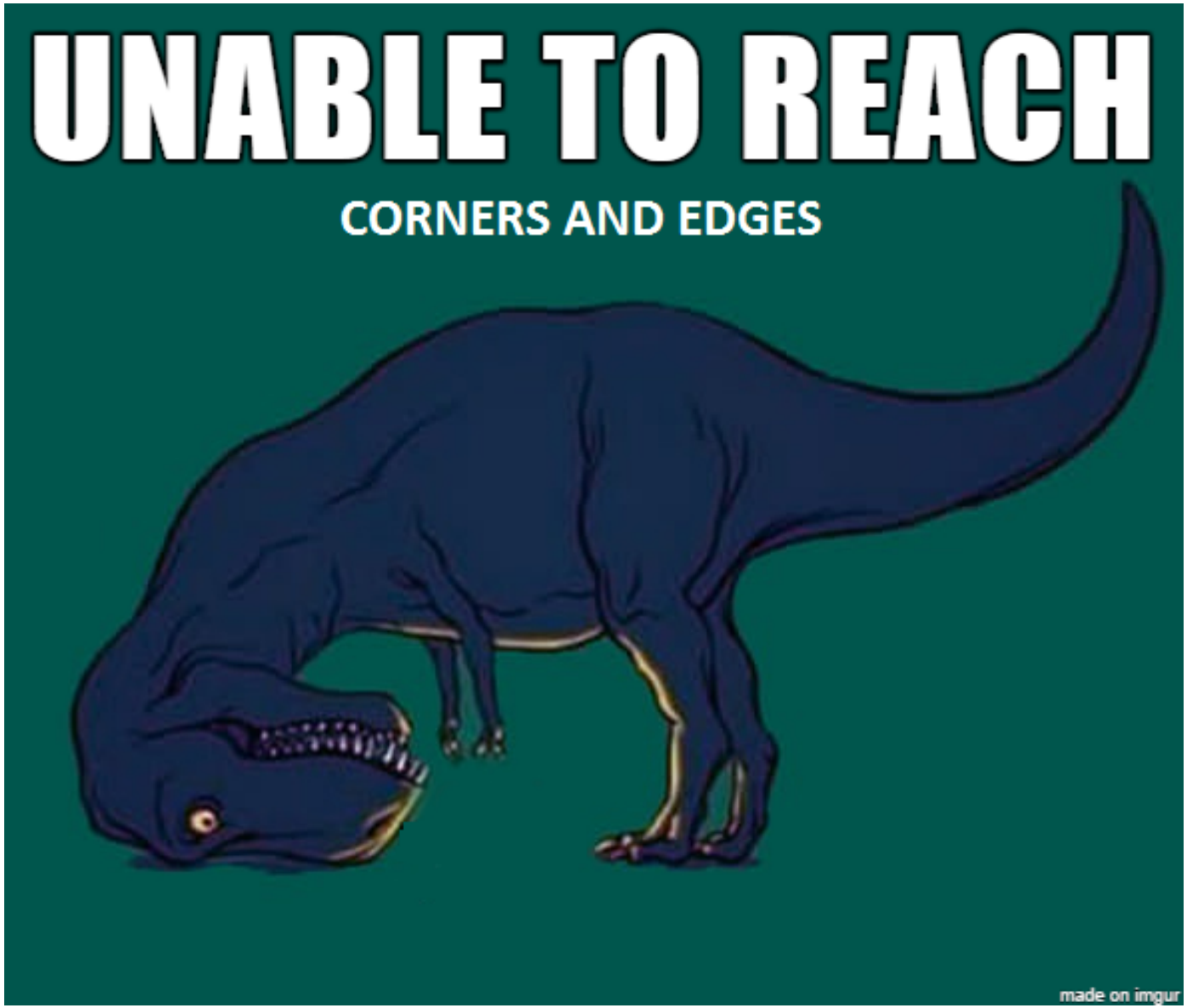

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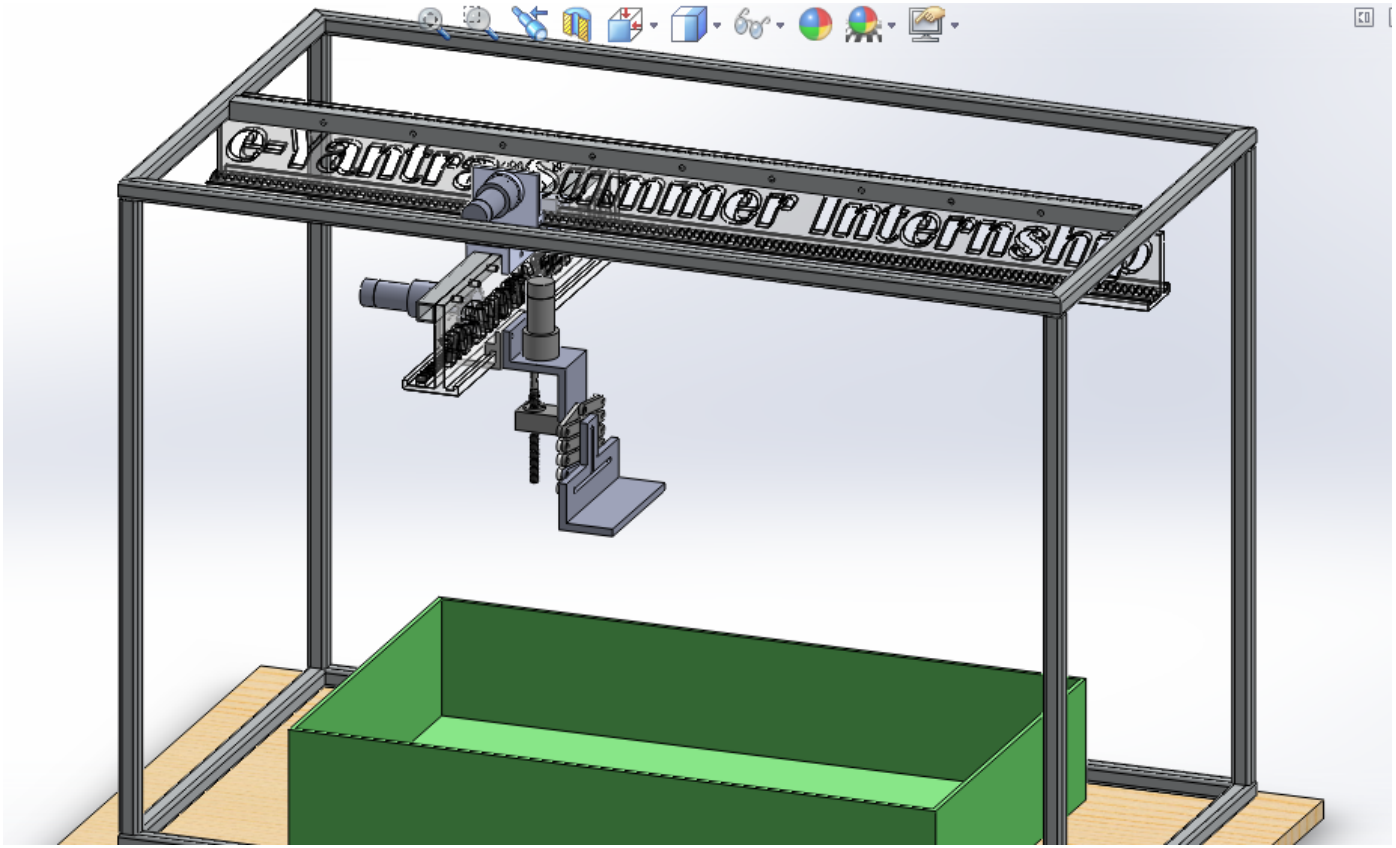

Figure: Final model

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Figure: Sample grid generation

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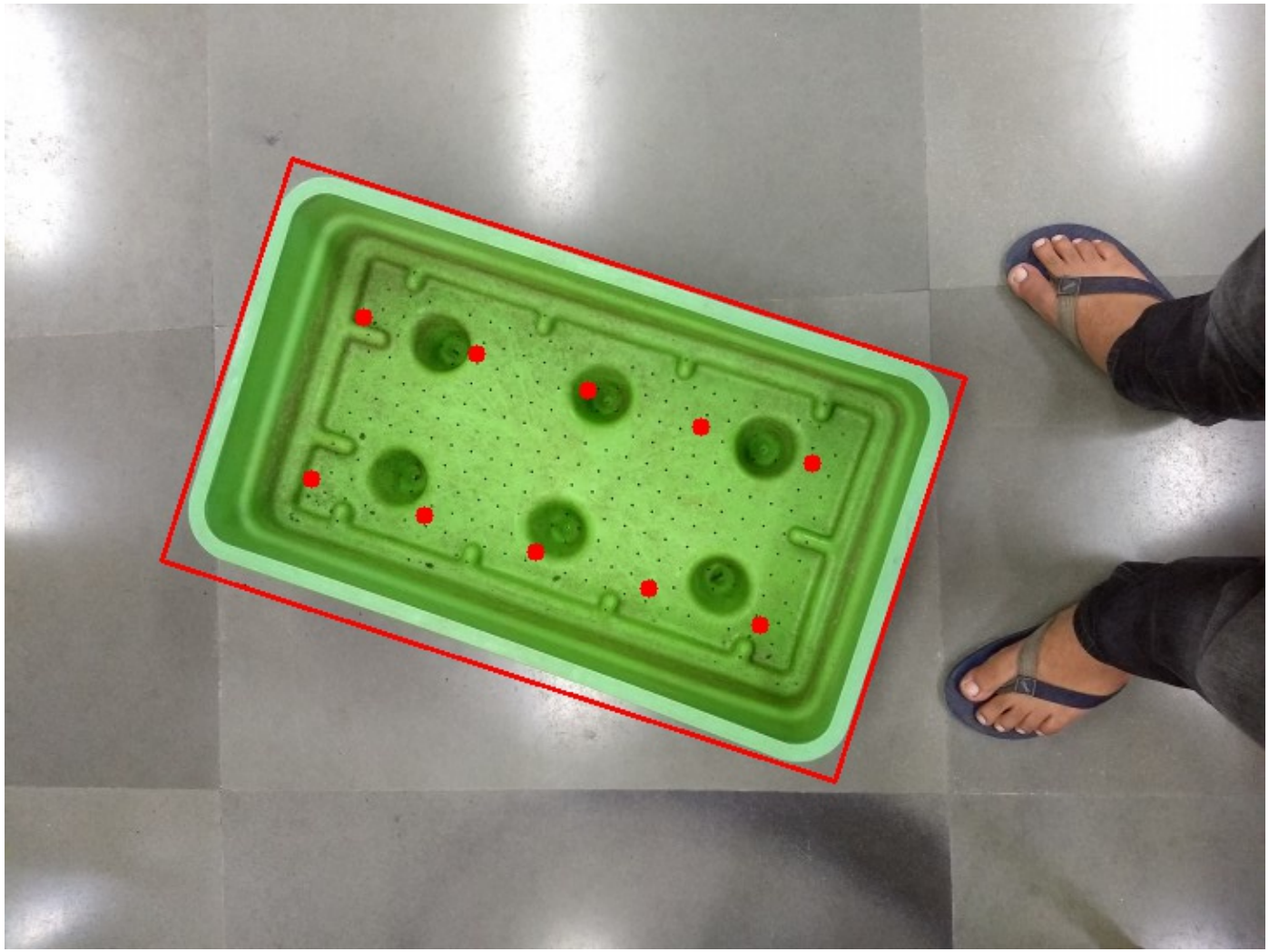

Figure: Dynamic sample grid generation

Challenges Faced

Mechanical

- Firstly, we find difficulty in finding the requirements or necessary constraints of the project.
- To obtain the transferability from one box to another one.
- To design such a light weight and compact mechanisms to meet the requirements.
- To design an overhanging mechanism.
- Designing expandable mechanism for the vertical motion which occupies the least space.

Electronic/Computer Science

- Dynamic grid generation that has to be independent of the orientation of trough w.r.t the box.
- Initialisation of coordinate system for CNC to receive commands after processing the images clicked by pi camera.
- At the fixed height of grow box, pi camera isn't able to capture whole of trough in one click.

Future Plans

Mechanical

- Designing of spray and seeding mechanism
- Construction of the CNC.
- Testing the functioning of all the mechanism.

Electronics and Computer Science

- To implement the decided coordinate system initialisation procedure.
- To process the whole of grow box by clicking multiple images and determine the position of trough, consequently the grid points
- To read literature and implement an algorithm to estimate moisture content on each plant.

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