

Internship Project Report

Author: Bouin Julien

Chapter 1 - Introduction:

We are faced with the development of a full-stack website that requires tight integration between the backend and the frontend. Both the backend and frontend of our application will be developed using Django. It will be interconnected with a Computerized Maintenance Management System (CMMS) for efficient maintenance operations management. On the other hand, the frontend, also built with Django, will be linked with Augmented Reality (AR), an immersive technology that enriches the user experience by providing real-time contextual information. In this project, my role primarily focuses on the frontend development.

Chapter 2:

What is Django?

Django is an open-source web framework written in Python, designed to simplify the development of complex and scalable web applications. Launched in 2005, Django is maintained by an active community of developers and is widely used in the industry to create a variety of web applications, ranging from simple websites to complex web platforms.

Key features of Django:

- **Full-stack Web Framework:** Django is a full-stack web framework, providing all the necessary tools to develop both the frontend and backend of a web application, including database management, business logic, URL routing, and form handling.
- **MTV Architecture (Model-Template-View):** Unlike the MVC model, Django follows the MTV architecture where models represent application data, templates are responsible for presentation, and views contain the processing logic. Before moving on to the next feature, let's define what an ORM is:
 - An ORM, or Object-Relational Mapping, is a programming technique that allows mapping objects from an object-oriented programming language (such as Python, Java, etc.) to data stored in a relational database. Rather than writing SQL queries directly, the ORM allows developers to interact with the database using familiar objects and methods, thus facilitating application development and maintenance. In summary, an ORM abstracts the complexity of the relational database, allowing developers to work with data in a more object-oriented way.
- **ORM (Object-Relational Mapping):** Django includes a powerful ORM that allows developers to manipulate database data using Python objects, abstracting the database logic and simplifying development.

- **URL Routing System:** Django uses a URL routing system that maps URLs to corresponding views, providing clean and efficient route management in the application.

What is CMMS (Computerized Maintenance Management Systems)?

CMMS are software used by companies to plan, organize, track, and manage their maintenance activities. They help maintain equipment in good working order, reduce downtime, and minimize maintenance costs.

CMMS manage a database containing information about an organization's maintenance operations.

This information is intended to help maintenance technicians do their jobs more effectively (for example, determining which machines require maintenance and which stores contain the spare parts they need) and to help management make informed decisions (for example, calculating the cost of repairing a machine breakdown).

It is therefore a software that allows managing a company's resources.

What is Augmented Reality?

Augmented Reality (AR) is a technology that overlays virtual elements, such as images, videos, or 3D models, onto the real world, typically through an electronic device such as a smartphone, tablet, or smart glasses. Unlike Virtual Reality (VR), which creates a completely virtual environment, AR enriches and enhances the real environment by adding real-time digital information.

Augmented reality applications can take various forms, such as product visualization applications, interactive games, training and assistance tools, navigation applications, and more.

Integration of Augmented Reality into Maintenance: Using Django, based on the MVT Model:

The integration of Augmented Reality (AR) into industrial maintenance operations offers innovative perspectives to optimize processes and increase operational efficiency. By combining the advanced capabilities of Computerized Maintenance Management Systems (CMMS) with the immersive power of Augmented Reality, companies can reduce unexpected downtime and improve overall productivity.

In this context, the use of Django, a web framework based on the MVT (Model-View-Template) model, proves to be an effective solution for developing applications integrating CMMS and AR. Django provides a robust architecture for managing data processing logic (Models), user interface presentation (Templates), and user interaction (Views). This structure facilitates seamless integration of augmented reality features into maintenance applications, allowing technicians to

access real-time contextual and visual information during equipment inspection or repair.