Registration No.: MEC1920239

Intermediate report

On

IIOT BASED INTEGRATED PACKAGING SYSTEM

Submitted By

Team Innovators

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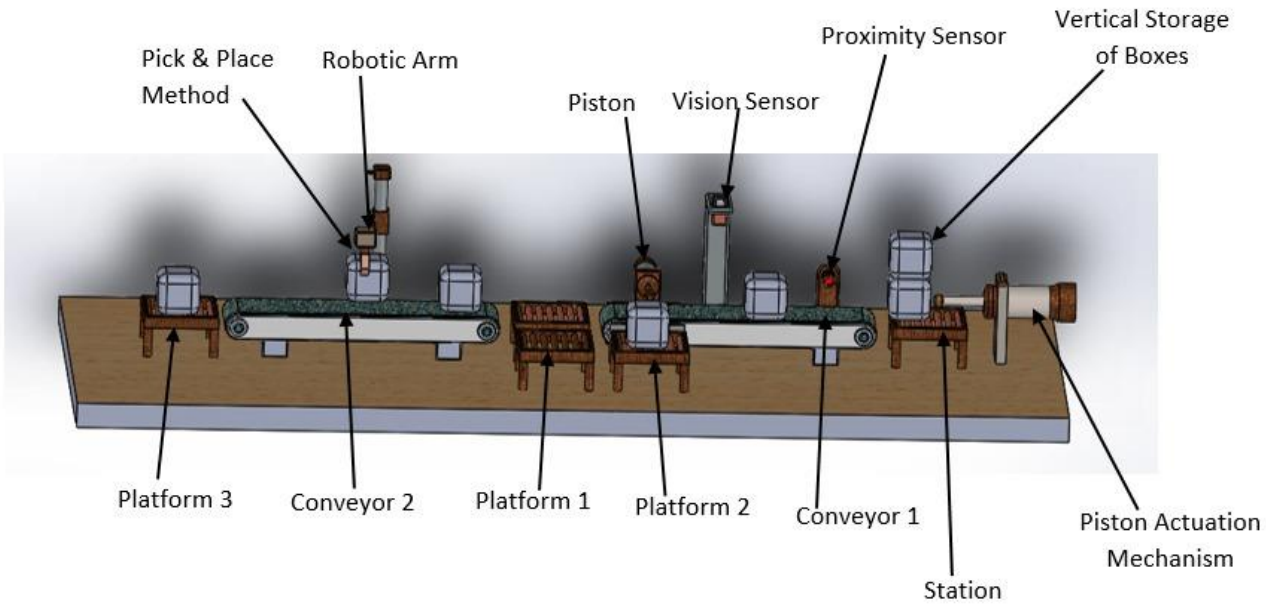
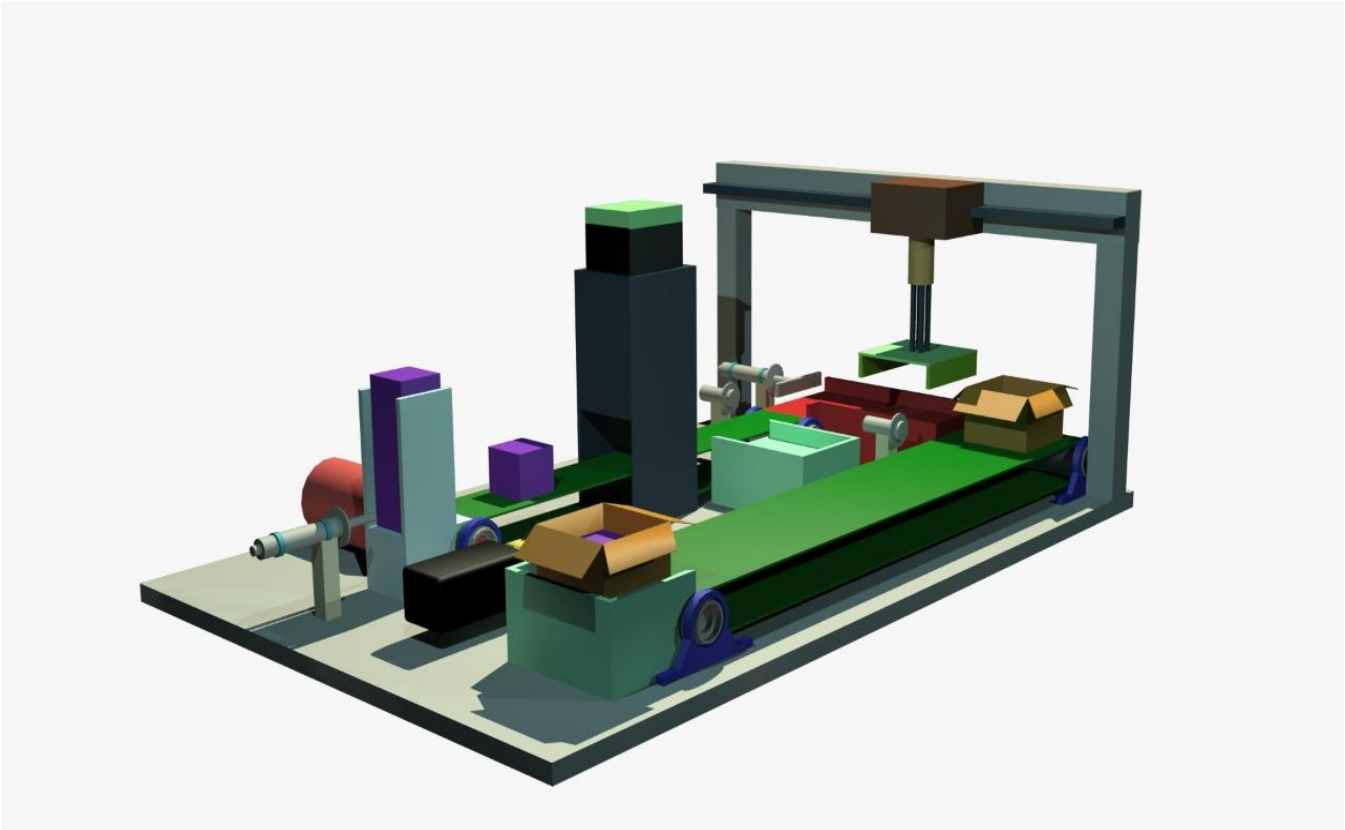
Faculty Advisor Name – Mr. Rahul Dixit

College Name - Ajay Kumar Garg Engineering College, Ghaziabad

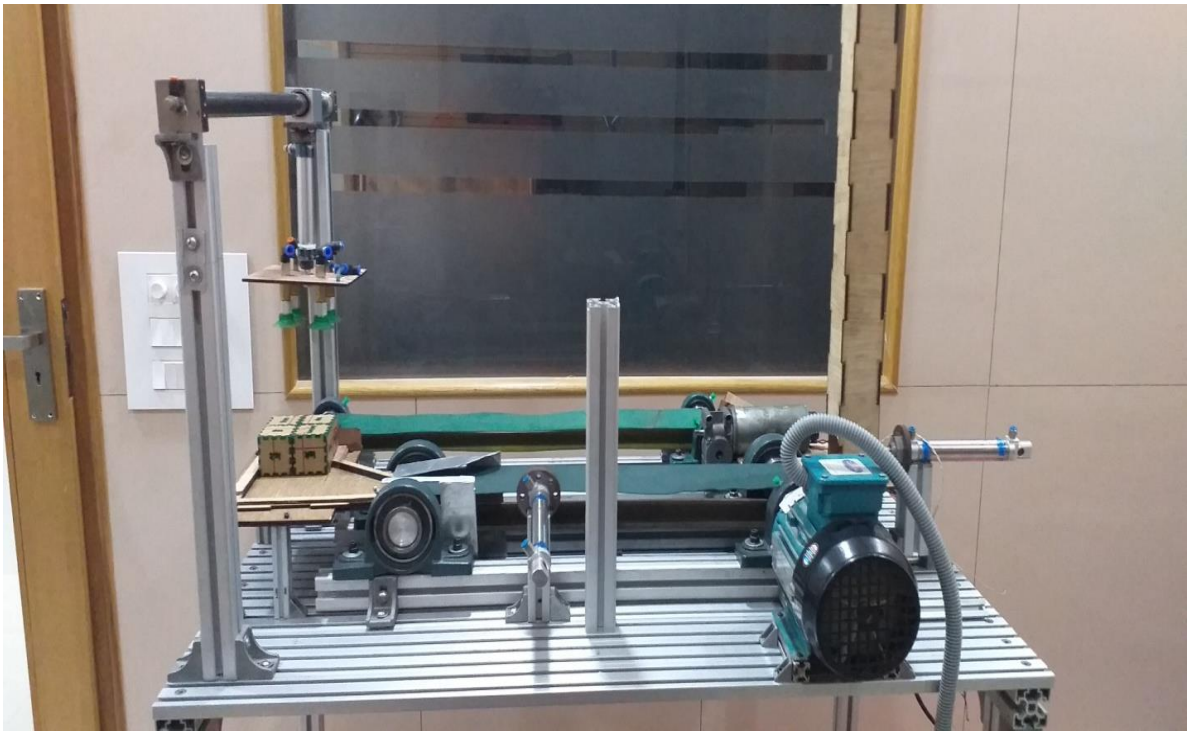
This is our previous design of prototype which is given inside proposal during registration :



This is our modified Computer Aided design of prototype currently implement in process :



Progressive picture of prototype



Proposed Work:

The basic idea is to implement the concept of Industry 4.0 in manufacturing and making system smarter and more autonomous with the help of Mitsubishi's FA products and e & eco f@ctory concept.

We have taken an example of small prototype plant in which there is a conveyor mechanism being controlled by a 3 phase induction motor being driven and control by VFD inverter of Mitsubishi. At centre of conveyor, there will be an industrial vision sensor which is an optical sensor used for enhanced image processing to detect different category of product on a single conveyor. This conveyor will be suitable to inspect wide range of products. With the help of GOT we can select the category of product to be inspected after that it will be inspected and then collected in a platform having boxes as per user demand. When required threshold quantity of product is reached, 2 axis pick and place mechanism comes and place boxes into another platform on its specified location for further processing of packaging.

By implementation of industrial IOT we will able to supervise and do settings of a web server application in which server gives command to the client and vice versa operate through IOT. It will support basic diagnosis and addressing of various slaves connected.

Hence it is justify the concept of “Smart Manufacturing for Better Tomorrow”.

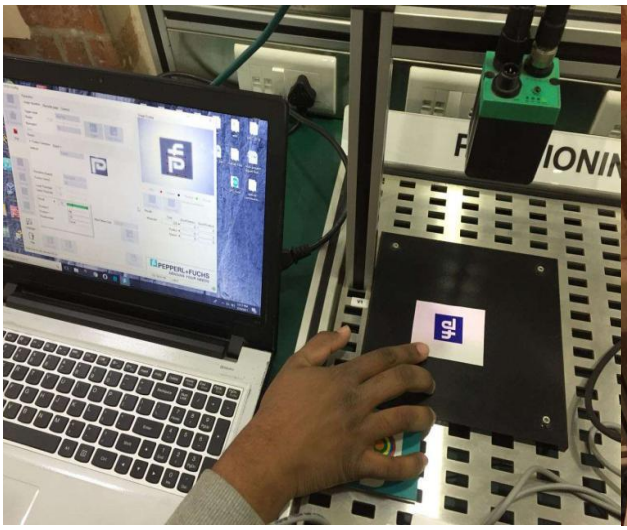
Project Progress Status:-

1. System Designing and fabrication:

Mechanical fabrication has been imitated and in progress. We have ordered Aluminium Profiles and Electrical Control panel box and trying our best to give it an industrial standard look. Also we are using various tools and machine like Vinyl Cutter, laser cutter, 3D printer for various task supported by AKGEC FAB Lab. Design of conveyor is done and in phase of purchasing same case apply with single axis robot (linear actuator). B.O.M. has been passed from college and requisite cash has also been given to us for local purchase.

2. Vision Sensor Testing and Interfacing with PLC

We are using vision sensor of Pepperl + Fuchs which is based on enhanced image processing technology based optical sensor. Its software testing and interfacing with PLC has been done.



Vision Configuration

Interfacing with PLC

3. Mitsubishi FA Hardware Training

We internally and externally performed PLC and HMI training in college as well as gurgaon and that of VFD has been done from MEI Gurgaon only. Now only Servo Training is remaining.

Project Progress Report Chart

Sr. No.	Activity Details	Activity Schedule	Responsible Person
1	Online Project Submission for ME Cup 2020	1st sept 2019 – 15th sept 2019	Mr. Anshul Varshney
2	Result announced	26th sept 2019	Team Innovator
3	Project start with proper discussion related to task	28th sept 2019	Team Innovator
4	Preparation of Mechanical design in 3-dimensional.	5th oct 2019	Mr.Faizan Ahmed

5.	Starting work on fabrication	7th oct 2019	Mr.Faizan Ahmed
6.	Arrangement of material and tools required for fabrication	7th oct 2019	Mr.Anshul and Shivendra
7.	Start study on plc with software installation	8th oct 2019	Mr.Anshul Varshney
8.	Start study on hmi with software installation	8th oct 2019	Mr.Shivendra Shukla
9.	Installation of vision software	2nd nov 2019	Mr.Shrameshwar Chaudhary
10.	Testing of vision sensor	4th nov 2019	Mr.Shrameshwar
11.	Material received from Mitsubishi (gurugram)	26th nov 2019	Team Members
12.	Training of VFD	26th nov 2019	Team Members
13.	Testing of AC motor by VFD	28th nov 2019	Mr.Shrameshwar and Anshul
14.	Motor and electrical wiring arrangement	2th dec 2019	Mr.Shivendra and Anshul
15	Raspberry pi connection with plc for IOT	15th dec 2019	Mr.Anshul Varshney
16	Server on raspberry pi	16th dec 2019	Mr.Anshul Varshney
17	Circuit diagram of Control panel of electric connection	Will be in progress	Mr.Anshul and Shivendra
18	Web designing and web application for remote user	Will be in progress	Mr.Anshul and Faizan Ahmed
19	Completion of training on plc	26th dec 2019	Mr.Anshul and Shrameshwar
20	Completion of training on hmi	27th dec.2019	Mr.Anshul and Shrameshwar

Bill of Material of Proposed Project Status

Sr.No.	Item Name	Availability of material	Report
1.	FX5U-32MT/ES PLC	Mitsubishi (gurugram)	Received on 26th nov 2019. and implement on project
2.	GS-2107-WTBD	Mitsubishi (gurugram)	Received on 26th nov 2019. and implement on project.
3.	FR-D720S-025-EC	Mitsubishi	Received on 26th nov

		(gurugram)	2019. and implement on project
4.	MCBs	Mitsubishi (gurugram)	Received on 26th nov 2019. and implement on project.
5.	Vision sensor (VOS310-100)	College	Tested by Shrameshwar chaudhary.
6.	Proximity sensor	Local vendor	Tested by Anshul varshney.
7.	Piston	College	Tested by Anshul varshney.
8.	DCV	Local vendor	Tested by Anshul varshney
9.	Aluminium material for fabrication	College	Tested by Faizan Ahmed.
10.	Raspberry pi and router	Local vendor (purchased)	Tested by Anshul varshney.
11.	Material of fabricating Conveyor system	Local vendor	Received and implement on project
12.	Electric control system	Local vendor	Will be available soon.
13.	Air compressor	College	Received and implement on prototype .
14.	Pneumatic connection	Local vendor	Tested by Shivendra shukla.

Acknowledgement and Commitments:

We would like to express our special thanks of gratitude to our mentor Ms. Esha Varshney and Faculty Advisor Mr. Rahul Dixit for conducting trainings and helping us to understand various hardware and software required.

We would also like to thank or Director Dr. RK Agarwal and Prof Ashiv Shah (HOD, CORE) for their extended support and also team of Mitsubishi Electric Cup for providing us the such opportunity to take part in this competition.

We are committed to complete the project within given time schedule and as per our proposed layout. We are also committed to work with utmost zeal and

determination to obtain positive results and learn various aspects of Factory Automation.

Some technical support required from MEI mentor during event :

1.Requirement of Wifi connection..

2.Requirement of pneumatic supply.

kindly acknowledge us if it is possible.

Conclusion –

Our project work is running in good state. After completion of our end semester exam scheduled from 10th Dec 2019 – 10th January 2020, hardware fabrication of the project will be almost completing before 10 January we will be completing the rest of software and finishing part. We are extensively utilising the features of FX5U PLC and other FA Hardware by using Rs-485 MODBUS, TCP/IP Socket communication and MOBUS/TCP using predefined protocol support function so that whole system is on a common network and various devices are communicating with each other. This is INDUSTRY 4.0 or e-F@ctory which we are trying to implement. Challenge is quite difficult but we are working on it and soon it will get completed.

Thanks..