EzParking: Project Experience Report

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Table of Contents

Initial Planning

Purpose and Objectives

The EzParking project aims to simplify the user parking experience by providing a highly efficient and versatile parking recommendation APP. The APP utilizes advanced algorithms and high-accuracy detection tools to recommend the most convenient parking options based on the user's desired destination. By applying versatile design precipice, this application is targeting to provide service to any facilities including universities, malls hospitals and more.

Audience

EzParking application is designed to be intuitive and user-friendly. It offers a clean and straightforward user interface which allow the application provides service to all age group and technology background user.

Initial timeline

The timeline was divided into 4 parts including the planning stage, implementation stage, testing stage and documentation stage. During the planning stage, the team defines project goals, scope, and requirements and researches to gather information needed for the project implementation. During the implementation stage, the group formed two sub-groups to parallel develop frontend and backend products. And conducted internal testing and made necessary changes and improvements so that when the project shifted to the testing stage, the team conducted an integration test and released the alpha test to the public to collect feedback from end users. The team then made final adjustments and ensured the project met all requirements and goals. In the end, the project moves to the documentation stage. The team creates final documentation, including user manuals and support materials.

Who was involved

During the project development process. Several stakeholders with different roles and responsibilities were involved. The facility parking administrator will be involved in providing corresponding data associated with the facility's parking lots. The technical guidance was provided by the project mentor to ensure the suitable tech stack was applied to the development. The end-user was also involved in the development to provide feedback.

Plan and Outcome

The project was initially planned to have a backend service and two frontends which provide end-user and administrators with to access the application, the system will also use many security cameras with signal board computer tier to it running an artificially intelligent vehicle detection model to be the detector. With the progress of development. The team realized that it will be more cost-efficient if use a central computer to collect live video of the security camera and run serval AI models at the same time. So the final delivered project was more economically friendly than the initial design.

During The Development

What actually occurred?

Our project followed our plan to a high degree and realized our plan to a high degree. The only possible drawback is that the program isn't as fast as we'd like it to be, but that's not a big deal. This problem can be easily solved by increasing the computing power of computers and servers.

In addition, there are also some defects in personnel allocation. Because We did not properly analyze the staffing problems that might result from the plan change. In other words, we did not have a backup plan, which led to a delay in the delivery of our final project. In the initial plan, we arranged for two team members to do the front-end application and two team members to do the back-end application.

Unfortunately, we did encounter this situation in our actual operation process and had to split two team members to complete the extra work of artificial intelligence vehicle detection. This was not mentioned in the initial plan, which slightly affected the delivery time of our project. Other than that, our work was carried out in a reasonable and orderly manner, and all the team members had a high degree of contact and communication, which also eliminated many problems caused by a lack of communication among the team.

Although there was some lack of rigor in the staffing plan, overall our plan was very reasonable. A good plan promotes the efficiency of our work so that each team member has the right work to do at the right time. It also shows the importance of a reasonable plan.

The steps we took toward our objective

As a team, a good initial design is very important to start the project. Before a project begins, the team needs to design a good initial model for the project, which defines the main functions and features of the program. Then we divide the construction of the entire project into small tasks, assign them to each member, communicate clearly, coordinate our efforts, and ensure that our development direction is correct.

With our professional knowledge and project experience, we chose a relatively suitable framework for the project, which saved us a lot of time, decoupled the code, and reduced errors. By using more common development techniques on the market, the EzParking applications are stable and highly scalable.

Finally, to ensure the code quality of the entire software. We will upload our code to our own branch of GitHub in advance, and then submit it to our teammates for review. Only the code that has passed the review can be merged into the main branch. The purpose of this step is to ensure code quality. Therefore, we can provide qualified application products that meet customer requirements.

Overall, our approach to improving efficiency is characterized by effective communication, collaboration, and quality monitoring. This approach allows us to avoid invalid work and low-quality code as much as possible.

How we keep the project on the right track

Collaboration and communication are essential for team projects. Through collaboration and communication, the team can ensure that our progress is as expected. And we can ensure that the part we develop can cooperate with other people's achievements.

The code base logic is very important to the whole project. In actual development, it is necessary to ensure that the code operation can get the results you want. And also prevent various potential problems, such as null pointers. In addition, in addition to the code logic is very important, the database design is also very important. In actual business, the multi-table joint query is inevitable. Good database design and data structure can effectively reduce the

number of database queries during a multi-table joint query, to save performance for the server.

In the process of project development, good code design will bring many benefits, including low coupling, high-tech scalability, and strong error detection. In the early stage of code design, we can classify the integrated code into multiple files through functional categories. In this way, less time can be spent on debugging and checking errors in later code development. This can also ensure the relative independence of the logic of each part. In addition, the stability of certain dependent versions must be ensured in back-end development, because with the iteration of certain dependencies, such as JAVA, they will modify, delete or integrate some functions. Modifying the JAVA version will cause many codes that could have been run to report errors due to the lack of native JAVA functions. Therefore, do not change the dependent version unless necessary, and ensure that the current version can meet the functional requirements of the project.

In general, collaboration, code design, and underlying logic are very important to the progress of the entire project. A good design will make subsequent development smoother. Problems caused by low-level code errors are almost irreparable, especially on the backend. The reconstruction of the underlying code means the reconstruction of the entire back-end-related functions.

Future improved

What we can do better

In the initial plan for our software project, we made the mistake of assuming that all team members possessed the same technical skills. As a result, some members required extra time to learn new technologies. Later on, we also had to assign two team members to work exclusively on the AI detector application. However, this caused a challenge for them to catch up when they rejoined their original sub-groups, frontend and backend teams, especially if the components had high coupling.

We learned that frontend development was more manageable as it could be divided into Myadmin and Client applications, which reduced the degree of interdependence between them. However, backend development was inherently more complex and required more coordination among team members.

Our advice

To overcome these challenges, we could identify several changes. Firstly, we can clearly define the tasks of each component to minimize the degree of coupling. This will help to reduce the dependency between different components and allow each team member to work more independently. Secondly, we could schedule periodic stand-up meetings for sub-groups to exchange information, encourage collaboration, and increase efficiency.

In the future, we plan to hold more frequent and quick meetings among each sub-group to stay updated on project progress. Additionally, we will begin user testing at specific points during the Minimum Viable Product development phase to ensure that the project is satisfied

their requirements. These changes will help us to improve collaboration and deliver desirable software products to our clients.

Conclusion

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This is a great opportunity for us to implement what we learn from school and improve what we have done previously. We inspected our relevant knowledge and practiced our communication skills during the process. We have learned new technologies and integrated them into our project, even though we met some difficulties in the process.

We will stick to what we did well and avoid the same mistakes that happened again in future projects. A comprehensive and multi-faceted plan is the key to achieving high-quality work, which is the main experience that we want to point out. Through our experience, the benefits of doing this are obvious, so we encourage our audiences and ourselves to place this priority when starting a new project.