

**ÇANKAYA UNIVERSITY
FACULTY OF ENGINEERING
COMPUTER ENGINEERING DEPARMENT**

CENG 200

**SUMMER INTERNSHIP
REPORT**

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**Performed at
Savronik**

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Contents

Abstract	2
1. Introduction	3
2. Company Information	4
3. Work Done	5
4. Conclusion.....	8
5. References	9

Abstract

My CENG200 internship has been performed at Savronik in the department of digital transformation. In my internship, I have researched about digital transformation and sensors with my teammate. Then, we have written a detailed report about sensors. After that, I have learned Qt which is a cross-platform software for creating graphical user interfaces [1]. After learning, I have written some code using C++ with my teammate for digital transformation department. The project was about agriculture. We have been asked to simulate a tractor. When writing the code, I have also seen visual design part and animation part of a software. It was more concrete and exciting for me.

1. Introduction

I have done my summer internship at Savronik which is defense industry company. I was in the digital transformation department. The company works not only in the defense industry, but also in the transportation sector especially about rail systems and in the information systems. I have chosen to intern in Savronik because I was wondering the defense industry sector and I wanted to work a defense industry company. Savronik has made a name in this field and is a successful company. My motivation for choosing this company is that Savronik provides engineering services in many fields such as defense, transport, informatics, simulation [2]. To gain experience in several areas, Savronik was a true choice for me. In addition, we have built good human relationship there and it was luck for us to have connections in this sector.

When I have started my internship, firstly I have begun working on sensors. After researching about sensors, I have written a research report with my teammate the first week. After that, I have gotten internship task from my supervisor. He has wanted to simulate a smart tractor to be used in agriculture using Qt. Before writing the code, I have watched many videos about Qt Software. The giving task is that according to values entered by the user, the program creates an area, a tractor, and a path that the tractor will follow is drawn. After this planning, simulation is started by the user. The back of the tractor is painted yellow as it moves on the drawn path. My motivation while doing this work was that it was a visual part of the project. It was exciting for me to create an animation and watch it. The work we have done was a demo of a project. Interns who will come after us will continue to develop the code we have written. Thus, the first steps of the project have been taken.

In the rest of the report, I will give some information about the company. Secondly, I will explain the work have done. After that, conclusion part will be added. Finally, I will include references at the end of the report.

2. Company Information

Savronik was founded in 1986 to provide services for Turkish Defense Industry. Savronik has more than 200 engineers and is an R&D (Research & Development) Center that maintains its design, production, and system integration capabilities. In the R&D Center, Savronik presents products and services within the scope of Communication Systems, Power and Control Systems, Avionics Systems, Missile Base Systems and System Integration Activities in the field of defense for requirement of air, land, and naval forces. Moreover, the company works on product development of smart Transportation Systems, Railway Signaling Systems, and on-board controlling-monitoring-saving systems in the fields of transportation. In addition, the company has other solution areas like Intelligent Transformation Systems, Advanced Ammunition Technologies, Digital Transformation Solutions, Simulation Solutions. It serves to domestic and foreign governments and organizations [2]. My department where I performed my internship is digital transformation. Digital transformation finds a solution to social and sectoral needs with the integration of digital technologies and accordingly defines the process of development and change of workflows and culture [3]. Digital transformation department has several solutions such as IoT Sensors, Telemetry Systems, ITMMIX, Smart Wall, Smart Stop, Operation/Emergency Centers, Vehicle Information Systems, Critical Communication Infrastructure and Distance Training.

Savronik has two separate locations which is Ankara and Eskişehir. The main building is in Eskişehir. The address of main building is Organized Industrial Area 20. Street No:19 Odunpazarı/Eskişehir. Telephone number of Savronik is 0222 236 15 90. I have done my internship in Ankara Administrative Office which is placed at Mutlukent Neighborhood Angora Boulevard 2010. Street No:33 Beysukent/Ankara. My supervisor whose name is Hasan Oksak works as the Technology Director in the Digital Transformation Department in Savronik. He graduated from Eskişehir Osmangazi University in the department of Electrical and Electronics Engineering in 2002. His E-Mail Address is hasan.oksak@savronik.com.tr and his telephone number is +90 (538) 972 3601. I had a teammate whose name is Özgün DOĞAN in my internship. He is studying at Çankaya University in the department of Computer Engineering like me.

3. Work Done

I have worked on a task that contributes to farming. It was aimed to make a smart tractor that mows the grass. While mowing grass, Ez-Guide 250 Lightbar Guidance System [4] inside the tractor I will describe in the following parts will show the path and headland to user. The tractor should be able to mow the grass according to the roughness and availability of the area. For instance, if there is a lake or a tree in the area, the tractor should follow a path accordingly. System should draw the path for guidance. The path may consist of only lines or firstly the headland circuits may be drawn after that the line swaths fill the headland boundary. Besides, if there is a tree in the plot, the tractor follows another path like a curve going around the tree. Like that, there are many scenarios associated with this. You can examine some of these scenarios in Figure 1.

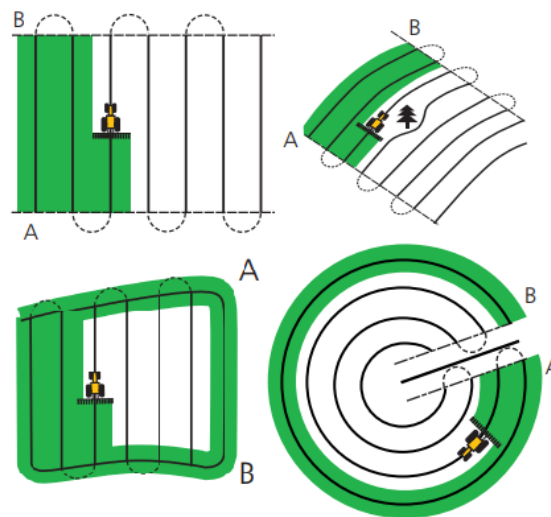


Figure 1 Some path scenarios to be followed [4]

Before starting the task, I have collected a lot of information via Internet. I have researched about not only Qt to write codes but also, I studied about sensors. To be able to start the project, I had to learn about sensors. Department of Digital Transformation generally interested in sensors. We have been asked to write a detailed researching report related to the sensors. The first week we have written this report, in the next three weeks we have interested in the main project.

In the first week of the internship, I have met company employees and my supervisor. They were so friendly people and I have gotten along well with all. Every lunch break, I have eaten together with 5-6 person. When we needed help, they helped us with everything. I had a meeting with my supervisor, an employee from the department and my teammate. They have asked us about our experiences, knowledges, and skills. We talked about ourselves. They have

given us the first task that includes research report on the sensors. While preparing for the report, they have considered the main project task involving coding. I have scanned a lot of web sites and articles to write the report. There are various details on the subject. Sometimes I could not find the information I was looking for, or I have found but the information was incorrect or missing. The research report [5] we have prepared contains the definition of sensor, the person who discovered, the year of discovery, the answer to the question of what passive or active sensors are, comprehensive descriptions related to sensor types and several examples of each sensor types. All examples have been supported with images. In addition, usage areas of the sensors have been included in the report. Food Industry, Automotive Industry, Defense Industry and Daily Life can be given as subject headings of the usage areas. The last part of the research report contains Companies and Market Overview for the sensors.

For the second week, I have handed the research report and I have gotten the main task from my supervisor. He has sent an e-mail that contains a document [4] about the project. He has asked us to learn Qt, and to make exercises about it. First, I have installed Qt on my computer. Then, I have watched a lot of videos from various web sites, studied many codes and functions used in Qt. As I watched the lesson videos, I tried to reinforce what I learned by writing sample codes. After that, I have examined the document sent by my supervisor. We have used C++ when we have written codes in Qt. Although we knew the C++, there were many functions and uses in qt that we did not know and needed to learn with my teammate.

Next week, I have started to write codes in Qt according to the assignment. What we had to do was design a user interface and create a simulation of the smart tractor. I want to give some information about the project. We have worked on a system that is Ez-Guide 250 Lightbar Guidance System [4]. The system connects to the tractor and while doing this, GPS is also used.



Figure 2 Lightbar Layout [4]

You can see in Figure 2 [4] the user interface and the Lightbar Layout. The user can choose the options through action buttons. The options include things like “Display Information Tabs”, “Turn on or off Coverage Logging”, “Return to Map View”, “Enter Mapping Mode” etc. In the third week I interested in this function buttons, and the design of the screen. There are two toolbars, and many functions in the toolbars. When the user hovers over the any function, it shows status bar which gives information about that function below the screen. At the end of the third week, we have had a meeting with my supervisor and my teammate. We have shown him what we did. He has liked them, and he has explained the part of the animation of the task. After making everything clear, we have prepared a meeting report that includes attendance, agenda, taken decisions and the target date [6]. I have done these works in the third week.

In the last week, we have taken care of the part of plan and animation. Our supervisor has drawn the target plan in Figure 3. He has asked us to do something like the target plan.

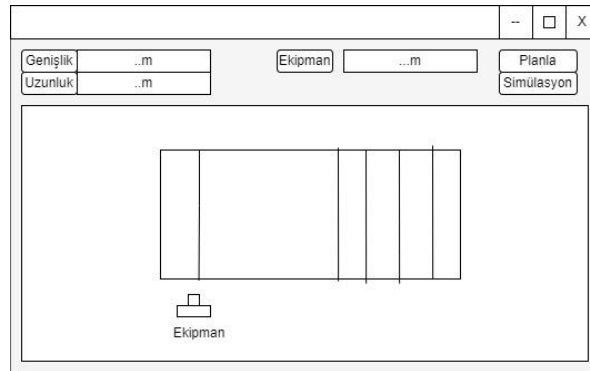


Figure 3 Target Plan

According to the target plan, width and height of the land, and width of the tractor (equipment) should be entered by the user. When the user clicks the plan button, a plan consisting of the land, the tractor, and the path to be followed by the tractor is created. When I have written codes of creating the path that tractor will follow, I have applied mathematics, science, and engineering subjects. I have formulated drawing the path, and then I have written the code of this part using for loops. After clicking the plan button, if the user does not want to that plan, he, or she can change the plan pressing clear button. After planning, the user should press the simulation button and the animation starts. We have finished the task and have delivered it on time. You can see the final version of our task in Figure 4.

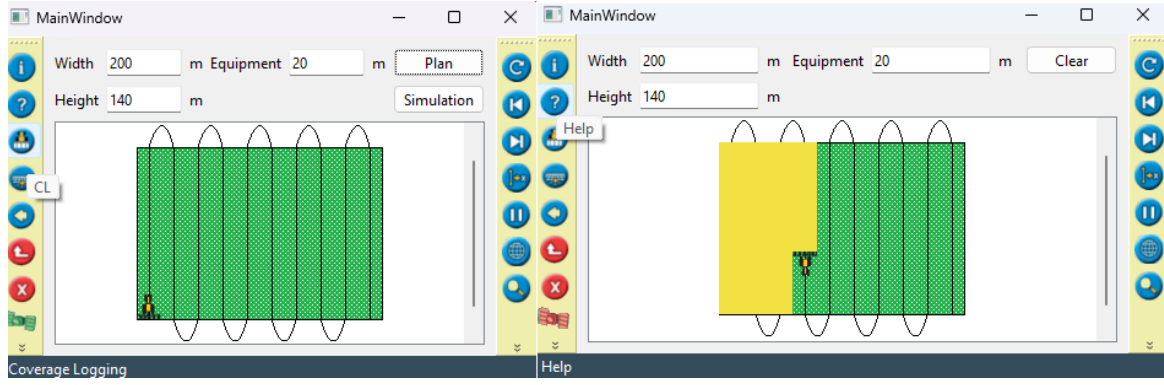


Figure 4 Final Version of the Task

4. Conclusion

Consequently, I have performed my internship at Savronik, in the department of Digital Transformation. During my internship, I have used subjects in Çankaya University such as Computer Programming, Object Oriented Programming and Data Structures. I think, we have built a complex system that can adapt to changing conditions. During the task, I have run into problems. After I have solved a problem, I have encountered a new problem. But I have researched about these problems, and I have solved them. According to the target task plan, I have done the task with my teammate with cooperation. I have experienced the teamwork, and it has contributed to me. I have experienced many things not only in the business life but also in human relations. I have learned to design a using interface and writing codes using Qt. It has improved me a lot. I think, this company fits in my career plans. Maybe I can decide that I may continue to my career with defense industry.

5. References

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- [6] Doğan Ö., Erke D. M., “Internship Evaluation Meeting”, 2022. [Online]. Available: <https://drive.google.com/file/d/1QNg7gurGizDMsBU7fximvVgdtOEme6dt/view?usp=sharing>. [Accessed 10 October 2022]