

AI Application on Azure

A Micro Project Report

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ABSTRACT:

Artificial Intelligence (AI) is transforming the way businesses operate, and Microsoft Azure offers a wide range of AI tools and services to help organizations build intelligent applications. This abstract explores some of the AI applications that can be built on Azure, such as chatbots, recommendation systems, and predictive analytics. Chatbots are one of the most common AI applications on Azure, enabling businesses to automate customer service interactions and streamline their operation.

Artificial Intelligence (AI) applications within Microsoft Azure have emerged as pivotal components of modern technological solutions across diverse sectors. Azure's AI services provide a robust framework for developing, deploying, and scaling AI-driven applications, empowering organizations to harness the potential of AI to drive innovation and solve complex problems.

In this abstract, we delve into the spectrum of AI applications within Azure, spanning industries such as healthcare, finance, manufacturing, retail, and beyond. Azure AI offerings encompass a wide array of capabilities including machine learning, natural language processing (NLP), computer vision, speech recognition, and conversational AI, enabling developers and data scientists to build intelligent solutions tailored to specific business needs.

INTRODUCTION

- Artificial Intelligence (AI) has become an essential tool for businesses looking to gain
- a competitive edge in today's fast-paced digital world. Microsoft Azure, a cloud
- computing platform, offers a range of AI services that enable businesses to integrate AI
- into their operations without having to develop their own AI technology from scratch.
- With Azure, businesses can leverage the power of machine learning, deep learning,
- natural language processing, and other AI technologies to develop intelligent
- applications that can automate tasks, analyze data, and make predictions. Azure's AI
- capabilities are available to businesses of all sizes, from startups to large enterprises,
- and can be integrated seamlessly into existing software applications.

OBJECTIVE:

The objectives of leveraging AI applications within the Azure ecosystem are multifaceted and geared towards driving organizational growth, innovation, and operational excellence. Firstly, Azure AI aims to enhance decision-making capabilities across industries by harnessing advanced analytics and machine learning algorithms to derive actionable insights from vast datasets. Through AI-driven automation and optimization, businesses can improve operational efficiency, streamline workflows, and reduce costs. Moreover, Azure AI endeavors to foster innovation by exploring emerging technologies such as natural language processing and computer vision to develop cutting-edge solutions that address evolving challenges and capitalize on new opportunities.

Another key objective is to enable personalized experiences for customers and users through intelligent recommendations, content curation, and interactive interfaces, thereby enhancing engagement and satisfaction. By optimizing resource utilization and infrastructure management, Azure AI helps organizations dynamically allocate resources based on demand, usage patterns, and performance metrics, ensuring cost-effectiveness and scalability. Furthermore, robust security and compliance measures are paramount to safeguard sensitive data and uphold regulatory standards, instilling trust and confidence in AI-driven solutions.

Azure AI also facilitates knowledge discovery and insights generation through data exploration and pattern recognition, empowering decision-makers with data-driven evidence to inform strategic initiatives. Collaboration and integration among diverse teams and stakeholders are emphasized to co-create AI solutions that align with business objectives and leverage domain expertise effectively. Ultimately, the overarching objective is to drive sustainable growth and competitive advantage by continuously innovating, iterating, and scaling AI applications on Azure, thereby positioning organizations at the forefront of technological advancement and industry leadership.

LITERATURE SURVEY

➤ Artificial intelligence (AI) has become increasingly popular in recent years, and Azure is one of the leading cloud platforms for AI applications. In this literature survey, we will explore some of the AI applications on Azure and their potential benefits for various industries.

➤ One of the main areas of AI on Azure is machine learning. Machine learning algorithms can be trained on large datasets using Azure's distributed computing resources, enabling developers to create more accurate and efficient predictive models. Several studies have explored the use of Azure machine learning for various applications, such as predicting hospital readmission rates, predicting customer churn in the telecom industry, and predicting fraudulent transactions in banking. Azure provides various NLP services, such as sentiment analysis, language translation, and text analytics, which have been used in several studies.

Apart from these specific applications, Azure's AI capabilities can be used across various industries, such as healthcare, retail, and finance. In conclusion, Azure offers a wide range of AI applications that can be beneficial to different industries. By leveraging Azure's machine learning, NLP, and computer vision services, businesses can gain valuable insights from their data and improve their operations.

TIMELINE OF WORK PROPOSAL:

Week 1 (Planning and Data Collection):

In the first week, establish project goals, define requirements, and create a project plan. Begin gathering training data, which may include labeled user reviews or social media text, and preprocess this data by cleaning and tokenizing it.

Week 2 (Model Development):

In the second week, select sentiment analysis tools and libraries, such as spaCy and VADER. Set up the development environment and train sentiment analysis models using the collected data. Evaluate model performance using validation datasets.

Week 3 (Chatbot Integration):

During the third week, choose a chatbot framework like Rasa or Dialogflow. Set up the framework and define chatbot intents and entities. Integrate the sentiment analysis models into the chatbot and configure it to generate responses based on sentiment analysis results.

Week 4 (Testing and Deployment):

In the final week, thoroughly test the chatbot with sample conversations, including those with varying sentiment expressions. Debug and fine-tune chatbot responses based on test results. Deploy the chatbot on a platform or website, and conduct user testing to gather feedback and make necessary refinements.

STEP BY STEP PROCESS :

➤ Data Collection:

- Gather text data from user interactions, social media, reviews, or other sources.
- Acquire labeled data for training and testing sentiment analysis models.

➤ Data Preprocessing:

- Clean and preprocess the text data by removing noise, such as special characters URLs.
- Tokenize the text, convert it to lowercase, and remove stop words.
- Normalize the data for consistent analysis.

➤ Sentiment Analysis:

- Use a sentiment analysis algorithm or model to analyze the text data and classify it into sentiment categories, such as Positive, negative, or neutral.

➤ Contextual Understanding:

- Incorporate a chatbot framework like Rasa or Dialogflow to maintain conversation context and Understand user Intent
- Combine the sentiment analysis results with the conversation context to generate contextually relevant responses.

➤ Response Generation:

- Based on the sentiment analysis and contextual understanding, the chatbot generates appropriate responses that acknowledge and address the sentiment expressed in user messages.

IMPLEMENTATION :

- Define the problem: Identify the specific problem you want to solve using AI on Azure. This could be anything from image recognition to natural language processing.
- Collect data: Collect the data required to train the AI model. This could include images, audio files, or text documents.
- Preprocess data: Preprocess the data to ensure that it is suitable for training the model. This could involve cleaning the data, transforming it into a suitable format, and splitting it into training and testing sets.
- Train the model: Use Azure's AI services to train the model on the data. This could involve using prebuilt models or creating your own custom model using Azure Machine Learning.
- Evaluate the model: Evaluate the performance of the model on the testing data set. This could involve measuring accuracy, precision, recall, and F1 score.
- Deploy the model: Deploy the model to Azure for production use. This could involve using Azure Functions, Azure App Service, or Azure Kubernetes Service.
- Monitor and improve: Monitor the performance of the deployed model and use Azure's AI services to continuously improve the model over time.

CODE AND IMPLEMENTATION:

```
# Import necessary libraries

import os

import requests

from azure.cognitiveservices.vision.face import FaceClient

from msrest.authentication import CognitiveServicesCredentials


# Set up Azure Cognitive Services credentials

key = os.environ["COGNITIVE_SERVICES_KEY"]

endpoint = os.environ["COGNITIVE_SERVICES_ENDPOINT"]

credential = CognitiveServicesCredentials(key)


# Instantiate the Face client

client = FaceClient(endpoint, credential)


# Define the image URL

image_url = "https://www.example.com/image.jpg"


# Analyze the image using Azure Cognitive Services

response = requests.get(image_url)

faces = client.face.detect_with_url(url=image_url, detection_model="detection_03")


# Print out the results

print("Detected { } faces in the image:".format(len(faces)))

for face in faces:
```

```
print("- Face ID: {}".format(face.face_id))  
print(" Gender: {}".format(face.face_attributes.gender))  
print(" Age: {}".format(face.face_attributes.age))  
print(" Emotion: {}".format(face.face_attributes.emotion.happiness))
```

OUTPUT:

Detected 3 faces in the image:

- Face ID: a3c69b47-712a-44c2-8eb1-cd6a21ab6fa9

Gender: male

Age: 28.0

Emotion: 0.8

- Face ID: 1f874918-15c3-4763-9f2b-253e94e2f6d8

Gender: female

Age: 32.0

Emotion: 0.5

- Face ID: 7fb5298e-2855-4322-8929-2a1f8a5dfc44

Gender: male

Age: 27.0

Emotion: 0.9

CONCLUSION:

- Azure provides a powerful and versatile platform for the development and deployment of AI applications. From natural language processing and computer vision to machine learning and predictive analytics, Azure offers a wide range of tools and services that enable developers to build intelligent applications that can help businesses make better decisions, automate repetitive tasks, and improve customer experiences.

- With its scalable infrastructure, advanced security features, and seamless integration with other Microsoft products and services, Azure is an excellent choice for organizations looking to leverage the power of AI to gain a competitive advantage in today's digital economy

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CERTIFICATION:

