Proposal of FPGA-based Low Cost and Power Efficient Autonomous Fruit Harvester

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Analysis of Existing Solutions

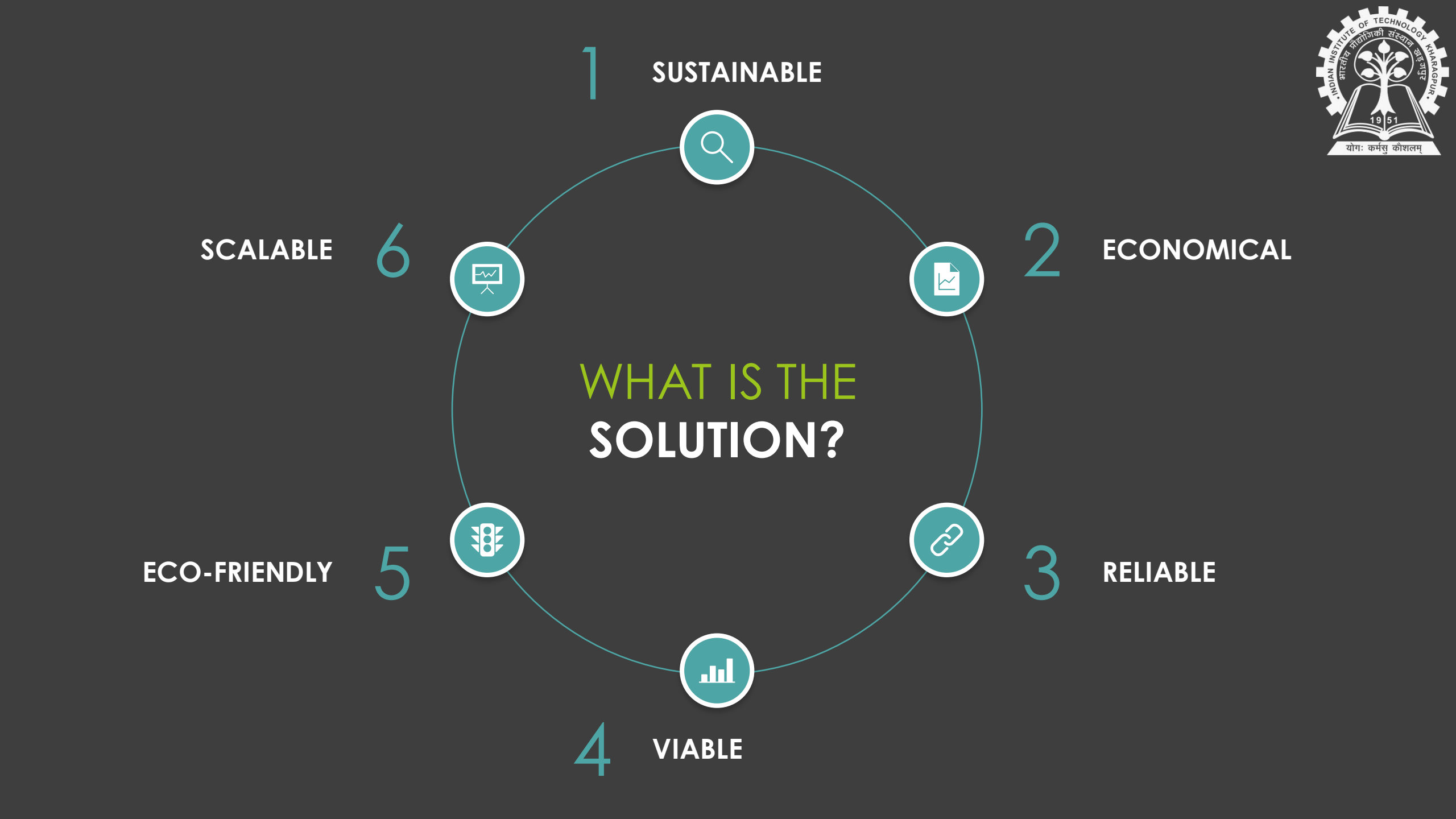
- Heavy Weight
- Too Expensive

- Large Sized
- Manually Operated

- Fuel Consuming
- GHG Emissions

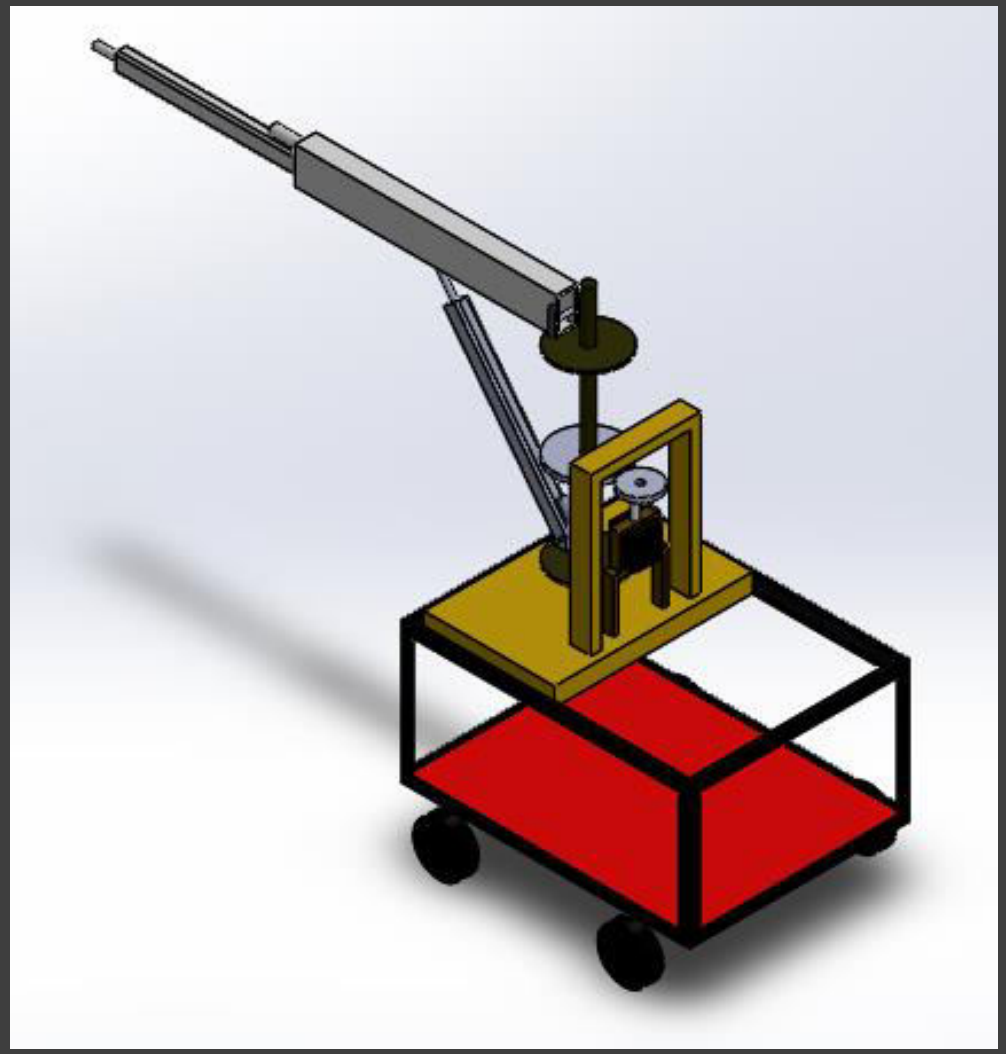
- Toxic Chemicals
- Musculoskeletal Disorders

Some solutions exist but aren’t suitable for the Indian condition

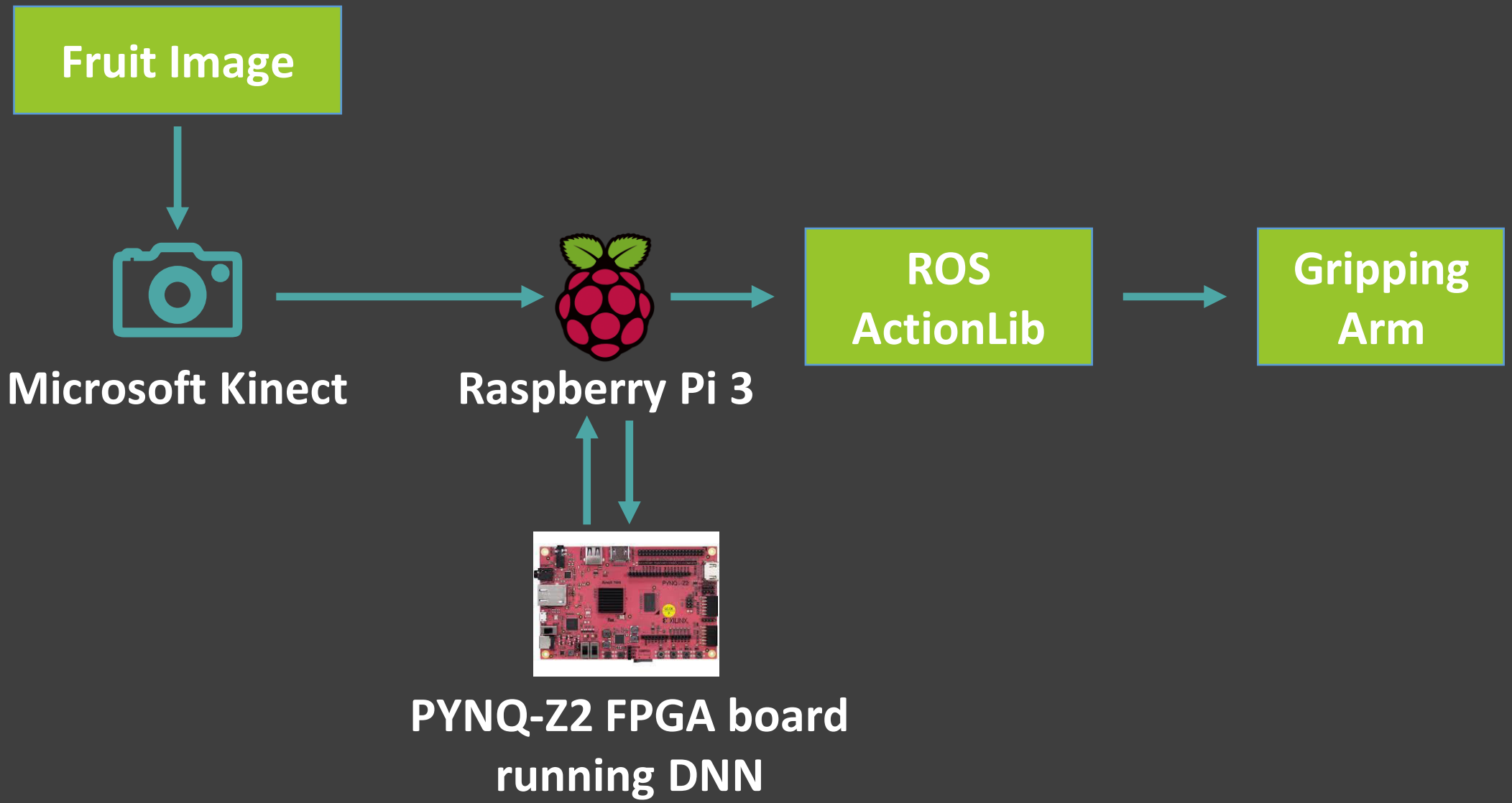

1
SUSTAINABLE
2
ECONOMICAL
3
RELIABLE
4
VIABLE
5
ECO-FRIENDLY
6
SCALABLE
WHAT IS THE
SOLUTION?

The Product

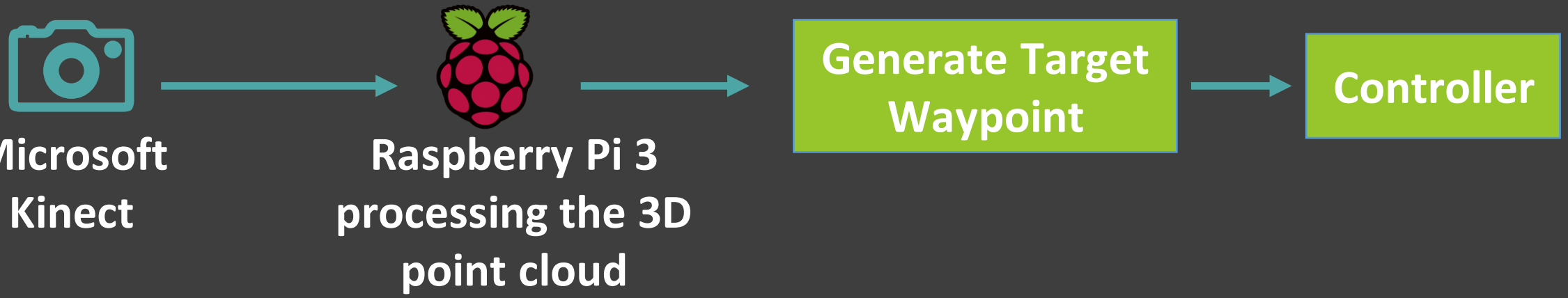
Mechanical Design



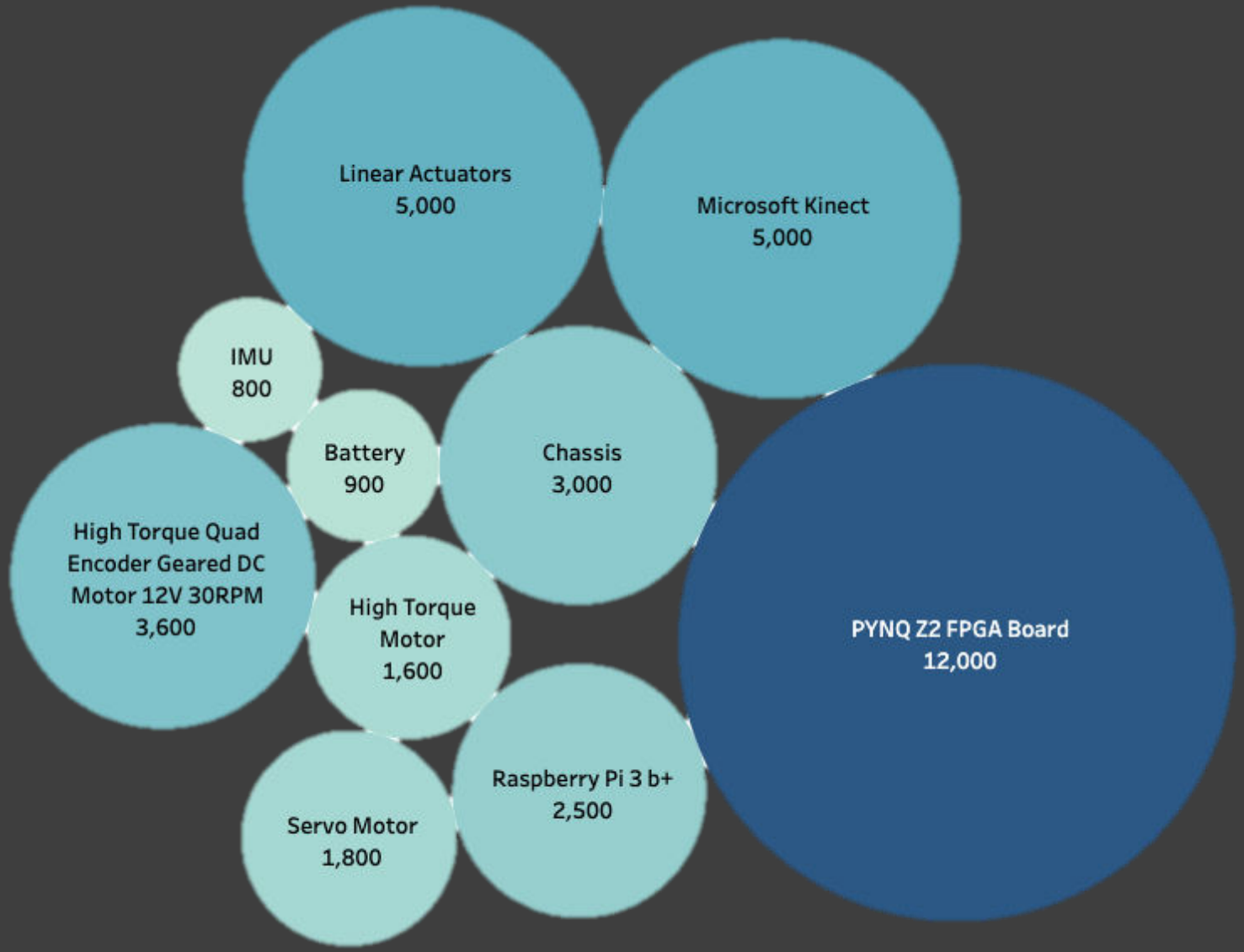
Algorithm: Fruit Plucking



Algorithm: Navigation



Cost Analysis



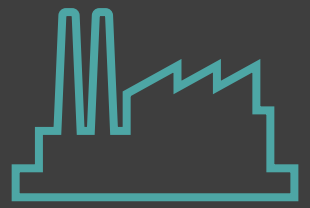
Major Costs

Other parts with minor costing:

- Motor Driver 5A
- Sharp IR sensor
- Pump
- Motor Driver 20 A
- Arduino Mega

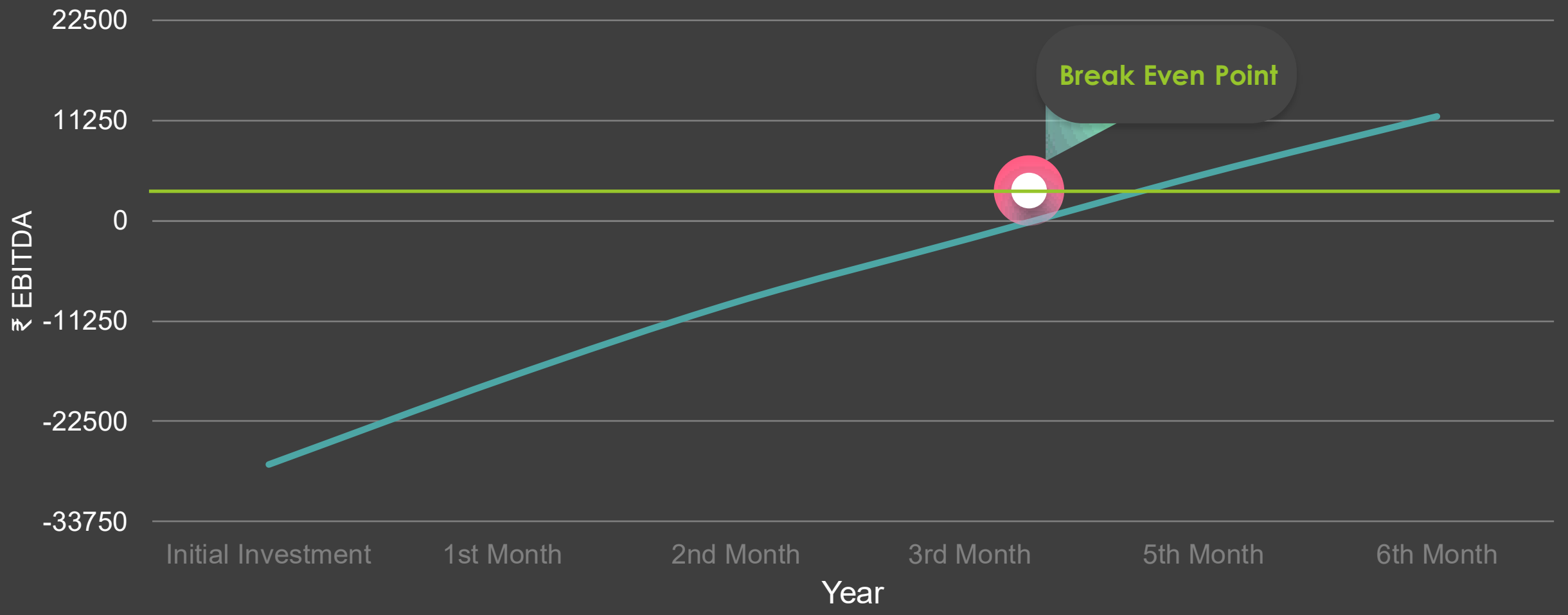
ASSUMPTIONS

- 30 plants in 1 row
- ₹ 350 per day: labor wage
- 10% discount rate



Fruit Plucking

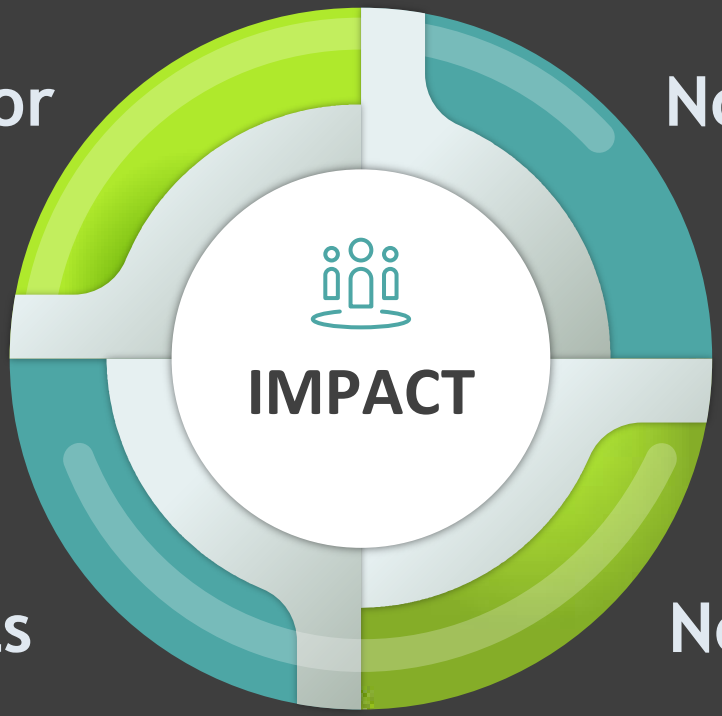
REVENUE REPORT



IMPACT

No shortage of skilled labor

No damage of fruits



No over-ripening of fruits

No high labor costs

FUTURE ASPECTS

- Skid drive instead of 4-W differential drive
- Threshold pressure sensor for different kind of fruits
- Height can be extended to pluck fruits from trees
- Solar powered for self sustainable & long run system

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ANNEXURE

Components	Quantity	Price
High Torque Motor	2	1600
High Torque Quad Encoder Geared DC Motor 12V 30RPM	2	3600
Chassi	1	3000
Servo Motor	5	1800
Linear Actuators	2	5000
Arduino Mega	1	600
Rassberry Pi 3 b+	1	2,500
Microsoft Kinect	1	5000
Sharp IR sensor	1	400
IMU	1	800
PYNQ-Z2 FPGA Board	1	13000

THANK YOU

We are open for the questions!