Project Proposal – Internship

Version: 7
Period: Spring 2023

Goal and use of this document

The proposal is used to describe a practical research internship which is carried out in semester 5 of the study program. Through this form the student requests approval for the assignment from the internship coordinator. This document is also used to receive feedback from client and coordinator and should lead to all three parties having one single view of the assignment. The student is responsible for writing the content, based on input of the organization and feedback of the coordinator. This document may be written in Dutch.

Student details

Student number	: 4471709
First name + Family name	: Johnson Domacasse
Location	: Eindhoven
Profile Semester 3	: Technology
Specialisation Semester 4	: Smart Industry
Internship choice	: Smart Industry
Dutch-speaking?	: Yes

Internship period

Start date	: 02/09/2024 (official start date: Monday FHICT-week 1)
End date	: 24/01/2025 (official end date: Friday FHICT-week 18)

Organisation details

Name	: Fontys University of Applied Sciences (Engineering)
Visiting address	: BIC 1,
Zipcode + City + Country	: 5657 BX Eindhoven, The Netherlands
Phone	: 08850 80000
Website	: https://www.fontys.nl
Own Company ("Eigen bedrijf")?	: No

Company mentor

(The person who guides the student on a regular basis)

First name + Family name	: Omar Idoum
Department	: Fontys Mechatronics & Adaptive robotics lectoraat
Position	: Researcher
Background (highest education)	: WO Masters
Background URL (e.g. LinkedIn)	: https://www.linkedin.com/in/omar-idoum-a1b97497/
Phone	: 0619714832
Email	: o.idoum@fontys.nl
Assignment in ASAM?	: No

Project Proposal – Internship

1. Context & Problem/Opportunity

1.1   Context & Background

Fontys University of Applied science has various studies available for students to choose from such as ICT, mechanical engineering, mechatronics engineering and so forth. Naturally they would want to advertise themselves to both companies and incoming students. The students are responsible for making new innovative systems and projects. Currently one of these projects is the "Flexible Automated Future Factory (FLUFFY)".

The problem arises when Fontys wants to showcase this system. Due to its large size, it is difficult to relocate and showcase to companies. For this reason the project "Mini-Fluffy" was begun. The mini-fluffy, as the name states, is a miniature version of the FLUFFY system with only the base of the factory in place. The mini-fluffy is a way to showcase the main fluffy system because of its size making it easy to transport around. This project was a combination of mechatronics students building the system and programming it with simple functionalities and ICT students refining this program and added more in-depth logic and providing HMI functionalities.

1.2   Current situation & Stakeholders

At present, the mini-fluffy system has the main functionalities of conveyor movement, solenoid triggers, sensor readings and transfer units working. This was all done using PLC programming on TIA PORTAL from Siemens by the previous ICT & technology students. What is missing from the system is the robotic arm, that grabs the pallet form the raised solenoids to perform actions on.

The only stakeholder is the adaptive robotics lectoraat as they own the system. In the lectoraat, Agnes Berendsenis is the adaptive robotics research leader, Omar Idoum and Randy Kerstjens are researchers responsible for mini-fluffy within the lectoraat.

1.3   Problem/opportunity description

The context of the assignment is to connect a robotic arm (most likely a DOBOT Magician) to the existing mini-fluffy system and program this again using the built-in PLC to program the functionality of this arm to make this system a better representation of the actual fluffy system.

2. Assignment

2.1   Desired project result

The goal of the project is to integrate a robotic arm (DOBOT magician) with the existing mini-fluffy using the existing PLC. The robotic arm should pick up an object from the pallet, perform a few assembly steps on the object and return it back to the carrier.

Project goal

The goal of the project is to integrate a robotic arm (DOBOT magician) with the existing mini-fluffy using the existing PLC. The robotic arm should pick up an object from the pallet, perform a few assembly steps on the object and return it back to the carrier. This brings us closer to having the mini-fluffy almost as an exact replica to the actual fluffy system.

Project IT-deliverable

Regarding the deliverables for this project, the stakeholder and the students have agreed on the following to be turned in by the end of the project:

- A working PLC program that integrates the current mini-fluffy with a robotic arm.
- An implementation plan (what was done and when)
- A research report (holding the research questions and answers)
- A user manual for the next group that works on this system.

2.2   Research aspects

Research questions

As it is important that all results are based upon (also practical) research: Which research questions are going to be relevant in order to achieve the desired project result? Provide (sub)-research questions and possibly a main research question.

The questions that have come to mind at this moment are the following:

- What needs to be adapted in the mini-fluffy program to accommodate a robotic arm?
- Will I need to define to optimal placement for the robot before beginning the implementation?
- How can make the program simple so that non ICT people can understand and improve upon it?
- How secure must the program be?
- What type of failsafe needs to be implemented for this system including the arm?

Research approach

Regarding the DOT Framework: give a first indication of which research strategies and methods will be used and/or will be the most important ones. Think of the possibilities your internship environment specifically has or lacks and how you can in any case ensure you have enough methods and strategies to use.

Regarding the DOT framework, here is what I plan to do for this upcoming internship:

- **Library:** I plan to explore existing methods that have already been used on the main fluffy system and see how I can apply the same and/or better techniques to improve the mini version.
- **Field:** I plan to understand the users of this system a bit better by having meetings with my stakeholders to confirm that what I am doing is up to their standards as both the product owner and as a user.
- **Lab:** I plan on performing countless experiments and test on the system before making the decision that the system is ready. These tests can include runtime, failsafe and more.
- **Showroom:** I plan on demonstrating the working system to experts at different fairs if applicable, so that they can also give me feedback on how I can improve on the system itself. This will also help me understand my system better and catch some faults that can occur.

3. Guidance & Expertise

Coach/Mentor

Omar Idoum has a WO masters from Wageningen University and works at Fontys mechatronics. Omar has guided more than 25 students on their internship (as a university mentor) and 10 students as a company mentor at the adaptive robotics lectoraat. Omar will be available at least 1 hour per week for a meeting with the student and will be around for questions.

Expertise / Guidance

There are plc specialists at the mechatronics department at Fontys who can be approached regarding technical challenges related to PLC programming. Omar Idoum and Randy Kerstjens are researchers responsible for mini-fluffy within the lectoraat and hence will also be available to guide the student as they both have a background in mechatronics.

4. Personal & Professional goals

Which aspects on personal or professional development will you further develop? Focus on soft-skills. Select a realistic three to five aspects to work on. Use previous feedback received from others (e.g. semester coaches and teachers as input).

Personal goal	Describe what exactly you want to achieve and how to work on this.
Communication skills	improve my ability to effectively communicate technical concepts and project updates to both technical and non-technical stakeholders within the organization. This can include improving my presentation skills, active listening, and adapting my communication based on the audience.
Problem-Solving skills	Improve my problem-solving abilities by look at a problem from different angles during the project utilising critical thinking skill and collaborating with my colleagues to come up with different solutions.
Networking	Develop my own networking skills by actively trying to come into contact with professionals within the industry. I am also looking to expand my current network with more professionals from different fields as well, in this case mechanical based professionals.
Self-reflection	Make it a habit to regularly reflect on myself, both as a professional and as a person. This can help me detect areas where I can improve on myself more frequently. This can help me grow as a person and become a better professional at what I do.
Creativity and Innovation	Improve my ability to think of other solutions from different angles. This can help me experiment with different outcomes and see which out of the solutions is best suited for the situation.
Industrial Automation	Improve my skill on PLC programming acquired from the previous semester. Improve my ability to write more modular, and robust PLC programs. Additionally learn as much as I can on the topic, while learning more about electronic and mechanical skills acquired from previous studies.

5. (Optional) other important remarks