High Level Design (HLD)

Brand Recognition

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Contents

Abstract

Visual content, such as videos and images, plays a significant role in modern-day marketing. Traditionally, brands have had to pay content creators to feature their brand logo in their content. However, marketers can now leverage ML-powered computer vision to identify and recognize their products in various forms of content, including videos and images. This technology enables marketers to extract valuable insights from the content and understand the audience's behaviour better. With this understanding, brands can improve their advertising strategies and achieve higher ROI by targeting their audience more effectively and personalizing their messaging. The potential benefits of ML-powered computer vision in marketing make it an exciting area of exploration for brands and marketers.

1. Introduction

1.1 Why this HLD document?

A High-Level Design (HLD) document is a technical document that describes the architecture of a software system or application at a high level. The purpose of an HLD document is to provide a blueprint for developers and stakeholders to understand the high-level technical details of the system, including the architecture, components, modules, interfaces, and other high-level design details

- The HLD document has several purposes:
- Establishing the system's architecture.
- Defining the components and modules.
- Providing a common understanding.
- Facilitating communication and collaboration.
- Guiding the low-level design.
- List and describe the non - functional attributes like:
    1. Security
    2. Reliability
    3. Maintainability
    4. Portability
    5. Reusability
    6. Resource
    7. Utilization

1.2 Scope

An HLD document is an essential document that helps ensure the successful development of a software system or application by providing a clear and high-level technical specification. The HLD document is often used as a starting point for the development process and serves as a foundation for the more detailed low-level design documents.

1.3 Definitions

TERM	DESCRIPTION
IDE	Integrated Development Environment.
S3	Amazon Simple Storage Service (Amazon S3) is an object storage service
VS Code	VS Code stands for Visual Studio code and it is an IDE.
AWS	Amazon Web Services

2. General Description

2.1 Problem Statement

In today's time marketing through video contents, images are a big part of advertising. Many brands used to pay a lot of content creators for showing their brand logo in their contents. Marketers can use ML powered Computer vision for their product recognition and extract user insights from various contents like videos, images etc.

2.2 Proposed Solution

A potential solution for leveraging ML-powered computer vision for product recognition and user insights in marketing is to develop an end-to-end brand recognition system that utilizes a custom computer vision model. This model can be trained on the specific products and logos of a particular brand, enabling it to identify and recognize the brand's products in various types of visual content, such as images and videos. By analysing this content, the model can provide valuable insights into the brand's target audience and their behaviour, including the types of content they engage with the most and how they interact with the brand's products. These insights can then be used to improve advertising strategies, resulting in higher ROI through more effective targeting and personalized messaging.

2.3 Further Improvements

The accuracy of the custom computer vision model can be improved by using more diverse and representative training data. This can be achieved by collecting and annotating a larger dataset of images and videos that feature the brand's products in different contexts and scenarios.

Additionally, integrating the system with other marketing tools such as social media monitoring and analytics platforms could provide even greater insights into user behaviour and help improve marketing strategies.

2.4 Technical Requirements

This project has no specific hardware requirements. The backend of the application will be deployed using an EC2 instance from the AWS cloud platform.

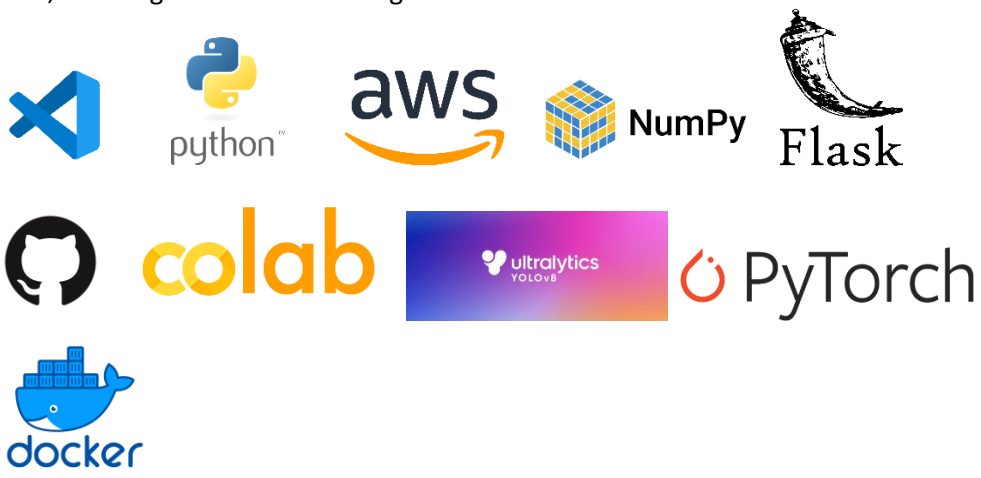
2.5 Data Requirements

The dataset for this project was collected by web scraping, and the annotations were added using the LabelImg tool. The annotated dataset is then stored on a GitHub repository.

2.6 Tools Used

- The environment was created using Python 3.8.10.
- VS Code is used as IDE.
- GitHub serves as the code repository.
- To host the application, an instance of EC2 from the AWS cloud platform is being utilized.

Python programming language and other frameworks such as NumPy, PyTorch, YoloV8, labellmg are used in building the whole model.

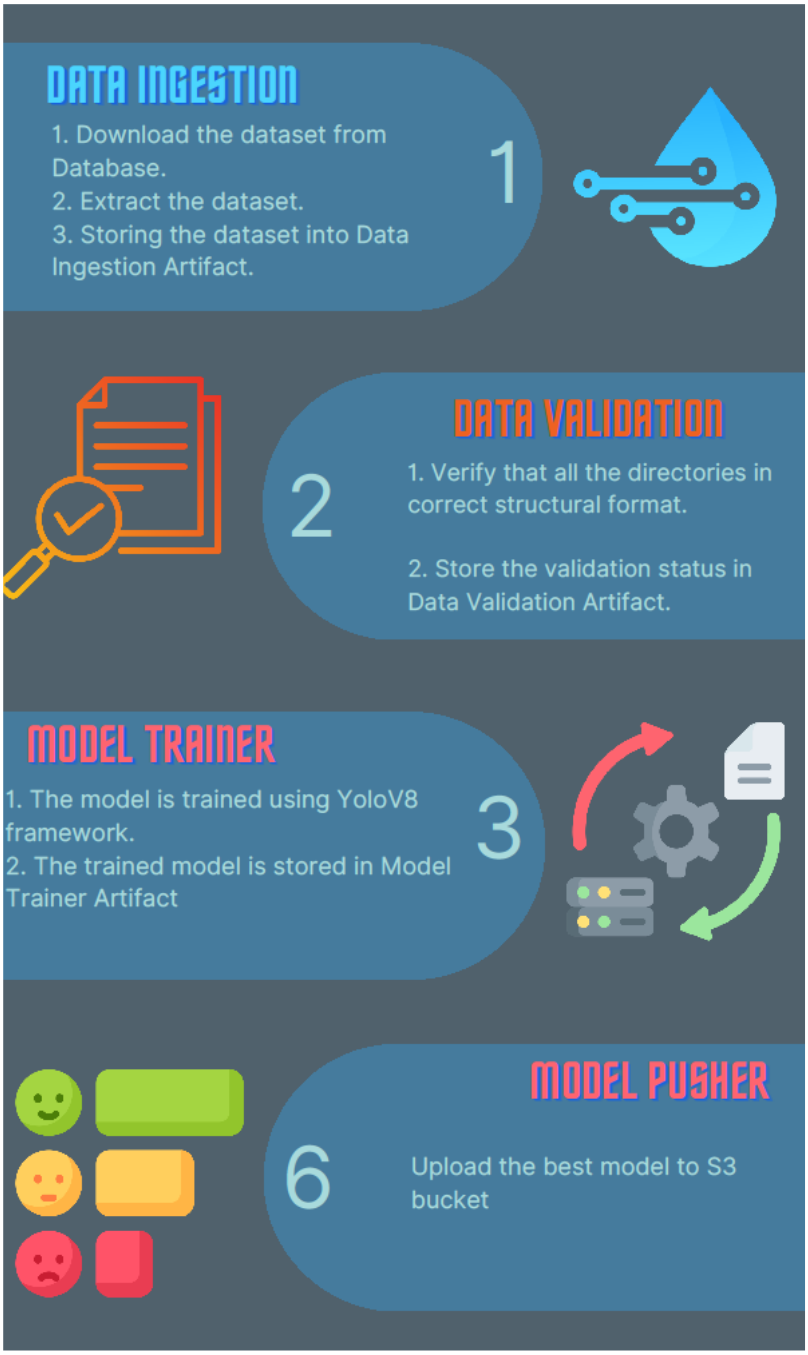


2.7 Assumptions

The primary aim of the project is to implement brand recognition system that utilizes a custom computer vision model, assuming that all functionalities are performing as expected.

3. Design Flow

3.1.1 Machine Learning Pipeline stages



3.1.2 Deployment Process

3.2 Logging

The entire execution process is logged with timestamps to facilitate the quick identification of errors.

3.3 Error Handling

The Exception handling is implemented to find the errors quickly and can easily be detected any wrong as has happened.

4. Performance

4.1 Reusability

The code has been written as per the industry standards and can be reused without any interruption.

4.2 Application compatibility

The various components of this project are built using python programming language. Each component has its own task to perform according to the pipeline

4.3 Deployment

This Model is deployed using an EC2 instance from the AWS cloud platform.