FARMBOT GROWROOM: THE MONARCH

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TOPIC & MOTIVATIONS

Australia has now been presented with an emerging opportunity for AgTech due to the following driving the changes of the agriculture industry [1]:

- increasing population;
- changes in demographic trends;
- depleting natural resources;
- climate change and;
- consumer dietary demands.

Thus begs the question:

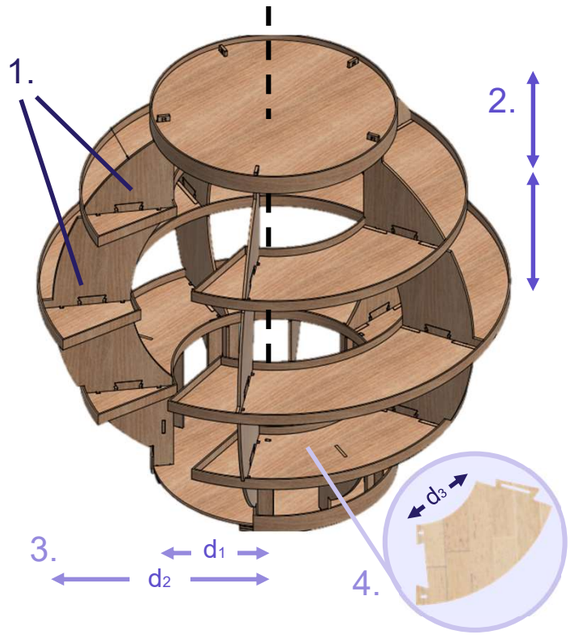
'How can technology be used to improve and assist the agricultural sector?'

BACKGROUND MATERIAL

GROWROOM

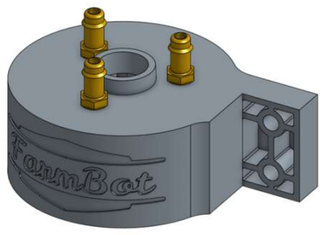
Many have argued that cities will need to produce food internally to respond to this demand, and as such have looked towards the vertical farm concept.

Such systems represent a paradigm shift in farming and food production and offer suitable and efficient methods for city farming by minimizing maintenance and maximizing yield [2]. Thus, the Growroom was created.



FARMBOT

The Farmbot is a current AgTech solution that uses standardized CNC machining techniques and coordinate systems to move to specific locations. The Universal Tool Mount will be adapted for use in this Thesis application.



TASK/AIM

To create a robotic arm for the Growroom that utilizes the UTM of the Farmbot.

KEY CHALLENGES

1. Support Structure of Growroom

Design must be retractable to maneuver in and around the supporting structures.

2. Distance Between Shelves

UTM has an approximate height of 120mm, thus height of arm must be minimized to fit between this.

3. Difference in Shelf Diameter

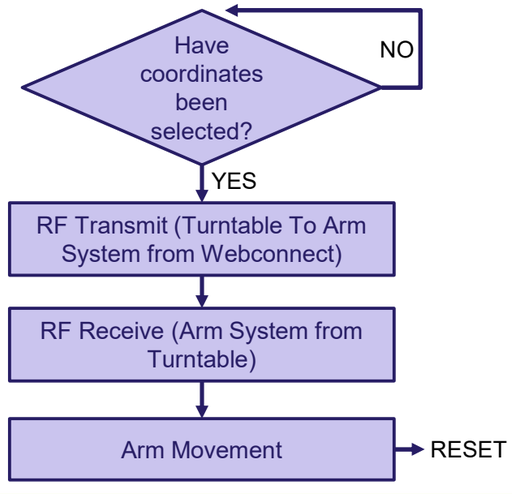
Be retractable (to clear distance d1) and extend to a distance of d2.

4. Size/Shape of Shelves

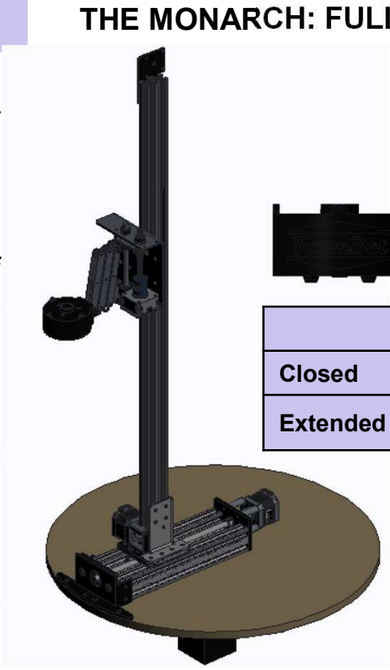
Restricted to a link length of D3 for any potential horizontal fold out arm (i.e. SCARA).

DESIGN AND SOLUTION

HIGH LEVEL SOFTWARE OVERVIEW



THE MONARCH: FULL CAD



	Angle	Reach
Closed	≈10°	≈0.15m
Extended	≈45°	≈0.29m

3 Axes of Movement

1. Turntable
2. C-beam/Arm
3. V-slot

FUTURE IMPROVEMENTS

- Drive train/motor on turntable
- Centering the motor & leadscrew
- Communication protocol revisited
- Website improvement/deployment
- Further waterproofing
- Locknut installation & purchase

REFERENCES

[1] https://home.kpmg/content/dam/kpmg/au/pdf/2016/ powering-growth-realising-potential-agtech-australia.pdf

[2] https://www.mdpi.com/2075-5309/8/2/24/htm