IMAGE RECOGNITION WITH IBM CLOUD VISUAL RECOGNITION

The digital word of today has the ability to automatically understand and analyze images has become a component across various industries. From content moderation to recommendation systems, image recognition technology has found applications in diverse domains. Thus, this project aims to leverage the power of IBM Cloud Visual Recognition to develop a robust image recognition system.

Keywords : Image Detection, IBM Cloud, Flask

Objective:

The primary objective of this project is to create an image recognition system that can accurately classify and to analyze image based on predefined categories. This system will be trained to identify objects, scenes, and even within images, which providing valuable insights for a wide range of applications.

Introduction:

This cloud based visual recognition achieve detection of image with high accuracy. With the aid of cloud computing, this can be implemented. Thus, to contend with this issue they have decided to use the concept of Edge Computing. Edge computing is very much unique, as for every data retrieval the system is not needed to initiate contact to the main data server which is the cloud. In this we have the discusses about the data collection and the methodology vital for the flow of the project. The basic methodology which we are using for the purpose of this study can be categorized in three parts. The first is collection and storing of data. The second is training of the data which we have obtained which has been done with IBM Cloud's visual

recognition feature after labelling the dataset using IBM Cloud Annotations and the obtained model is implemented to front-end via Flask and TensorFlow

Methodology:

1. **Project Inception and Planning :**
   - Objectives and Scope : Clearly outline the project's goals, including the specific tasks the image recognition system will perform.
   - Identify Use Cases : Determine the applications where image recognition will be employed.
   - Set Milestones and Deliverables: Establish measurable milestones to track progress. Define the expected deliverables at each phase of the project.

2. **Data collection and Preparation:**
   - Data Collection : To gather a diverse dataset of images relevant to the project and to ensure the dataset covers a wide range of scenarios and variations you expect to encounter.
   - Data Annotation : Annotate the images with labels or bounding boxes if needed. This is crucial for training the model.
   - Data Preprocessing : Normalize pixel values, Auggment data to increase robustness.

3. **Model performance:**
   - Validation Set : Set aside a portion of dataset as a validation set to assess the model's performance.
   - Iterate and Improve : Analyze the results and if necessary, refine model architecture, training process or the dataset.

Modeling and Analysis:

1. **Model Creation**

- Access the IBM Clous Visual Recognition Dashboard : Login to your IBM Cloud Cloud account and navigate to the Visual Recognition service.
- Create a Custom Model : To start a new project and give model a descriptive name and select the type of recognition you want.
- Organize Data : Upload the annotated dataset to the model, This include labeled images for training.

2. **Model Evaluation**
   - Validation Set and Metrics : Use separate set of images that were not part of the training process to evaluate the model.
   - Then calculate and analyze key metrics, like the precision, accuracy and recall to understand how the model is performing.
3. **Iterative Process**
   - Iterate and Improve : Based on the results of evaluation, to make the necessary adjustments to improve the model's performance. This was includes collecting more data, refining annotations.
   - Re-training : If there is significant changes are made, re-train the model with the updated dataset.

4. **Model Deployment**
   - Deploy the Model : Once satisfied with the model's performance, deploy it in your IBM Cloud environment.
   - Integration : Integrate the deployed model into your application or system using the provided API.

Software Requirements:

1. **IBM Cloud Account :** To need an IBM Cloud account to access the services and resources provided by IBM, including the Visual Recognition service.

2. **Operating System :** Can work on any major operating system, including Windows, Linux or macOS.

3. **Web Browser :** A modern web browser like Google Chrome, Microsoft Edge, or Mozilla Firefox for accessing the IBM Cloud dashboard.

4. **Code Editor or IDE :** To choose a code editor or Integrated Development Environment(IDE) which comfortable with. Some of the options like Visual Studio Code, PyCharm, Sublime Text, etc.

5. **Development Environment :** Depending on programming preferences, you may need specific development environments;

    - **Python :** In python, ensure you have it installed along with relevant packages for API integration.
    - **JavaScript or Node.js :** For JavaScript or Node.js applications, we need Node.js and Node Package Manager(npm).

6. **Image Annotation Tools :** project requires annotating images for training, this includes image annotation software. The tools using available in both open-source and commercial.