

# Project Report

## 1. Understanding the Project

The project involves the application of computer vision techniques to a specific domain. The primary objective is to leverage computer vision technology to solve a problem or improve a process. To gain a thorough understanding of the project's requirements and objectives, a comprehensive project brief was reviewed. This included the project's scope, goals, deliverables, and the expected impact of the project outcomes. The initial phase focused on identifying the specific problem to be addressed, the data required, and the methodologies to be employed in the project.

## 2. Site Visit

A site visit was conducted to gather firsthand information and insights into the practical aspects of the project. During the site visit, observations were made regarding the environment and any potential challenges that might be encountered. This step was crucial in aligning the project's objectives with real-world scenarios.

## 3. Learned Basics of Computer Vision

To effectively contribute to the project, it was essential to acquire a foundational understanding of computer vision. This involved studying the basic concepts and techniques used in the field. Key topics covered included:

- **Image Processing:** Understanding how images are represented, processed, and manipulated in a digital format.
- **Feature Extraction:** Learning how to identify and extract significant features from images that can be used for analysis.
- **Object Detection and Recognition:** Studying methods for detecting and recognizing objects within images.
- **Machine Learning in Computer Vision:** Exploring how machine learning algorithms are applied to computer vision tasks.

This foundational knowledge equipped me with the skills needed to approach the project's computer vision tasks competently.

## 4. Installation of Anaconda

To create a suitable development environment, Anaconda was installed. Anaconda is a widely-used distribution of Python and R for scientific computing, which simplifies package management and deployment. The steps involved in the installation were:

- Downloading the Anaconda installer from the official website.
- Running the installer and following the on-screen instructions to complete the installation.
- Verifying the installation by opening Anaconda Navigator and ensuring that the necessary tools were available.

Anaconda provided a robust platform for managing the various packages and dependencies required for the project.

## 5. Creation of Virtual Environment

A virtual environment was created to ensure that the project's dependencies were isolated and managed efficiently. This involved the following steps:

- Opening Anaconda Prompt or Terminal.
- Creating a new virtual environment using the command: `conda create --name project_env python=3.8`
- Activating the virtual environment with the command: `conda activate project_env`

The virtual environment allowed for the installation of specific versions of libraries and tools without affecting other projects or the system's global Python environment.

## 6. Installation of Jupyter Notebook

Jupyter Notebook was installed within the virtual environment to facilitate interactive computing and documentation. The steps included:

- Activating the virtual environment.
- Installing Jupyter Notebook using the command: `conda install jupyter`
- Launching Jupyter Notebook with the command: `jupyter notebook`

Jupyter Notebook provided an interactive platform for developing and testing code, visualizing data, and documenting the analysis process.

## 7. Learned About Image Labeling and Annotation

An essential part of the project involved learning how to label and annotate images. Image labeling and annotation are critical steps in preparing data for computer vision tasks, such as training machine learning models. The process included:

- Understanding different types of annotations, such as bounding boxes, polygons, and key points.
- Using annotation tools like LabelImg and VGG Image Annotator (VIA) to label images.
- Creating and managing annotation files in formats such as XML, JSON, or CSV, which are compatible with machine learning frameworks.

This knowledge enabled the accurate and consistent labeling of images, which is crucial for the success of the computer vision models.

By following these steps, a strong foundation was established for the successful execution of the project. Each phase contributed to a deeper understanding and more effective application of computer vision techniques, ensuring that the project objectives could be met efficiently.