Automation with HORST600
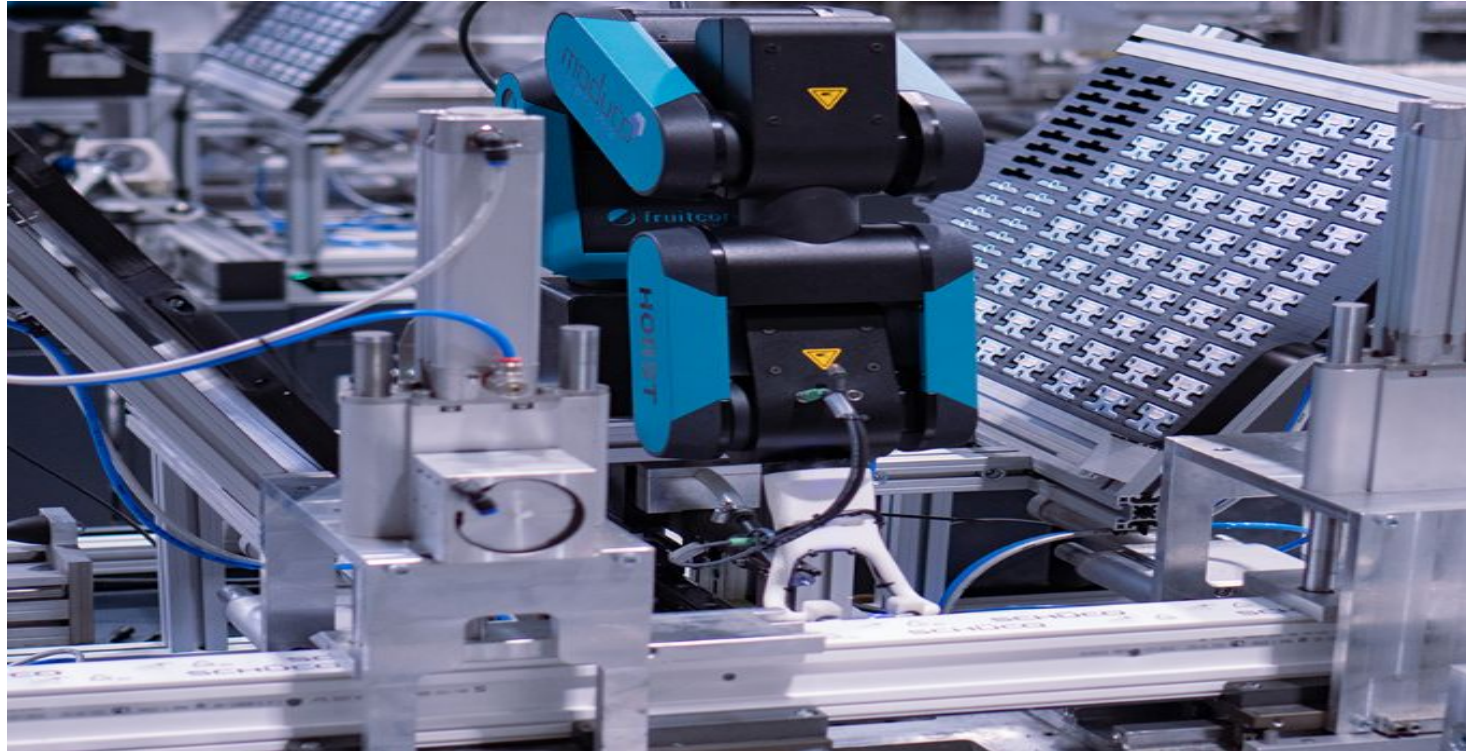
History Of Industrial Automation

18th Century — 19th Century — 20th Century — Today

Industry 1.0
Mechanical production equipment powered by steam

Industry 2.0
Mass production assembly lines requiring labour and electrical energy

Industry 3.0
Automated production using electronics and IT

Industry 4.0
Intelligent production incorporated with IoT, cloud technology & big data
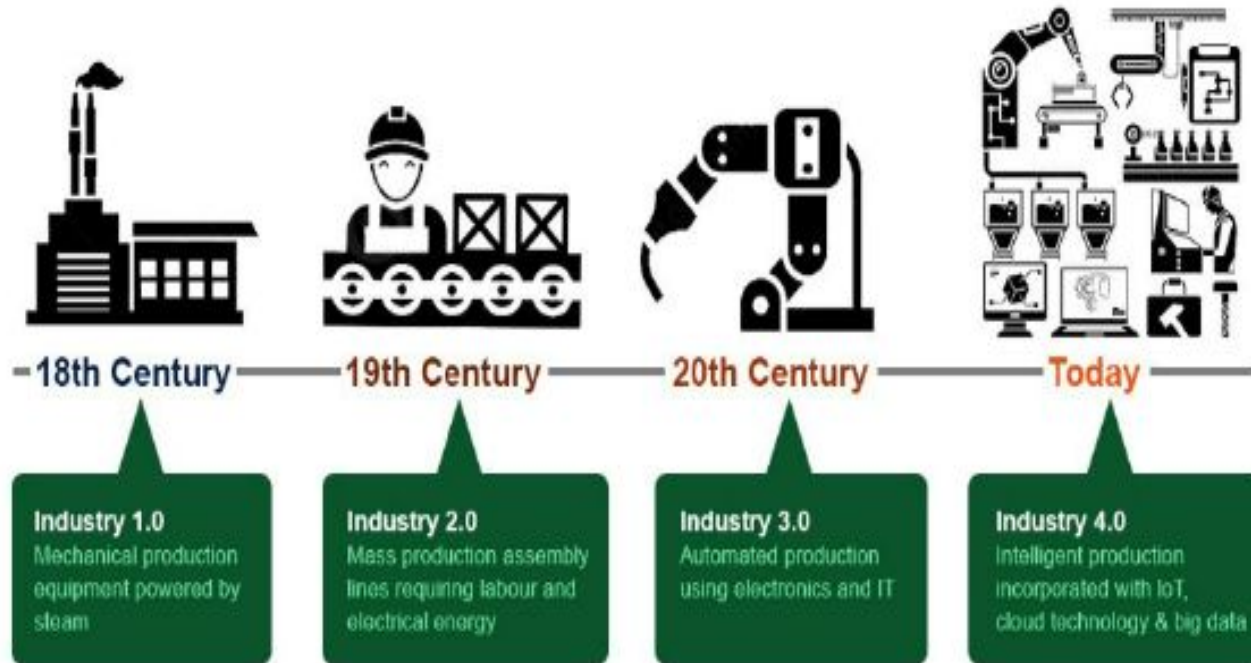
Industrial Robot

➔ Types of robots
● Cartesian(move on XYZ coordinate)
● Poly-articulated(6 axes and Max 10 Joints)

➔ 4 Main Components Poly-articulated Robot
● Manipulators(joints or linkage)
● End Effectors(end mounted like grippers)
● Feedback Devices(state check,like sensors)
● Controllers(Computer with hardware + software)

➔ 4 Biggest Manufacturer
● ABB,KUKA,FANUC,Yaskawa

Industrial Robot Arm(2)

➔ Purpose of Robot arm
● Palletizing
● Pick & place
● Material handling
● Assembly and mounting

➔ Advantages
● Improve output
● Maximization of production
● High repeatability precision & consistency rate
● Reduction of risk for employee
● Improve working condition

➔ Criteria for selection
● The load & required reach
● Task to be automated & cycle time
● The working environment

Fruitcore Robotics

➔ Origin:Founded in 2017 based in Germany

➔ Focus:Industrial automation solution

➔ Portfolio:HORST 600,1000,1400 &1500

➔ Goal:Best return-on-investment

➔ Services:predictive Maintenance,online back-up and code optimisation

➔ HORST robot system components
● Robot
● horstControl Cabinet (Digital I/O)
● Horst Panel
● Mobile Roboter Basis
● horstFX software
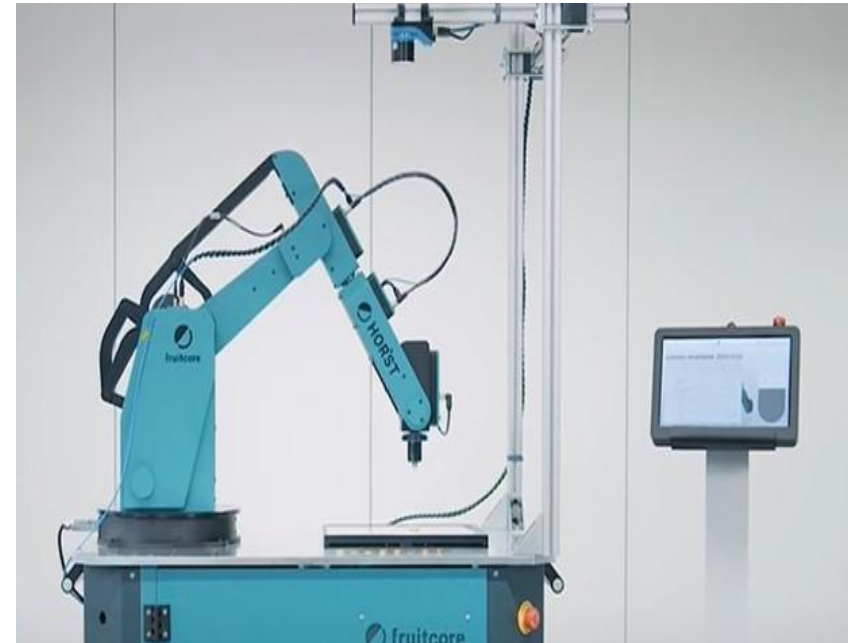
Horst 600

➔ Design for
● Load & unload CNC Machine
● Pick and place Task

➔ Load: 3Kg

➔ Repetition accuracy:+/-0.05mm
➔ Reach:584 mm

➔ Axes:6 with high acceleration rate(for reduce cycle time)

➔ Programming:Graphical & Textual method

Axis 4
Axis 3
Axis 5
Axis 6
Axis 2
Axis 1
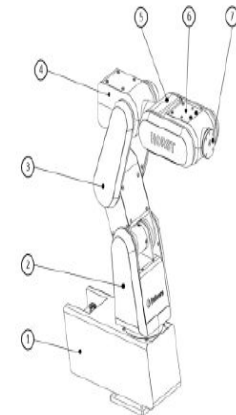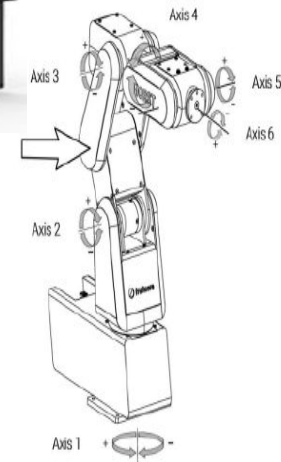
1 Base – fixed part with floor flange
2 Base – moving part
3 Swivel arm
4 Support arm 1
5 Support arm 2
6 Support arm 3
7 Tool flange

Illustration

Example 1:Workpiece Machining
- Configuration(set end effector,max carry weight,environment)
- Initialisation & Start cutting tool
- Define all waypoints & setting operation speed
- Stop cutting tool

Example 2:Palletizing
- Configuration(set end effector,max carry weight,environment)
- Initialisation & opening of the gripper
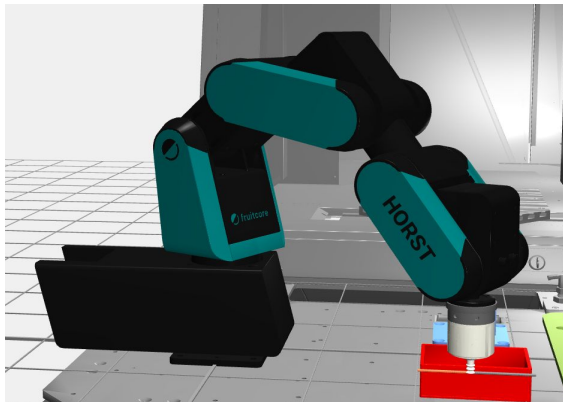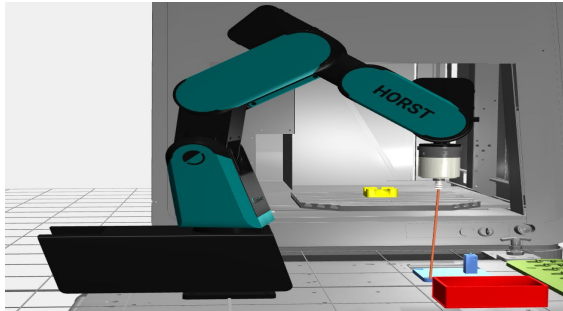- Palette creation(define 4 corners of palette ,drop spot & approach/departure point)
- Loop

Example 3:Writting
- Configuration(set end effector,max carry weight,environment)
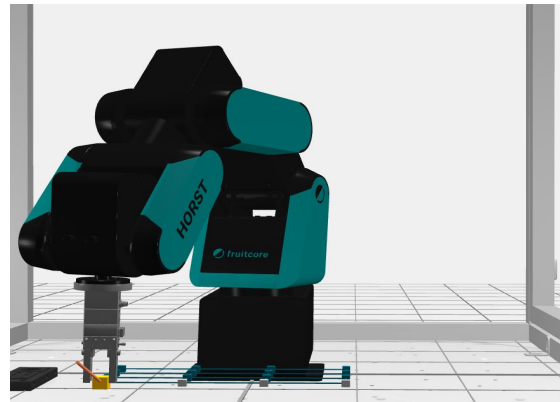- Use concatenate function
- Define SplinePath and CirclePath
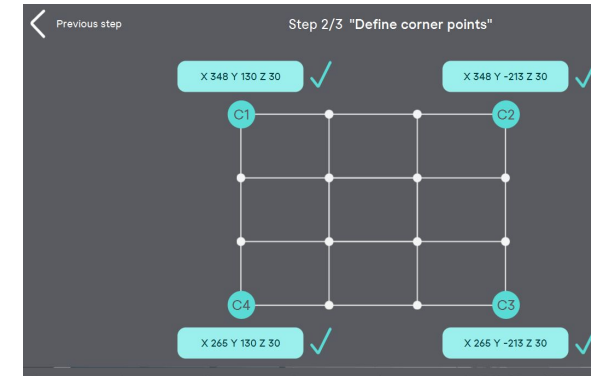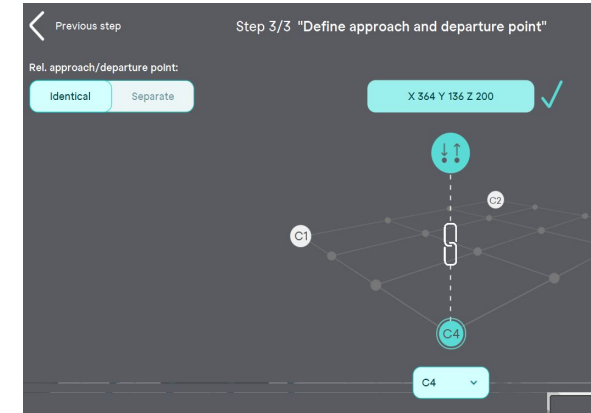
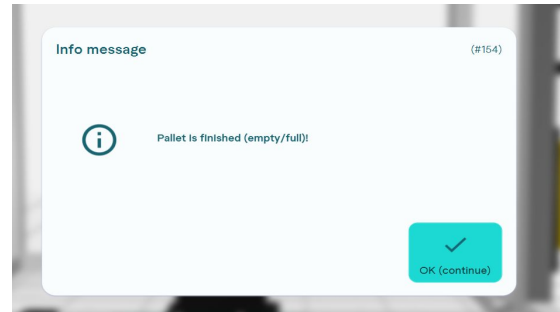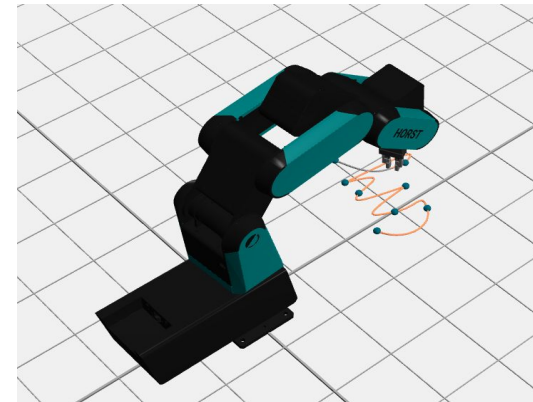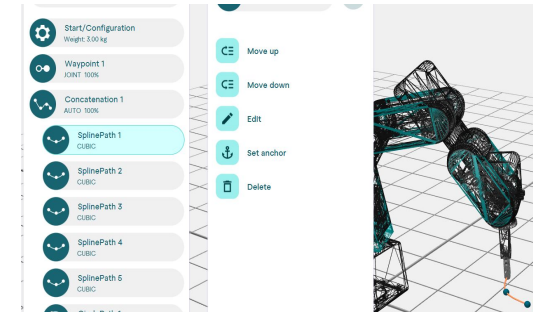# Results

Example 1

Example 2

Example 3

Challenges

➔   Example 1
●   No appropriate cutting tool available

➔   Example 2
●   Setting up the palette
●   Initialising end effector
●   Dimension of Palette out of work space
●   Program crashed at 12th palette point

➔   Example 3
●   For each spline simulate before moving to next step
●   Delete and redefine SplinePath not looking as desired
●   Start point of new SplinePath is end point of previous one

➔   Lack of resources

➔   No real time feedback from end effector

Conclusion & Future Work

➔ IOT

➔ COBOT