ºEl Tefegé



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# Introducció

Vivim en un moment en el que el temps és un dels recursos més valuosos, per això tots els processos s’intenten automatitzar i fer el més ràpid possible. D’aquesta forma, no precisem d’un humà el qual pot desenvolupar una feina menys “automàtica”.

Donat el cas de EXPLICAR LES RESPOSTES A MÀ I QUE HI HA UNA PERSONA QUE LES ESTÀ PASSANT A ORDINADOR DE FORMA MANUAL + Edat avançada del camp per lo que un formulari amb QR / Ordinador / Mòbil no son opcions adients:

<https://red2030.com/el-campo-envejece/#:~:text=La%20edad%20media%20de%20los,generacional%20en%20el%20entorno%20rural>.

## Objectius

The objectives of this Final Degree Thesis are to provide assistance not only to the agricultural sector but to anyone who needs to automate the reading of handwritten answers, therefore, some objectives have been defined to be fulfilled by the project:

### Functional goals

### Easy to use

### Intuitive interface with no "extra" features

### Fast response from the system

### Good user experience

### Attractive and modern design

### Nonfunctional goals

* High Scalability
* Multiplatform System
* Security
* Data Privacy

## Personal Motivation

I've been looking forward to a big project for a long time. During the summer I worked with colleagues from my career to start a project, we got our first customer, and now we're trying to face this idea in a clearer way.

From this project, I've become interested in the world of development, of SAAS, of the different companies that have been able to take advantage of a market niche that had to meet a need in order to obtain benefits.

With this thesis, I will be able to combine the two interests I have: On the one hand, to create a useful application that will help people, and on the other hand, to see the whole process of market analysis, a feasibility study and finally to verify the operation in real cases.

But there are also some personal aspects that were part of my choice for this project:

* + Learning a new language: JavaScript
  + Improvement of my Docker skills
  + Managing a project
  + Making decisions based on the product's features

# Planificació

## Anàlisi de competència

## DAFO

## Diagrama de GANTT

# The project

As previously discussed in the planning section, the decisions made were based on a thorough investigation of various tools and services

that could provide solutions to the problem. The three main aspects that need to be addressed are the framework, server, and processing tools required to obtain the expected results.

## VPS(Virtual Private Server)

Firstly, we will analyze the system where our project will be implemented, specifically the server.

Our goal is to find a server that can handle multiple requests to the backend API of our service. Additionally, we require the ability to *dockerize* the entire project and ensure a stable connection.

While these requirements are not overly demanding, we will also consider cost effectiveness when choosing a server.

### Hostinger

Hostinger is a popular web hosting provider that offers VPS hosting starting at 5.49€ per month + 21% VAT for a 24-month paid-all-in option.

This plan includes 1 vCPU core, 4GB RAM, 50GB SSD storage and 4TB bandwidth. Hostinger also offers weekly backups and a dedicated IP address.

### Ionos

Ionos is a reliable option for companies seeking hosting and web creation services. They offer a package with 2 vCPU cores, 2GB of RAM, and 80GB of SSD storage along with unlimited traffic up to 1GB/s.

This package is priced at 2€/month for the first 6 months and 4€/month thereafter.

### Piensa Solutions

Upon investigation, it is apparent that there are other lesser-known companies that offer VPS at a more affordable price. Piensa Solutions, for example, has two plans that may be of interest.

**VPS S**

With similar characteristics to the ones we have already found, we have 2 vCPU cores, 2GB of RAM, 80GB of SSD and a connection of up to 1GB/s. This option comes at 2€/month for the first year and 5€ after that.

**VPS M**

This option is superior to other alternatives as it provides 2 vCPU cores, 4GB of RAM, and 160GB of SSD memory. The package costs 4€/month for the first year and 10€ thereafter.

It is evident that lesser-known providers offer lower prices. This is primarily due to the reduction in support staff and service guarantees.

Since this is the initial stage and we aim to test the market, we will continue using the service provided by Piensa Solutions. In the future, if we require a more robust service, we can explore other suppliers that meet our needs.

## Backend

Given that we will be working with computer vision, machine learning models, and other artificial intelligence tools, Python immediately comes to mind as a suitable language.

Python is widely recognized as a leading language in the field of artificial intelligence. Utilizing my existing knowledge of this language and the tools I have already used, I believe it would be advantageous to avoid the need to learn a new language and libraries for information processing.

I will be able to apply the knowledge I gained from my high school research work, where I utilized computer vision to simulate an autonomous vehicle.

SELCCIONAR FASTAPI com framework per construir les peticions que es realitzaran des del frontend.

## Frontend

During my studies, I discovered that I am not particularly fond of front-end development. Although I have experience with several languages and frameworks, such as Django although is not frontend oriented and NextJS which I had a little approach at the hackathons.

Talking with Jordi Agost, my tutor, he recommended me to take a look at VUE, which is a JavaScript framework.

## Database

In our case, the database will only be used for testing purposes. In production, the data we collect will be sent to the API. Therefore, we will not require a large database, as it will only be used for storage tests.

## Docker

Docker is an open-source platform that allows for the creation, deployment, and management of application containers. These containers are standardized software pieces that include the application code, as well as all necessary dependencies and libraries, ensuring reliable and consistent application performance in any environment.

### Advantages

**Portability:** Docker allows you to package an application along with all its dependencies in a lightweight, portable container. This makes it easy to deploy the application in any environment that has Docker installed, whether it is a local server or a remote server.

**Isolation:** Docker containers provide an isolated execution environment for applications, which means that each application runs independently and does not affect the operation of other applications running on the host. This segregation improves system security and reliability.

**Resource efficiency:** Docker uses system resources more efficiently compared to other virtualization methods, such as traditional virtual machines. Containers share the core of the host operating system and therefore require less memory and storage.

**Rapid deployment:** Thanks to its lightweight nature and integrated management tools, Docker enables applications to be deployed quickly and efficiently. With Docker, developers can automate the process of deploying and scaling their applications.

**Centralized management:** Docker provides centralized management tools that facilitate the monitoring, control and management of containers and applications. This includes the ability to control resources, monitor the status of containers and manage the deployment of new containers.

### Drawbacks

**Initial complexity:** Docker may seem complex to those unfamiliar with the concept of containers and their implementation. There is a learning curve associated with using Docker, especially for new developers.

**Security:** Although Docker offers inter-container isolation, there are still security risks associated with the use of containers, especially if they are not properly configured. Potential security attacks include data leakage between containers, container vulnerability and port exposure.

**Compatibility issues:** In some cases, there may be compatibility issues between the development environment and the production environment, especially if Docker images are not created and configured properly. This can cause unexpected errors during application deployment.

As we can see, Docker offers many advantages and the disadvantages that we encounter can be solved without major problems.

Taking advantage of the fact that our project is not a project that needs a lot of resources, but it does need speed, Docker seems the best option because it allows us to have all the programs and dependencies together, so we will have a simpler maintenance and scalability.

## Diagram of operation

The user will log in to our portal, from where he/she can manually enter the training data to be processed and select the images scanned from the first and second pages.

Once the user has selected the files, the system processes them, this process is:

As we can see, once the image is read, we have the different answers. We order them according to their position, so we can process them in order to reach the checked values.

Different steps are taken for each answer contour:

## OpenCV

Per poder endinsar-se dintre de l’anàlisi i transformació d’imatges amb OpenCV explicaré que és aquesta llibreria i per què considero que és la millor opció pel nostre cas.

# Web bibliography