

Hackathon - Final Individual Report

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Introduction

During this semester, we had the opportunity to take part in a hackathon where we had to develop an innovative idea and solution to a real-life challenge using emerging trends and technology.

To do this, we worked in a team of five people and developed a project that identify a real-time problem that can be addressed. Each team member had a role assigned based on their strenghts and expertise, that ensured collaboration and contribution throughout the project.

We created a project that is called « Prometheus » and that is a 70cm^3 cube-shaped robot that lights up and cleans the streets by clearing up garbage.

I- Teamwork Experience and Collaboration

Working in a team of 4 members was an incredibly valuable experience to me. In fact, it has improved both my communication and collaboration skills. Each team members brought unique knowledge and skills to the project, which made our collaboration dynamic and well-balanced. Some members were more comfortable and experienced with the technical aspect, such as prototyping and designing, while others excelled in areas like project management, organizing timelines, and maintaining clear communication among the group.

I was in charge of the implementation and product marketing of our solution. I felt more comfortable working on this subject.

However, our team is highly supportive, and everyone is encouraged to share their opinions, even on aspects of the project that are not directly part of their assigned parts. For instance, two members of my team helped me find a solution about the product marketing of our robot. In fact, thanks to them, we decided to take inspiration from Duolingo. We will tag phrases on streets walls to promote our robot. Phrases like « Cleaner, more beautiful, thanks to whom ? ».

Additionally, the fact that our team included both Welsh and French members enhanced my communication skills. To ensure that everyone could understand and contribute equally, we chose to communicate in English, even though for some of us, speaking French would have been more natural. Speaking in English consistently throughout the projet helped me become more confident in my ability to communicate clearly.

This experience helped me become more confident in expressing ideas clearly and adapting my language to ensure that everyone can understand.

II- Team Performance Evaluation

Throughout our project, every member of the team contributed effectively and played an essential role in the success of our work. Each member fulfilled their responsibilities, tasks were completed on time and everyone remained actively engaged during meetings and collaborative sessions.

In my opinion, each team member fully deserves a rating of 5 out of 5, as everyone carried out their assigned tasks with a high level of responsibility. Many members showed initiative by helping others by offering constructive suggestions to improve different aspects of the project, even beyond their assigned roles.

Our team consisted of five members, each bringing unique skills and perspectives to the project. Ava KENNEDY was in charge of developing the robot's intelligence and took a leadership role in organizing the team's effort. Han YUELIANG served as our mechanical engineer and researcher, providing essential technical knowledge and conducting background studies to support our design choices. Matthew DELEHAYE serves as both our security manager and budget coordinator, ensuring that both safety measures and financial aspects were properly managed. Thomas QIAN was responsible of the prototype design and electronic integration, turning our concepts into a functional system. And finally I, Nour AL MUTWALY, focused on the implementation and product marketing aspects, ensuring our project was not only technically sound but also aligned with real-world market needs and potential user expectations.

All together, we collaborated and delivered a project we are all proud of. We shared ideas openly, respected each other's contribution, and maintained a strong team dynamic from the beginning to the end of the project.

III- Evaluation of Design Limitations and Risk Factors

While our project is both unique and innovative, it does present certain design limitations and risk factors that must be carefully considered. Our robot is designed to vacuum the streets while also providing lighting during the evening as it gets dark. This dual-functionality adds value but also introduces challenges in terms of mobility and durability.

One of the main limitations that our robot has encountered is the terrain adaptability. Our prototype performs best on flat and clean surfaces. However, in real urban environments, our robot may encounter some obstacles such as irregular surfaces, debris of various sizes or other physical barriers. This could affect both the waste suction efficiency and the mechanical movement of the robot. Our robot can adapt to complex outdoor conditions if it has more advanced sensors and higher-quality materials.

Our robot presents potential risk issues. In fact, it is essential that our robot includes smart navigation that enables it to avoid collisions with people, animals and other obstacles.

Another risk that our robot could encounter is that it can be vulnerable to cybersecurity threats. In fact, if someone manages to hack into the robot, they could take control of it or even shut it down. Therefore, without a good cybersecurity, there's a real risk that the robot could be misused.

Moreover, another risk the robot may face in public environments is interaction with intoxicated individuals. In fact, drunk people could be a danger for our robot. They could push the robot or damage it. It can be a danger for the robot but it can also be a danger for people, such as pedestrians walking in the streets.

The cost of the mechanical part could also be a problem. In fact, we decided to implement different sensors and technical parts to our robot such as infrared photoelectric sensor, ultrasonic sensors, camera and a communication module. So the cost poses a limitation, both in initial development and long term maintenance. For instance, sensors for navigation can range from 150 to over 1,000 pounds. Also, components such as batteries or motor parts will wear down and require replacement. For a robot, yearly maintenance costs could easily reach 500 to 1,000 pounds per unit.

Conclusion

Thanks to this project, I was able to communicate and collaborate with a diverse group of students that enhanced my communication and project management abilities. Each team member contributed to the success of our robot prototype and I believe that the mutual respect and solidarity were key factors in our success.

References

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