

Shrimp-IR/Automization Team „NEXT Steps” (as of 2024/07/08)

Dear Team,

this is to brief you on the activities and outcome for the month of July.

A: Mobile PU-Demonstrator

At the end of July, I will travel to the client to demonstrate the “Process-Unit”. This will require making a new demonstrator unit, which actually contains only one new function, the “suction cleaning”, but in order to effectively demonstrate this, it must include some improved versions of existing functions.

More importantly, I need to be able to control the actuators with my own laptop or whatever computer I will bring along for this purpose. I therefore require programming a “manual control” surface.

Description of the demonstrator

1. No image recognition, no linear drive
2. updated version of the arm: I am building a complete new and improved instance, the existing one stays mounted on the linear drive for now. In August, this new version will be swapped and mounted onto the linear drive. This new version of the arm will still include the same 2 servos (1 big for raiding arm, 1 small for closing the clamps)
3. updated version of the Head-Cut Unit “HCU”: it will contain the bigger servo (“HCU-servo) but mostly stays the same.
4. updated version of shrimp clamps on the Process Unit: they will receive a shrimp “by hand” but they are opened by the HCU-servo (no additional actuator required)
5. updated version of the chin-cut unit: I will include a flywheel
6. updated version of the support structure: basically the same as before, but accommodating the changed chin-cut-unit. MAYBE I will make a lower version, because MAYBE the “scanning angle” and “cutting angle” will be lower to minimize travelling times.

B: Moving FU-TU handover

I would like you to work on how the TU-arm picks up the shrimp from the MOVING Feeder Belt (FU)

My proposed technical concept:

- A. There is a small magnet on each clamp, positioned to that they have a higher position when the clamp is closed (likely: carries shrimp) and a lower position when opened (which PROBABLY means “empty clamp”)
- B. There are two series of reed-sensors installed at fixed position(s) on the side of the belt, in an area before the “Hand-over Zone”. Each “series” has at least 3 sensors at the same pitch distance as the 3 clamps on the belt (1 inch=25.4mm). The “high series” will be triggered by the closed clamp magnets, the “low series”, located exactly under the “high series” will be triggered by the opened clamp magnets. So, the “low series” purpose is for validation of the “high series” readings AND for detecting empty clamps.

- C. We can call this the “Static Reed Array”. Already a series of only 3 sensors can determine the feeder-belt velocity. More contacts in the series would however probably increase the reliability of the reading.
- D. The controller can now make the TU-arm lower and start the X-motion at exactly the right time and velocity.
- E. It will probably increase safety if a second “Mobile Reed Array” is mounted on the base (non-lifting) of the arm.

The activities

- 1. We should very soon meet, online possible, so that I can show you the mechanical layout of magnets and reed arrays. We then choose the most appropriate sensor for the Array (distance to magnet, availability, cost)
- 2. We order the sensors.
- 3. I design and manufacture the array housing
- 4. you plan I/Os, possibly additional Arduinos for the Arrays etc.
- 5. we plan relative positioning of the Static and Mobile Reed Arrays
- 6. programming
- 7. physical testing. I think we might be able to use Ruj’s belt as a “Feeder-Belt Dummy”

C: Further develop Image recognition

- speed of detection
- strategy of fast positioning
- strategy of positioning in case of “bad recognition”
- error routines implementation

Overall, I would like to continuously progress all tasks A, B and C simultaneously and be able to demonstrate whatever progress we can make at the end of July.