An Internship Report

on

AI-ML Virtual Internship

Submitted in partial fulfilment of the requirements

for the award of the degree of

BACHELOR OF TECHNOLOGY

in

Computer Science and Engineering (Data Science)

By

M .VEDHANATH REDDY **(224G1A32B0)**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(DATA SCIENCE)

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)

(Affiliated to JNTUA, accredited by NAAC with 'A' Grade, Approved by AICTE, New Delhi & Accredited by NBA (EEE, ECE & CSE))
Rotarypuram village, B K Samudram Mandal, Ananthapuramu-515701.

2024 – 2025

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Certificate

This is to certify that the internship report entitled "AI-ML Virtual Internship" is the bonafide work carried out by **M.VEDHANATH REDDY** bearing Roll Number 224G1A32B0 in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering (Data Science)** for 10 weeks from April - June 2024.

Internship Coordinator

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Assistant Professor

Head of the Department

Dr.P.Chitralingappa M.Tech.Ph.D

Assosciate Professor

Date:

Place: Ananthapuramu

EXTERNAL EXAMINER

PREFACE

All India Council for Technical Education (AICTE) has initiated various activities for promoting industrial internship at the graduate level in technical institutes and Eduskills is a Non-profit organization which enables Industry 4.0 ready digital workforce in India. The vision of the organization is to fill the gap between Academic and Industry by ensuring world class curriculum access to the faculties and students. Formation of the All-India Council for Technical Education (AICTE) in1945 by the Government of India.

Purpose: With a vision to create an industry-ready work force who will eventually become leaders in emerging technologies, Eduskills & AICTE launches -Virtual Internship' program, supported by Google.

Company's Mission Statement: The main mission of these initiatives is enhancement of the employability skills of the students passing out from Technical Institutions.

Business Activities:

- Product and Service Development
- Data Collection and Preparation.
- Model Training and Optimization.
- Deployment and Integration.
- Performance Monitoring and Maintenance.
- Ethical and Responsible AI Practices.

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of people who made it possible, whose constant guidance and encouragement crowned our efforts with success. It is a pleasant aspect that I have now the opportunity to express my gratitude for all of them.

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Finally, I wish to convey my gratitude to my family who fostered all the requirements and facilities that I need.

M.VEDHANATH REDDY

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LIST OF ABBERVIATIONS

API	Application Programming Interface
GCP	Google Cloud Platform
SDK	Software Development Kit
VPC	Virtual Private Cloud
CIDR	Classless Inter-Domain Routing
AI	Artificial Intelligences
ML	Machine Learning
S3	Simple Storage Service
RDS	Relational Database Service

CHAPTER- 1

INTRODUCTION

Google AI-ML encompass a diverse range of tools, platforms, and services provided by google to facilitate artificial inteligence and machine learning development. Google Cloud Al provides a suite of AI and ML services hosted on Google Cloud Platform (GCP). These services enable developers to build, train, and deploy machine learning models at scale

Iterating through our AI/ML transformation journey relies on your foundational capabilities to adopt AI/ML across business, people, governance security, and operations. A capability is an organizational ability to use processes to deploy resources (such as people, technology, and other tangible or intangible assets) to achieve an outcome.

Business Perspective

Google's AIML initiatives serve to innovate and differentiate its products, enhance user experiences, open up new monetization opportunities, leverage data for insights, maintain competitive _advantage, address ethical considerations, foster ecosystem development, and explore new markets and industries.

Governance Perspective

People are one Cornerstone of AI/ML adoption, another cornerstone is managing. optimizing, and scaling the organizational AI/ML initiative. As much as the cloud offered new days of looking at operational expense (OPEX) versus capital expense (CAPEX), AI/ML requires adopters to look at cost structures in a different way while managing the organizational risks and opportunities that rise from that.

Google's AIML initiatives involve establishing robust frameworks and policies to ensure responsible development, deployment, and usage of Al technologies. This encompasses addressing ethical concerns such as bias and fairness, ensuring_ data privacy and security, complying with regulations and standards, fostering transparency in AI systems, promoting diversity and inclusion in AI development teams, and engaging with stakeholders to build trust and accountability.

CHAPTER -2

TECHNOLOGY

Google provides various tools and platforms for developers interested in building conversational AI applications, including chatbots and virtual assistants. These tools typically leverage more advanced AI techniques such as natural language processing (NLP) and machine learning (ML) rather than AIML.

Here are some relevant offerings from Google for developers interested in conversational AI:

DialogFlow:

Dialogflow is a comprehensive development suite for building conversational interfaces, including chatbots and interactive voice response (IVR) systems. It offers natural language understanding (NLU) capabilities powered by machine learning, enabling developers to create intelligentand context-aware conversational experiences.Dialogflow supports integration with various messaging platforms, voice assistants, and custom applications.

TensorFlow:

TensorFlow is an open-source machine learning framework developed by Google. While not specifically designed for conversational AI, TensorFlow provides powerful tools and libraries for building and training custom machine learning models, including those used in natural language processing tasks such as text classification, sentiment analysis, and language generation.

Google Cloud AI:

Google Cloud offers a suite of AI services and APIs that developers can leverage to add advanced AI capabilities to their applications. This includes services for speech recognition, text-to-speech conversion, translation, entity recognition, and sentiment analysis, which can be integrated into conversational AI systems to enhance their functionality.

Actions on Google:

Actions on Google is a platform for building and deploying conversational actions for the Google Assistant. Developers can create custom actions using Dialogflow or build them from scratch using the Actions SDK. Actions on Google allows developers to reach users on Google Assistant-enabled devices, including smartphones, smart speakers, and smart displays.

Google Assistant SDK:

The Google Assistant SDK enables developers to integrate Google Assistant functionality into their own devices and applications. This allows developers to create custom voice-powered experiences using the same technology that powers the Google Assistant.

Roles of AI-ML

The applications of AI and ML in software development are essentially endless, and they will only become more and more possible as these technologies evolve. The following are a few of the methods that businesses most frequently employ these technologies:

Data analysis:

By examining huge amounts of organized or unorganized info, engineers can derive insightful information from their current systems or identify areas for advancement in various divisions, including marketing, customer service, finance, and others.

Automation of operations:

By automating some operations, resources that would have previously been utilized on tiresome repetitive tasks, such as form filling, are released, giving developers more time for innovative ideas and creative endeavours.

User Experience Enhancement:

Using machine learning algorithms like natural language processing (NLP) enables businesses to comprehend how clients feel through comprehending what they type into search bars; his assists in developing an improved client experience since clients frequently type searches or questions about products or services they're interested in but don't know precisely how to term it when looking online stores or websites.

Security:

While there may be numerous factors involved in some cases, making it challenging for humans alone to identify irregularities precisely within an appropriate timespan without taking conveniences, developed security systems operated by AI can identify spectacle behaviour patterns more _quickly than ever before, including those that include malware attacks or unauthorized transactions.

CHAPTER - 3

APPLICATIONS

Google's AI/ML applications are vast and diverse, spanning areas such as:

Building Chatbots and Virtual Assistants:

Developers can use Google's Dialogflow platform to create chatbots and virtual assistants for various use cases, such as customer support, information retrieval, appointment scheduling, and more. Dialogflow enables developers to design conversational interfaces, define intents and entities, and integrate with messaging platforms like Slack, Facebook Messenger, and Google Assistant.

Voice-Activated Applications:

With the Google Assistant SDK, developers can integrate Google Assistant functionality into their applications and devices, enabling users to interact with them using voice commands. This can be useful for building voice-controlled smart home devices, automotive applications, hands-free productivity tools, and more,

Multimodal Experiences:

Developers can create multimodal experiences using Google's conversational AI tools, combining yoice interactions with visual elements such as cards, images, and buttons. This can be particularly useful for building interactive experiences on devices with screens, such as smartphones, smart displays, and wearables.

Natural Language Processing (NLP) Applications:

Google Cloud Al offers a range of NLP services and APIs that developers can use to analyze and process natural language text.This includes services for sentiment analysis, entity recognition, text classification,language translation, and more. Developers can integrate these services into their applications to extract insights from text data and enable more sophisticated conversational experiences.

Custom Machine Learning Models:

Developers can leverage TensorFlow, Google's open-source machine learning framework, to build custom machine learning models for specific tasks related to conversational AI. This could include training models for intent detection, entity recognition, language understanding, and dialogue management, among others.

CHAPTER -4

MODULE EXPLANATION

Module-1: Program neural networks with TensorFlow

The module Program neural network with TensorFlow includes Introduction to computer vision, Basics of Machine Learning. Machine learning is a subfield of Artificial Intelligence (AI) that focuses on the development of algorithms and statistical models that enable computers to learn from and make predictions or decisions based on data. A neural network is a machine learning program, or model, that makes decisions in a manner similar to the human brain, by using processes that mimic the way biological neurons work together to identify phenomena, weigh options and arrive at conclusions. TensorFlow is an end-to-end open source platform for machine learning.

Consider the traditional manner,

Fig,4.1: Traditional Programming

You express rules in a programming language. They act on data and your program provides answers. In the case of the activity detection. the rules (the code you wrote to define activity types) acted upon the data (the person's movement speed) to produce answer. The process of detecting that activity status via ML is very similar, only the axes are different.

Fig.4.2: Machine Learning Programming

Instead of trying to define the rules and express them in a programming language, you provide the answers (typically called labels) along with the data, and the machine infers the rules that determine the relationship between the answers and data.

For example, your activity detection scenario might look like this in an ML context:

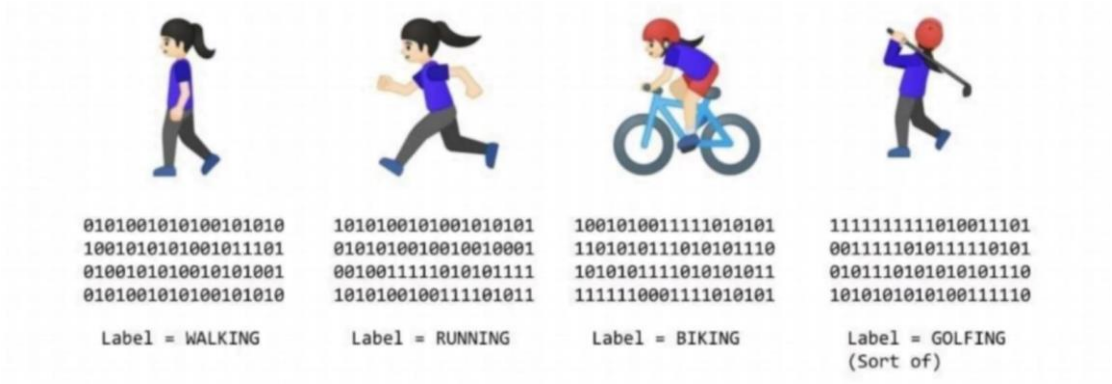


Fig:4.3: Activity detection

Consider the following problem: You're building system that performs activity recognition for A fitness tracking You might have access to the speed which a person is walking and attempt to infer their activity based on that speed using conditional.

Fig.4.4: Label-Walking

ifspeed<4) {

status=WALKING;

}

Fig.4.5: Label-Running

if(speed<4)f status=WALKING; else f status=RUNNING;

}

In the final condition you could similarly detect biking.

Fig.4.6: Label- Biking

```
if(speed<4){
        status=WALKING;
} else if (speed<12){
        status=RUNNING;
}else{
        status=BIKING;
}
```

You have a model that has been trained to learn the relationship between X and Y. You can use the model.predict method to have it figure out the Y for a previously unknown X. For example, if X is 10, print(model.predict([10.0]))

You might have thought 31, but it ended up being little over. Neural networks deal with a probabilities, so it calculated that there is a very high probability that the relationship between X and Y is Y=3X+1, but it can't know for sure with only six data points. The result is very close to 31, but not necessarily 31.

As you work with neural networks, you'll see that pattern recurring

Module-2: Get started with object detection

This module includes Introduction to Objection detection, Introduction to ML-kit. Object detection is a computer vision task that involves identifying and localizing objects within an image or a video frame. The goal is to not only recognize what objects are present in the scene but also to determine their precise locations by drawing bounding boxes around them.ML Kit is a mobile SDK (Software Development Kit) offered by Google that allows developers to integrate machine learning capabilities into their Android and iOS applications with ease. ML Kit empowers developers to incorporate powerful machine learning capabilities into their mobile applications quickly and efficiently.

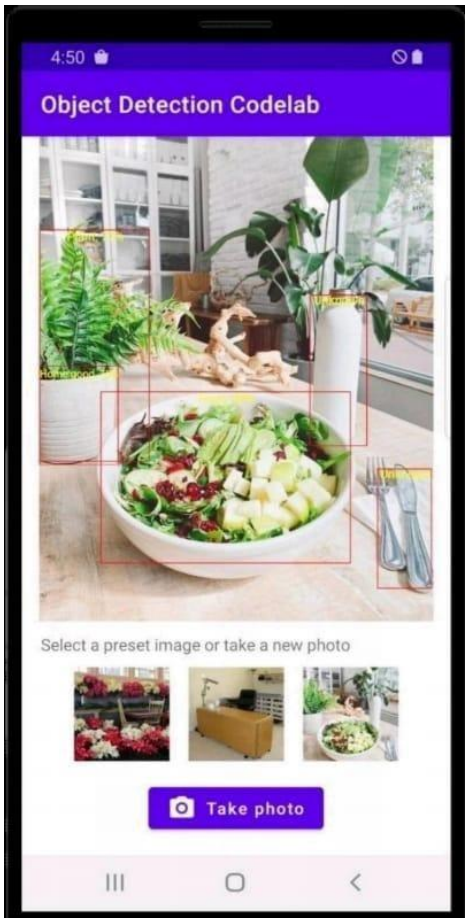


Fig.4.7:Object Detection Codelab

Get Set up

For this codelab, you will only need the sources in the object-detection subdirectory

The object-detection subdirectory in the mlkit-android repository contains two directories

- ⇨ starter--Starting code that you build upon for this codelab.
- ⇨ Final-- Completed code for the finished sample app

Add ML Kit Object Detection and Tracking API to the project

Let's start by importing the starter app into Android Studio**.**

Open Android Studio, select **Import Project (Gradle, Eclipse ADT, etc.)** and choose the starter folder from the source code that you have downloaded earlier**.**

Add the dependencies for ML Kit Object Detection and Tracking

The ML Kit dependencies allow you to integrate the ML Kit ODT SDK in your app. Add the following lines to the end of the app/build.gradle file of your project:

build.gradle

```
dependencies {

// ……

 implementation 'com.google.mlkit:object-detection:16.2.4’

}
```

Sync your project with gradle files

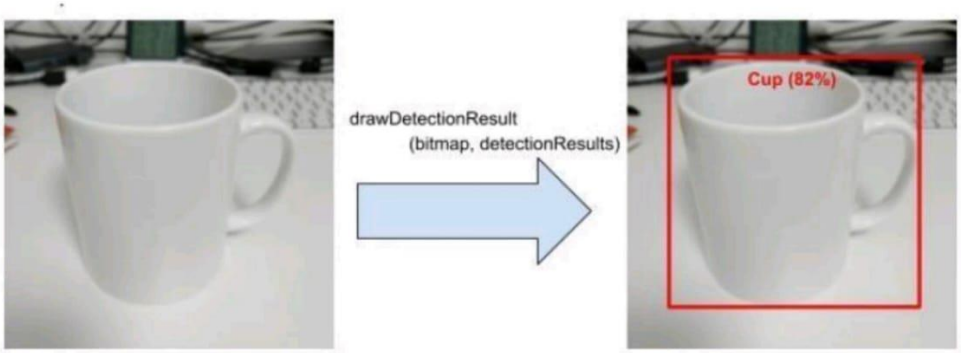
To be sure that all dependencies are available to your app, you should sync your project with gradle files at this point.

Select **Sync Project with Gradle Files (-----)** from the Android Studio toolbar**.**

Module-3: Go further with object detection

Object detection is a set of computer vision tasks that can detect and locate objects in a digit images. An object detection model can identify which of the known set of objects might be present, and provide information about their positions within the image. TensorFlow provides pre-trained, mobile optimized models that can detect common objects, such as cars, bikes, fruits etc. This requires collecting your owntraining images, then training and deploying your own object detection model.

Example of an output of the drawDetectionResult method in TensorFlow: detectionResults=[[boundingBoxes: ((200,220),(1289,1264),text: "cup(82%)"]]



Fig,4.8: Object detection Results

Understand the visualization utilities

There is some boilerplate code inside the codelab to help you visualize the detection result. Leverage these utilities to make our visualization code simple:

=>data class BoxWithText(val box: Rect, val text: String) This is a data class to store an object detection result for visualization. box is the bounding box where the object locates, and text is the detection result string to display together with the object's bounding box.

=>fun drawDetectionResult(bitmap: Bitmap, detectionResults: List<BoxWithText>): Bitmap This method draws the object detection results in detectionResults on the input bitmap and returns the modified copy of it.

Visualize the ML Kit detection result

Use the visualization utilities to draw the ML Kit object detection result on top of the input image.

=>You start by parsing the ML Kit's DetectedObject and creating a list of BoxWithText objects to display the visualization result.

=>Then you draw the detection result on top of the the input image, using drawDetectionResult utility method, and show it on the screen.

Draw the detection result on the input image

In this step, you'll make use of the utility method already implemented for you in the starter app, in order to:

=> draw a bounding box on an image

=>draw a category name and confidence percentage inside the bounding box.

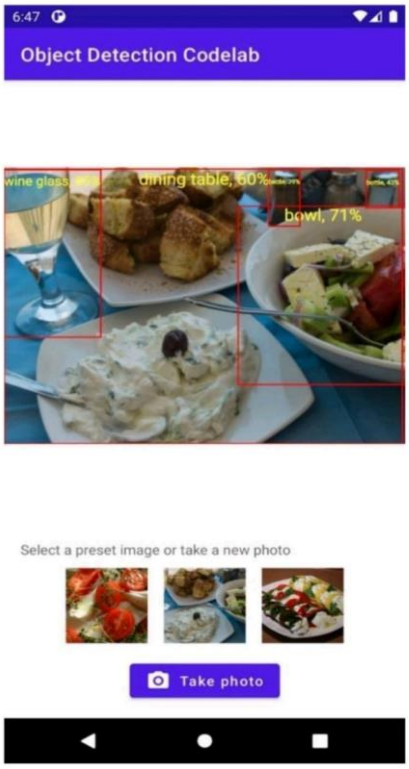


Fig.4.9; Bounding Box Results

Train a custom object detection model

In the previous step, you integrated a pre-trained TFLite object detection model to the Android app and saw for yourself that it can detect common objects, uch as bowls or dining tables, in sample images. However, your goal is to detect ingredients of the dishes in the image, so general object detection doesn't suit your use case. You want to train a custom object detection model using a training dataset with the ingredients we want to detect. It will take about 30 minutes to train the custom model

Module-4: Get started with product image search

Introduction to product image search on mobile involves leveraging computer vision and machine learning technologies to enable users to search for products using images captured bytheir mobile devices. Product image search typically involves the image capture, image recognition, search and detection of image. The foremost step in this image recognition. Selecting a suitable framework such as ML-Kit to deploying model on mobile devices. The ML-Kit analyze the photo to identify visual features and characteristics of the product, such as shape, color, texture, and patterns.Based on the identified features, the app searches its product database or connects to external sources (e.g., e-commerce websites, retail databases) to find matching or similar products. The app presents the user with a list of matching or similar products along with relevant information such as prices, descriptions, and purchasing options.

Set up Google Cloud Platform (GCP) Account: Developers need to create a Google Cloud Platform account if they haven't already. They can sign up for GCP and create a project. Enable the Cloud Vision API: In the Google Cloud Console, developers need to enable the Cloud Vision API for their project. This allows their application to access the image analysis capabilities provided by the API

Authentication: Developers need to set up authentication to allow their application to access the Cloud Vision API. This typically involves creating credentials such as API keys or service account keys and securely managing them within their application.

Upload Images: Users can upload images to the application for analysis. These images could be product photos taken from a mobile device or images retrieved from an online source.

Call the Cloud Vision API: Developers use the Cloud Vision API to analyze the uploaded images. They can make API calls using the client libraries provided by Google or through direct HTTP requests. Developers can specify the type of analysis they want to perform, such as object detection, label detection, or product search.

Process API Responses: Once the Cloud Vision API analyzes the images, it returns JSON-formatted responses containing information about the detected objects, labels, and products. Developers can parse these responses to extract relevant information such as product names, descriptions, and links.

Display Search Responses: Finally, developers can display the search results to users within their application interface. Users can then browse through the products identified in the images and access additional details or make purchases if applicable

By leveraging the capabilities of the Google Cloud Vision API, developers can create powerful product image search functionality in their applications, enabling users to discover and explore products visually. Developers can refer to the official documentation and tutorials provided oy Google Cloud for more detailed guidance on using the Cloud Vision API for product image search implementations.

Module-5: Go further with product image search

Module includes the visual product search backend using Vision API. Vision API Product Search is a feature in Google Cloud that allows retailers to create products, each containing reference images that visually describe the product from a set of options.When users query the product set with their own images, Vision API Product Search applies machine learning to compare the product in the users query image with the images in the retailers product set and returns the similar results. Vision API Product Search is a feature in Google Cloud that allows users to search for visually similar products from a product catalog. The Vision API Product Search empowers businesses to enhance their applications with visual product search capabilities, enabling users to discover products more intuitively# and efficiently.

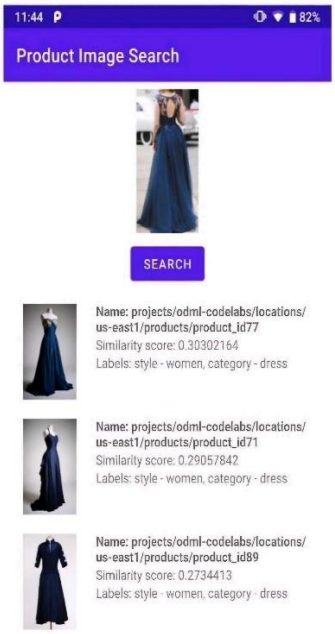


Fig.4.10: Product Search Result

The Vision API seamlessly integrates with other Google Cloud services, allowing developers to analyze images stored in Google Cloud Storage.

Research and Understand Requirements:

Begin by thoroughly understanding the requirements and objectives of the product image search module. Identify the specific functionalities and features required, as well as any constraints or limitations.Explore Existing Solutions: Investigate existing product image search solutions and technologies, including both open-source and proprietary options. Analyze their features, performance, and suitability for integration into the AIML environment

Evaluate Google Cloud Vision API: Assess the capabilities of the Google Cloud Vision API for product image search. Explore its features for image analysis, object detection, label recognition, and product identification. Consider how it can be leveraged within the AIML internship project.

Prototype Implementation: Develop a prototype implementation of the product image search module using the Google Cloud Vision API. Integrate it into the AIML environment and test its functionality with sample product images.

Optimization and Customization: Optimize the product image search module for performance, accuracy, and scalability. Explore options for customizing the API's behavior and parameters to better suit the requirements of the AIML project.

Integration with AIML Framework: Integrate the product image search module with the existing AIML framework or platform. Ensure seamless communication between the image search functionality and other components of the AIML system.

Testing and Validation: Conduct comprehensive testing and validation of the integrated product image search module. Test its functionality under various scenarios, including different types of product images and search queries.

Feedback and Iteration: Gather feedback from stakeholders, mentors, and users to identify areas for improvement. Iterate on the product image search module based on feedback and make necessary adjustments to enhance its performance and usability.

Documentation and Reporting: Document the design, implementation, and usage of the product image search module. Prepare detailed reports and documentation to share insights, findings, and learnings from the internship project.

Presentation and Demo:

Prepare a presentation or demo to showcase the product image search module and its integration within the AIML environment. Highlight key features, functionalities, and benefits of the module to stakeholders and peers.

Module-6: Go further with image classification

Classification between objects is a fairly easy task for us, but It has proved to be a complex one for machines and therefore image classification has been an important task within the field of computer vision.

Structure of an Image Classification task,

• Image Preprocessing

• Object detection

• Object recognition and training

• Object classification

Image Preprocessing-The aim of this process is to improve the image data(features) by suppressing unwanted distortions and enhancement of some important image features so that our computer vision models can benefit from this improved data.

Object detection-refers to the localization of an object which means the segmentation of the image and identifying the position of the object of interest.

Object recognition and training-This is the process where the model learns the features from the dataset is called modeltraining once you've labeled your data, you need to train the model. This involves uploading large amounts of data to each of your labels to give the model something to learn from. The more training data you upload, the more accurate your model will be in determining the contents of each image. Object classification-This is the final step in the process, Now your model is ready to classify the images by several different criteria. It does classification by comparing picture patterns to desired Patterns,

Training an image classification model typically involves the following steps:

Data Collection: Gather a dataset of images that are labelled with their corresponding classes. The dataset should be diverse and representative of the images the model will encounter in the real world.

Data Preprocessing: Preprocess the images to ensure they are in a suitable format for training. This may include resizing, normalization, and augmentation to increase the diversity of the dataset.

Model Selection: Choose a suitable model architecture for image classification. Common choices include Convolutional Neural Networks (CNNs) such as AlexNet, VGG, ResNet, or more modern architectures like EfficientNet or ResNeXt.,

Model Training: Train the selected model using the labeled dataset, During training, the model learns to map input images to their corresponding classes by adjusting its weights based on the training data.

Model Evaluation: Evaluate the trained model on a separate validation or test dataset to assess its performance. Common metrics for evaluation include accuracy, precision, recall, and F1-score,

Model Fine-Tuning: Fine-tune the model by adjusting hyperparameters, such as learning rate or batch size, to improve its performance further.

Deployment: Once the model is trained and evaluated, it can be deployed to classify new, unseen images in real-world applications.

Image classification involves training a machine learning model to categorize images into different classes or categories. It's a common task in computer vision and has many practical applications, such as facial recognition, object detection, and medical image analysis.

To further explore image classification, you can consider the following advanced topics and techniques:

Transfer Learning: Use pre-trained models (e.g., GG ResNet, Inception) and fine-tune them on your specific dataset. This can significantly reduce the training time and improve performance, especially when you have limited data.

Data Augmentation: Generate new training data by applying random transformations (e...,rotation, flipping, scaling) to existing images. This can help improve the model's generalization and robustness. Ensemble Learning: Combine predictions from multiple models (e.g., bagging, boosting, stacking) to improve overall performance and reduce overfitting,

Attention Mechanisms: Use attention mechanisms (e.g., self-attention, spatial attention) to focus on relevant parts of the image, improving the model's ability to extract important features.

One-shot and Few-shot Learning: Explore techniques that enable learning from a small number of examples per class, which is useful when you have limited labelled data.

Adversarial Training: Train the model using adversarial examples to improve its robustness against adversarial attacks.

Self-supervised Learning: Train the model using pretext tasks (e.g., predicting image rotations, image colorization) to learn useful representations that canthen be fine-tuned for image classification.

Domain Adaptation and Transfer Learning: Adapt a model trained on one domain to work wellin another domain with different characteristics (e.g., ifferent lighting conditions, camera angles).

Model Compression and Optimization: Use techniques such as pruning, quantization, and knowledge distillationto reducethe size and computational complexityofthe modelwhile maintaining performance.

Active Learning: Selectively querythe most informative data points for labelling to improve the model's performance with minimal labelling effort. These advanced techniques can help you improve the performance, efficiency, and robustness of your image classification models

CHAPTER 5

Real Time Examples

Google Assistant Actions: Developers can create conversational actions for Google Assistant using Dialogflow, Google's natural language understanding platform. These actions enable users to interact with Google Assistant using voice commands to perform tasks like checking the weather, ordering food, controlling smart home devices, or accessing information.

Vision AI: Google Cloud Vision API allows developers to build applications that an understand and interpret the content of images. Real-time examples include image classification, object detection,text recognition, and content moderation in applications such as e-commerce, social media, and healthcare

Language AI: Google Cloud Natural Language API provides tools for sentiment analysis, entity recognition, and language classification. Developers can use this API to analyze and understand the sentiment and structure of text data, enabling applications like chatbots, content recommendation systems, and social media monitoring tools.

Recommendation Systems: Google offers tools like TensorFlow Recommenders and TensorFlow Ranking for building recommendation systems. Developers can use these tools to create personalized recommendation engines for e-commerce platforms, streaming services, news aggregators, and more,

AutoML: Google's AutoML suite allows developers to build custom machine learning models without requiring expertise in machine learning algorithms. Real-time examples include image classification, text classification, object detection, and translation models tailored to specific use cases and industries.

Smart Analytics: Google Analytics offers advanced analytics features powered by AI and ML, such as predictive analytics, anomaly detection, and churn prediction. Developers can use these features to gain insights into user behavior, optimize marketing campaigns, and improve business decision-making processes.

CHAPTER 6

LEARNING OUTCOMES

By the end oft 'this we will be able to know about:

Foundational Knowledge: Participants gain a solid understanding of fundamental concepts in neural networks, deep learning, and computer vision, laying the groundwork for more advanced studies and applications in the field,.

Practical Skills with TensorFlow: Participants learn how to use TensorFlow, Google's open-source machine learning framework, to implement neural network models for various tasks, including image classification, object detection, and product image search.

Advanced Techniques and Algorithms: Participants delve into advanced techniques and algorithms in object detection, such as instance segmentation, multi-class detection, and real-time tracking, enabling them to tackle more complex computer vision challenges.

Hands-on Experience: Through practical exercises and projects, participants gain hands-on experience in training, evaluating, and deploying machine learning models for real-world applications, honing their skills in model development and deployment.

Specialized Applications: Participants explore specialized applications of computer vision, such as productimage search, gaining insights into industry-specific challenges and solutions indomains like e-commerce, retail, and visual search.

Critical Thinking and Problem-Solving: Participants develop critical thinking skills and problem-solving abilities through project-based learning, where they apply theoretical knowledge to solve real-world problems and optimize machine learning solutions .

Stay Updated with Latest Developments: By engaging with cutting-edge research and industry trends, participants stay updated with the latest advancements in AI and ML, preparing them to adapt and innovate in a rapidly evolving technological landscape.

CONCLUSION

In conclusion, the Google AI-ML Virtual Internship provided me with practical experience and knowledge in Artificial Intelligence and Machine Learning. Through completing various units, I have gained hands-on experience in object detection, product image search, and image classification. This internship has equipped me with valuable skills and insights that will guide me in my future projects in AIML

CERTIFICATE

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