Project Report

Automation

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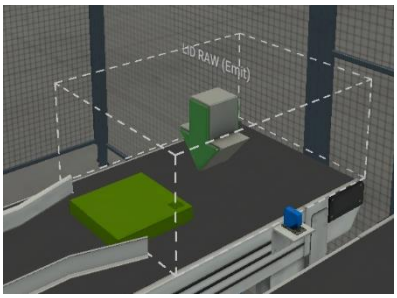
Introduction:

- Our project description is a Design of full functioning production line on a simulation platform in order to mimic the considerations coupled with real industrial processes.
- Using Siemens TIA portal software in order to control the simulated production line while incorporating the studied functions in the design process of such application.
- Designing a suitable HMI module in order to visualize the various states of the simulated production line.

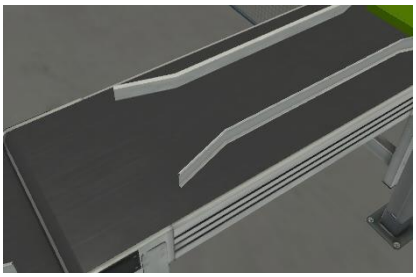
Production Line Components:

In this production line we used some of components which will be discussed :

- Emitter



- Conveyor



- pick up and place

Feeding and excess raw part removal:

It is the first stage in our production line, when we press start button; emitter produce random raw materials (blue and green) into a conveyor which move raw material to end of conveyor.

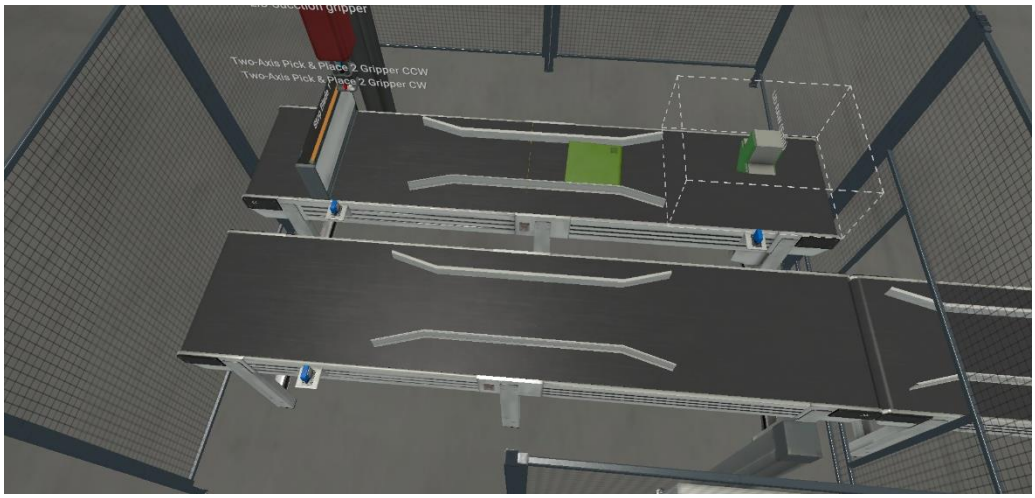


Figure 1 : First raw material has been emitted

At the end of conveyor there is a sensor whose application to detect if there is raw material or no. If there is raw material, then pick up and place robot role begin and produce another raw material at the beginning and the cycle keep going.

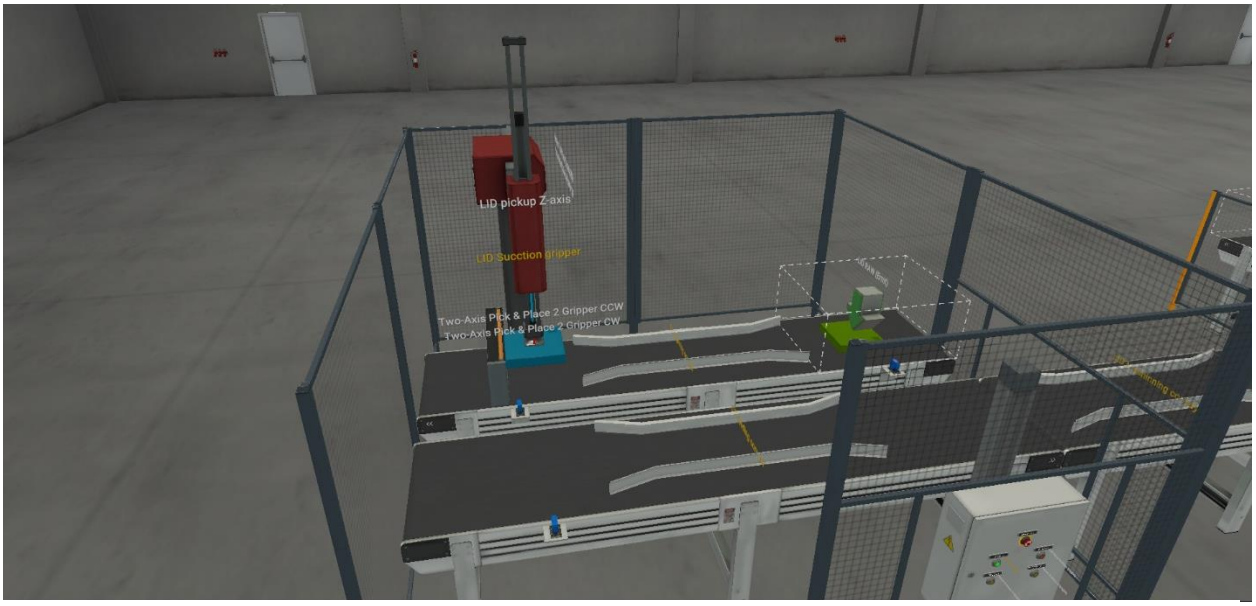


Figure 2 : the conveyor stops when two raw at 2 side

Pick up and place robot start to move through raw material and pick up it from beginning conveyor to feeding conveyor to continue process after that another raw material go to the pickup robot. If there two parts at the beginning and at the end of beginning conveyer; the conveyer will stop until the robot pick up the raw material. Then after that the conveyer will start to begin the cycle again.

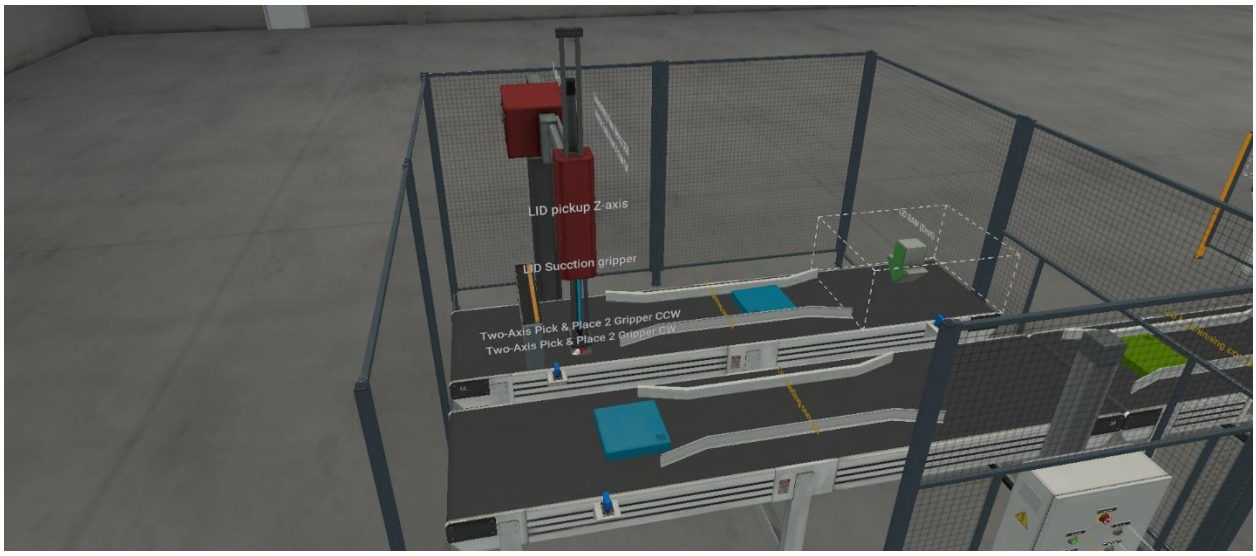


Figure 4 the raw has been transferred

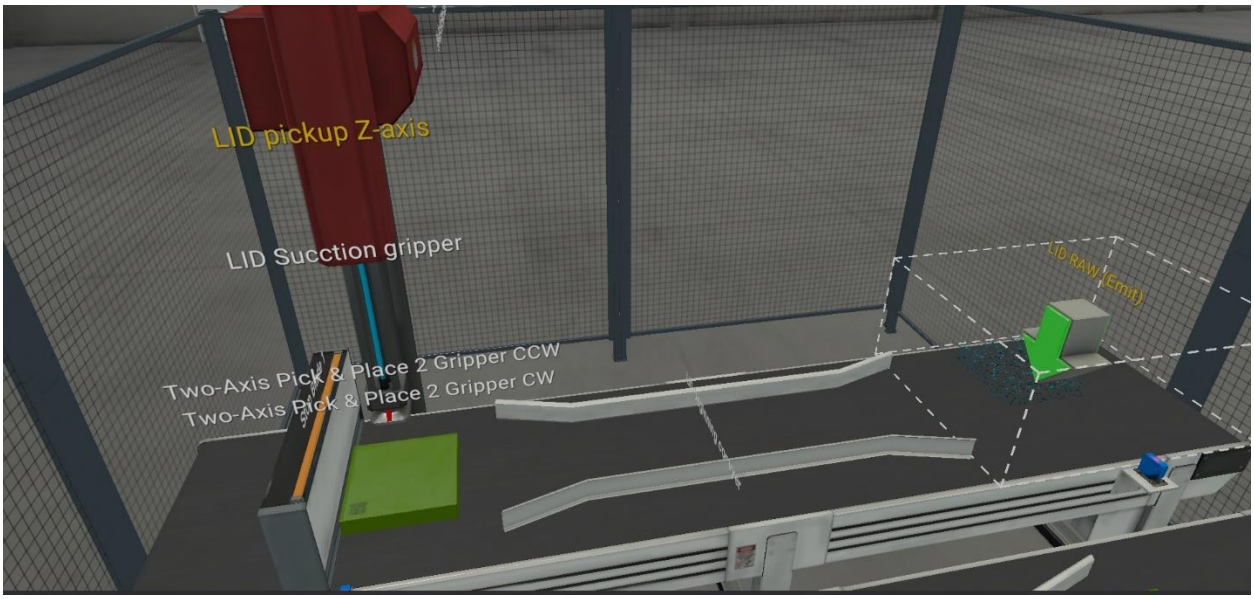


Figure 3 conveyer has been stopped as there two materials on same belt

After the feeding station, excess raw removal station will work if specific number of blue and green raw material have passed, it starts to remove the excess raw material by mean of hydraulic piston to return it to the storage to reduce wastes and continue production. there's a led that indicate if the counter has reached the specific value or not, if led it on then the counter has reached the

Figure 6 : the counter hasn't reached desired value

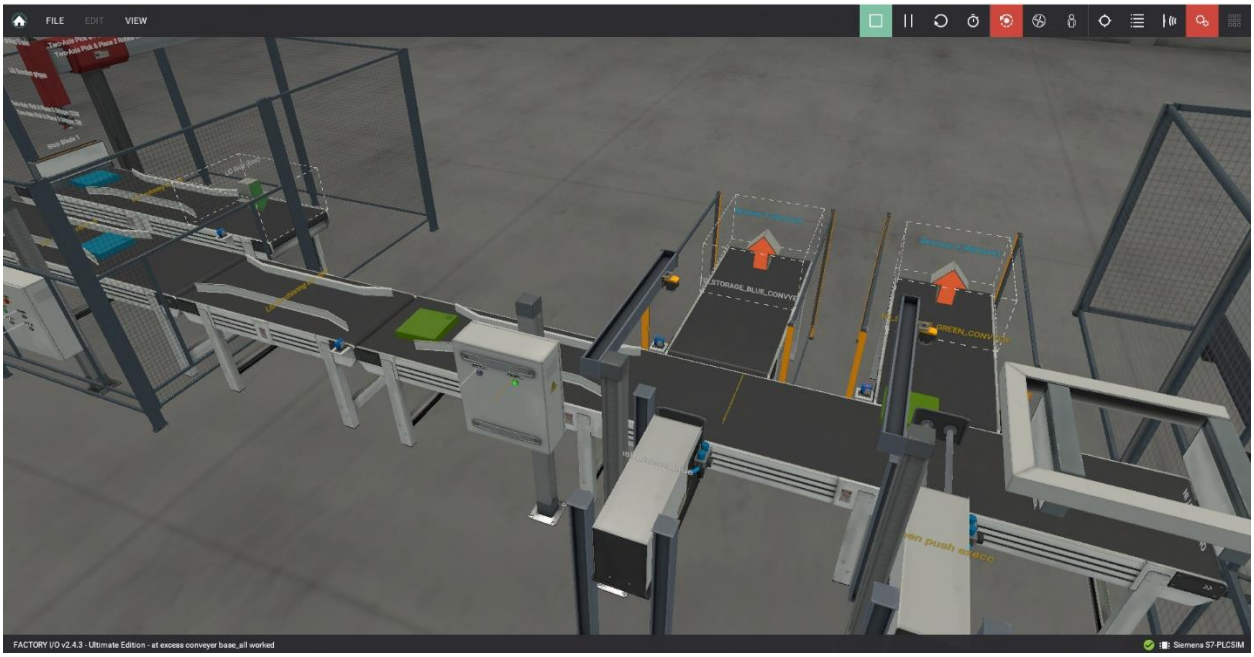


Figure 5 : the counter has reached and remove excess part

Note: At figure 5 the green raw has reached to desired value the begin to push it to storage has reached the specified value while blue not has reached yet.

Machining:

Machining is a station used to manufacture lids and bases from raw materials. Articulated robot waits for raw material to be placed at the entry bay.

Figure 7 : machining center

When new material is detected, it stops the previous station and close 2 doors that's its mission to protect from stacking of parts into CNC. Until it is loaded into the CNC machine which will start manufacturing an item. After the part has been successfully loaded into CNC the door will be opened and the previous station begin to work again.

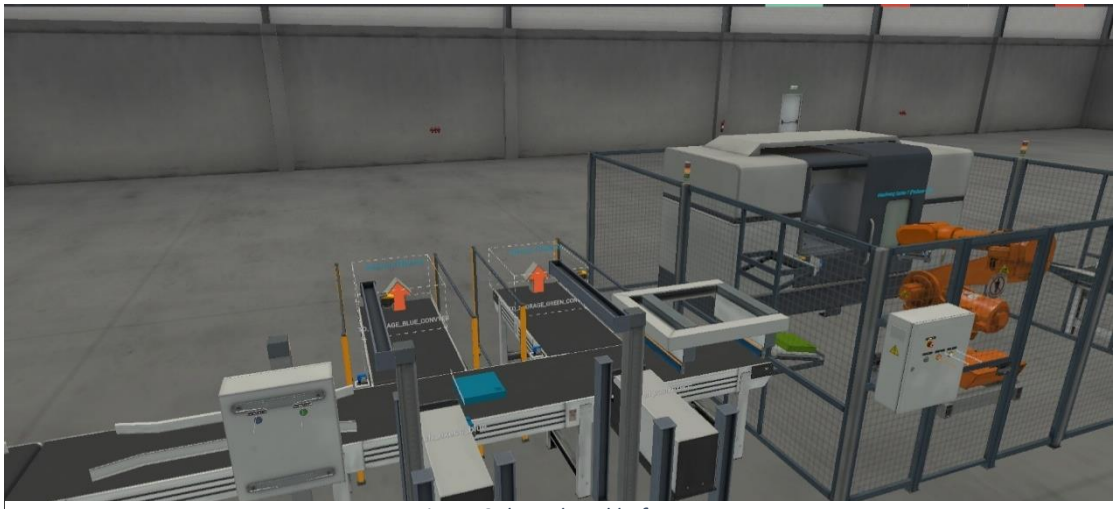
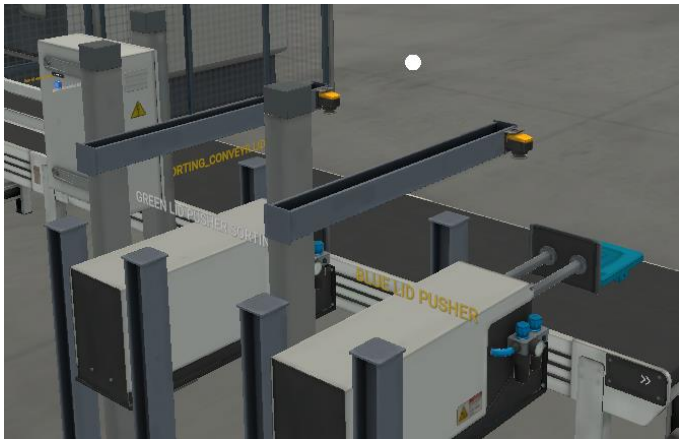


Figure 8 door closed befor cnc

Figure 9 : the part has been successfully loaded and cycle begin again

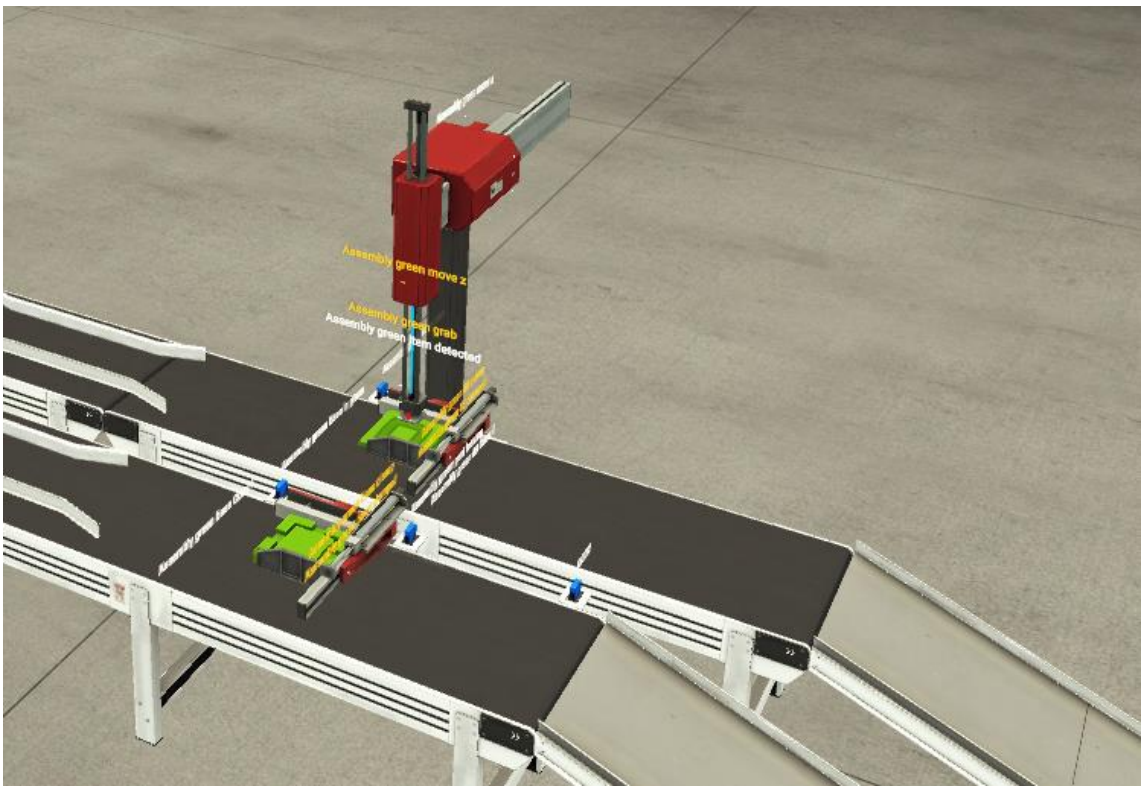
Sorting:

In this stage we Sort the products into designated removers according to their color and there a sorting blue and green led that worked only when the pusher works. If it pushes green, then green led will works while if the blue is being pushed the blue led will be operated.

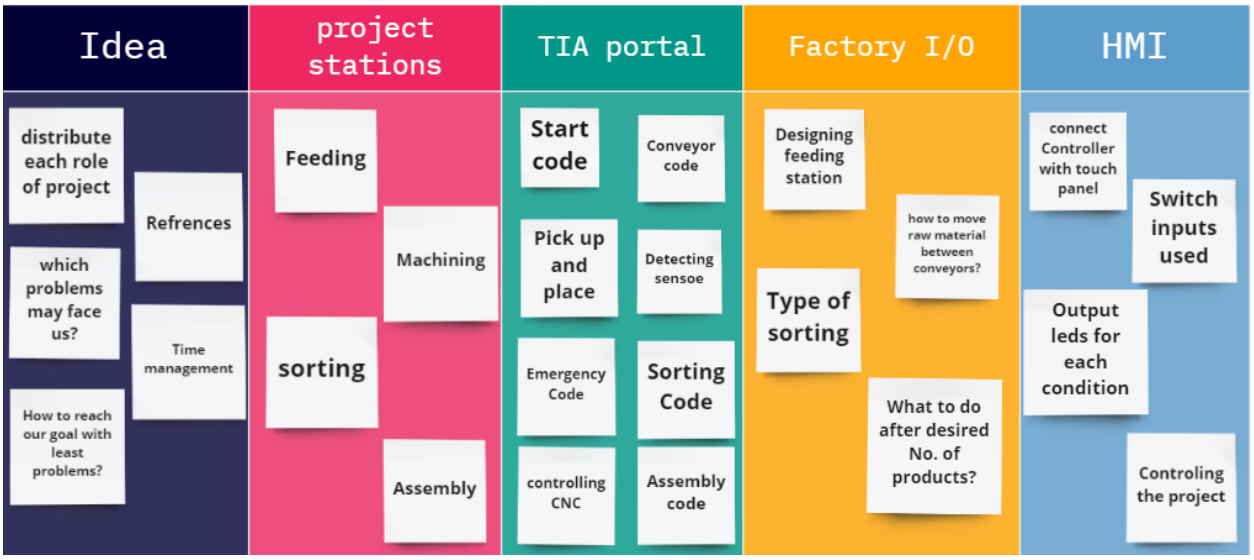


Assembly:

This part is being used to assemble Lids on Bases or pick and place items from one place to another by using pick up and place robot and use clamping to ensure that the there's no residual movement of parts while assembling and if we reached the required number of assembled products of both colors, it would turn off all of production.



Work Flow:


Idea
distribute each role of project
Refrences
which problems may face us?
Time management
How to reach our goal with least problems?
project stations
Feeding
Machining
sorting
Assembly
TIA portal
Start code
Conveyor code
Pick up and place
Detecting sensoe
Emergency Code
Sorting Code
controlling CNC
Assembly code
Factory I/O
Designing feeding station
how to move raw material between conveyors?
Type of sorting
What to do after desired No. of products?
HMI
connect Controller with touch panel
Switch inputs used
Output leds for each condition
Controling the project