Sinhgad Technical Education Society's

SINHGAD COLLEGE OF ENGINEERING, Pune-41

Department of Information Technology

A Seminar

on

"AI using Cloud Computing: a Study of Microsoft Azure and its Cognitive Services"

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Seminar Topic and Domain

- **Topic :** AI using Cloud Computing: a Study of Microsoft Azure and its Cognitive Services
- **Topic Description** : Azure Cognitive Services are cloud-based artificial intelligence (AI) services that help users to use Artificial Intelligence tools into an application without having any AI or Data Science knowledge.
- **Domain :** Cloud Computing
- **Sub-Domain :** Cloud Based Artificial Intelligence APIs

Introduction

- Cloud is an abstract, virtual environment where programs and data are stored. In cloud computing power is provided by data centers.
- Users do not need to buy software or maintain expensive servers and devices for data storage, this leads to significant reduction of expenses, office space, and internal staff for IT support and increase of data security.
- There are three main components for cloud computing these components are :
- Client
- Data centers
- Distributed Servers.

Literature Survey

Sr. No	Paper Title	Author Name	Year	Advantages
1	Cloud Computing and Windows Azure	G. CARUTASU, M. A. BOTEZATU , C. BOTEZATU & M. PIRNAU	2016	Gives Basic Information regarding Cloud Computing and by using Microsoft Azure.
2	Semantic Representation of Cloud Services: a Case Study for Microsoft Windows Azure	Beniamino Di Martino, Giuseppina Cretella, Antonio Esposito and Raffaele Giulio Sperandeo	2014	Has detailed explanation of Cloud Services provided in Cloud Computing and description of Services by using Microsoft Azure.
3	A Detailed Study of Azure Platform & Its Cognitive Services	Amit Choudhary, Ankita Verma, Dhutima Malla, Vasudha Arora	2019	This Paper gives more detailed study on Microsoft Azure and examples of cognitive services like Face Detection and Image Recognition

What is Cloud

- The cloud is not a physical entity, but instead is a vast network of remote servers around the globe which are hooked together and meant to operate as a single ecosystem.
- Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN.
- Applications such as e-mail, web conferencing, customer relationship management (CRM), all run in cloud.

Cloud Computing

- Cloud computing is the delivery of computing services like servers, storage, databases, networking, software, analytics, and intelligence over the Internet or the cloud, to offer faster innovation, flexible resources, and economies of scale.
- It is manipulating, configuring, and accessing the applications online. It offers online data storage, infrastructure and application.
- Cloud Computing is both a combination of software and hardware based computing resources delivered as a network service.

Working Models for Cloud Computing

There are two Working Models for Cloud Computing :

1. Deployment Models
    i. Public
    ii. Private
    iii. Hybrid
2. Service Models
    i. Infrastructure as a Service (IaaS)
    ii. Platform as a Service (PaaS)
    iii. Software as a Service (SaaS)

Deployment Models

Deployment models define the type of access to the cloud, i.e., how the cloud is located?

- **Public Cloud:** The Public Cloud allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness, e.g.-mail.
- **Private Cloud:** The Private Cloud allows systems and services to be accessible within an organization. It offers increased security because of its private nature.
- **Hybrid Cloud:** The Hybrid Cloud is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.

Service Models

Service Models are the reference models on which the Cloud Computing is based.

- **Infrastructure as a service:** IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.
- **Platform as a service:** PaaS provides the runtime environment for applications, development & deployment tools, etc.
- **Software as a service:** SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a Web-based service.

Introduction to Microsoft Azure

- Microsoft Windows Azure is a cloud computing platform released on 1st February 2010 and created by Microsoft.
- It helps to build, deploy and manage application and services through a global network of Microsoft-managed data centers.
- It provides all IaaS, PaaS and IaaS services.

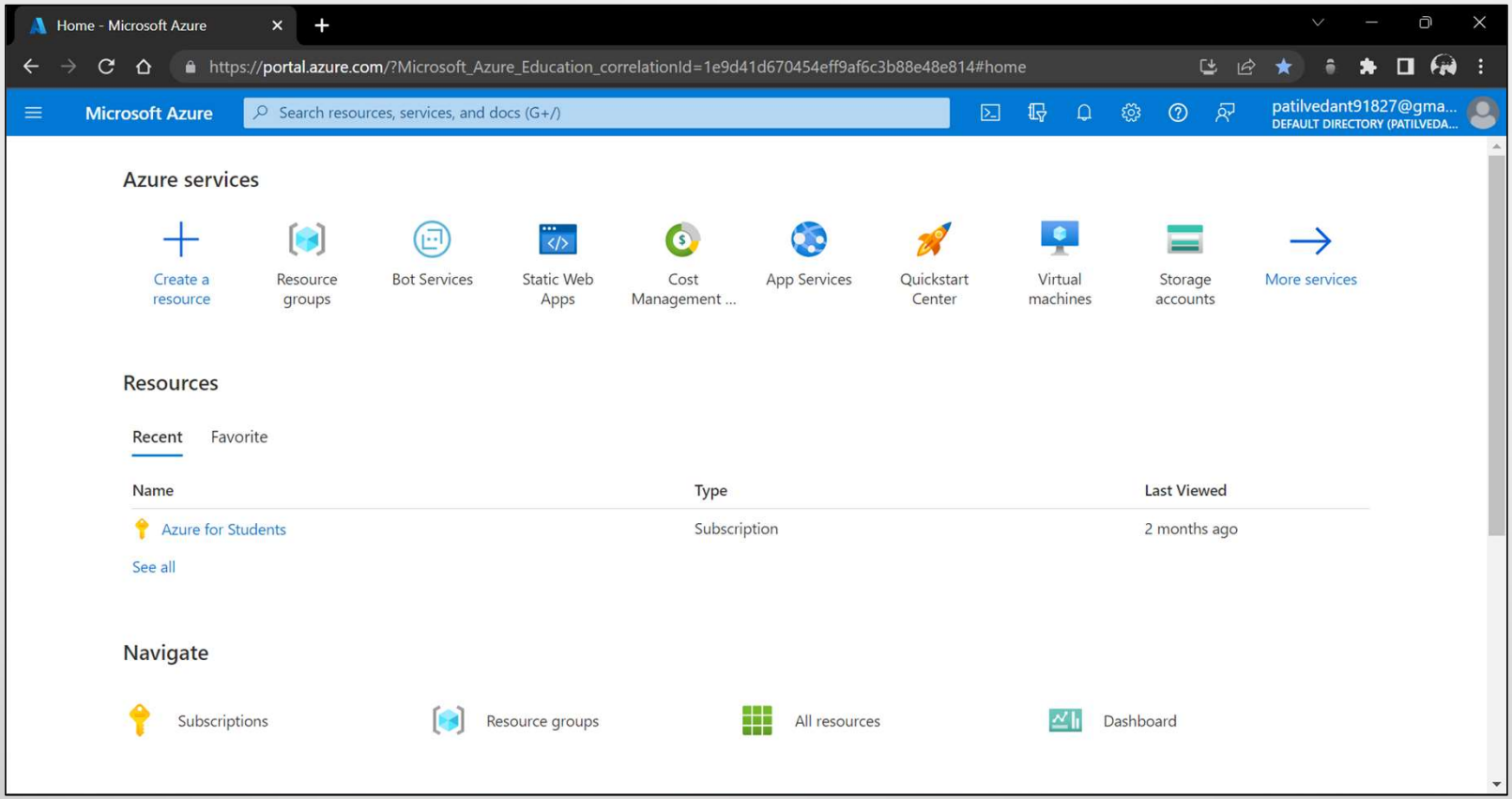


Fig Azure Console

Comparison With Other Cloud Services

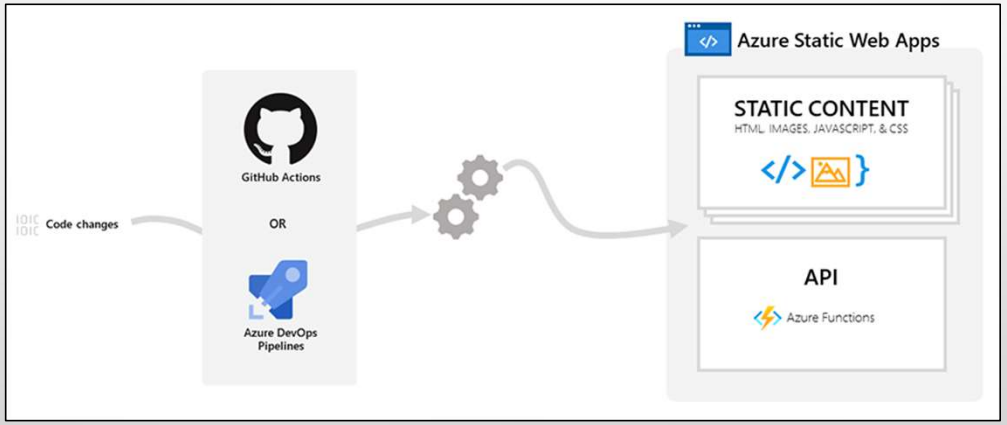
Feature	AWS	Azure	GCP
Geographic Availability		X	
Security and Compliance		X	
Operating System Support (Windows)	X	X	
Operating System Support (Linux-variants)	X		X
Containers (hybrid cloud environments)	X	X	
Containers (machine learning)	X		
Containers (web applications)		X	
Persistent Functions	X	X	
Final Recommendation		**X**	

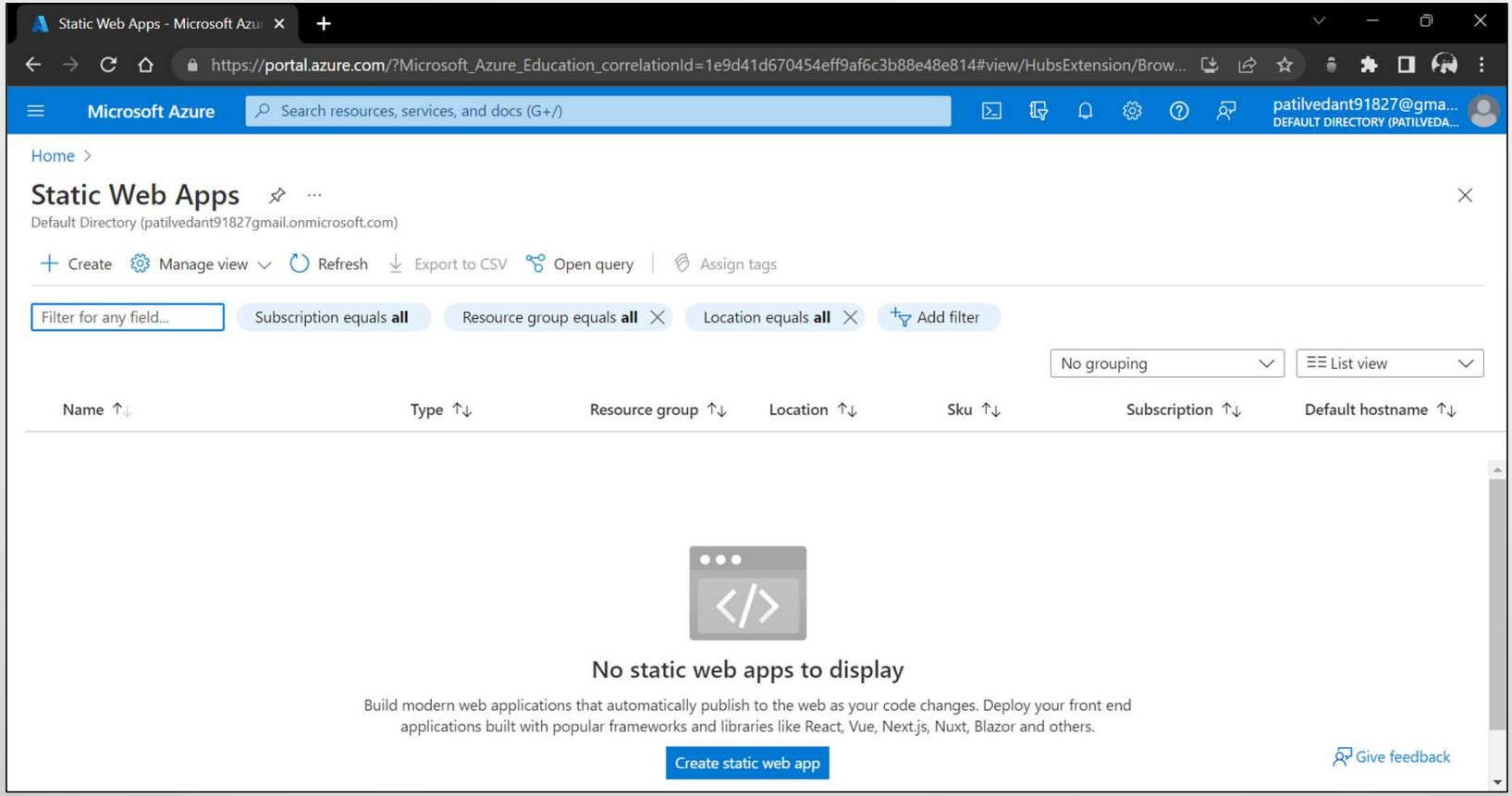
Comparing of features of all three major cloud services providers are shown in table, based on that Microsoft azure is widely recommended for commonly used services.

Azure Static Web Apps

- Static web apps are commonly built using libraries and web frameworks like Angular, React, Svelte, Vue, or Blazor where server-side rendering isn't required.

- These apps include HTML, CSS, JavaScript, and image assets that make up the application.




Static Web Apps - Microsoft Azu
https://portal.azure.com/?Microsoft_Azure_Education_correlationId=1e9d41d670454eff9af6c3b88e48e814#view/HubsExtension/Brow...
Microsoft Azure
Search resources, services, and docs (G+/)
patilvedant91827@gma...
DEFAULT DIRECTORY (PATILVEDA...
Home
Static Web Apps
Default Directory (patilvedant91827gmail.onmicrosoft.com)
Create
Manage view
Refresh
Export to CSV
Open query
Assign tags
Filter for any field...
Subscription equals all
Resource group equals all
Location equals all
Add filter
No grouping
List view
Name
Type
Resource group
Location
Sku
Subscription
Default hostname
No static web apps to display
Build modern web applications that automatically publish to the web as your code changes. Deploy your front end applications built with popular frameworks and libraries like React, Vue, Next.js, Nuxt, Blazor and others.
Create static web app
Give feedback

AI using Cloud Computing

- Azure Cognitive Services are cloud-based artificial intelligence (AI) services that help developers build cognitive intelligence into applications without having direct AI or data science skills or knowledge.

Cognitive Services can be categorized into four main pillars:

- Vision
- Language
- Speech
- Decision

Language Service

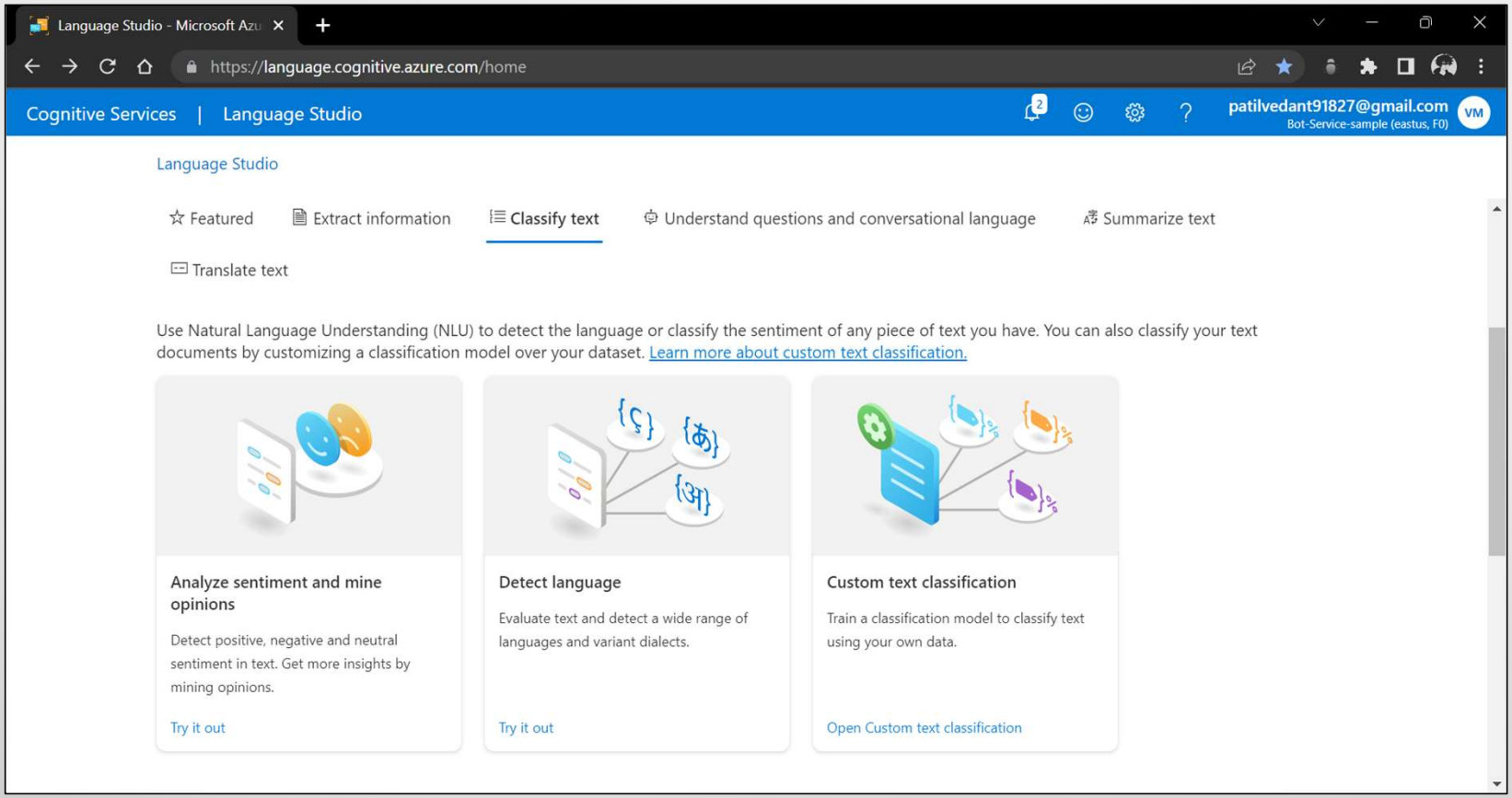
- Azure Cognitive Service for Language is a cloud-based service that provides Natural Language Processing (NLP) features for understanding and analyzing text.
- Use this service to help build intelligent applications using the web-based Language Studio, and client libraries.

Azure Bot Service & QnA Maker

- QnA Maker is a cloud-based Natural Language Processing (NLP) service that allows us to create a natural conversational layer over your data.
- It is used to find the most appropriate answer for any input from your custom knowledge base (KB) of information.
- QnA Maker is commonly used to build conversational client applications, which include social media applications, chat bots, and speech-enabled desktop applications.

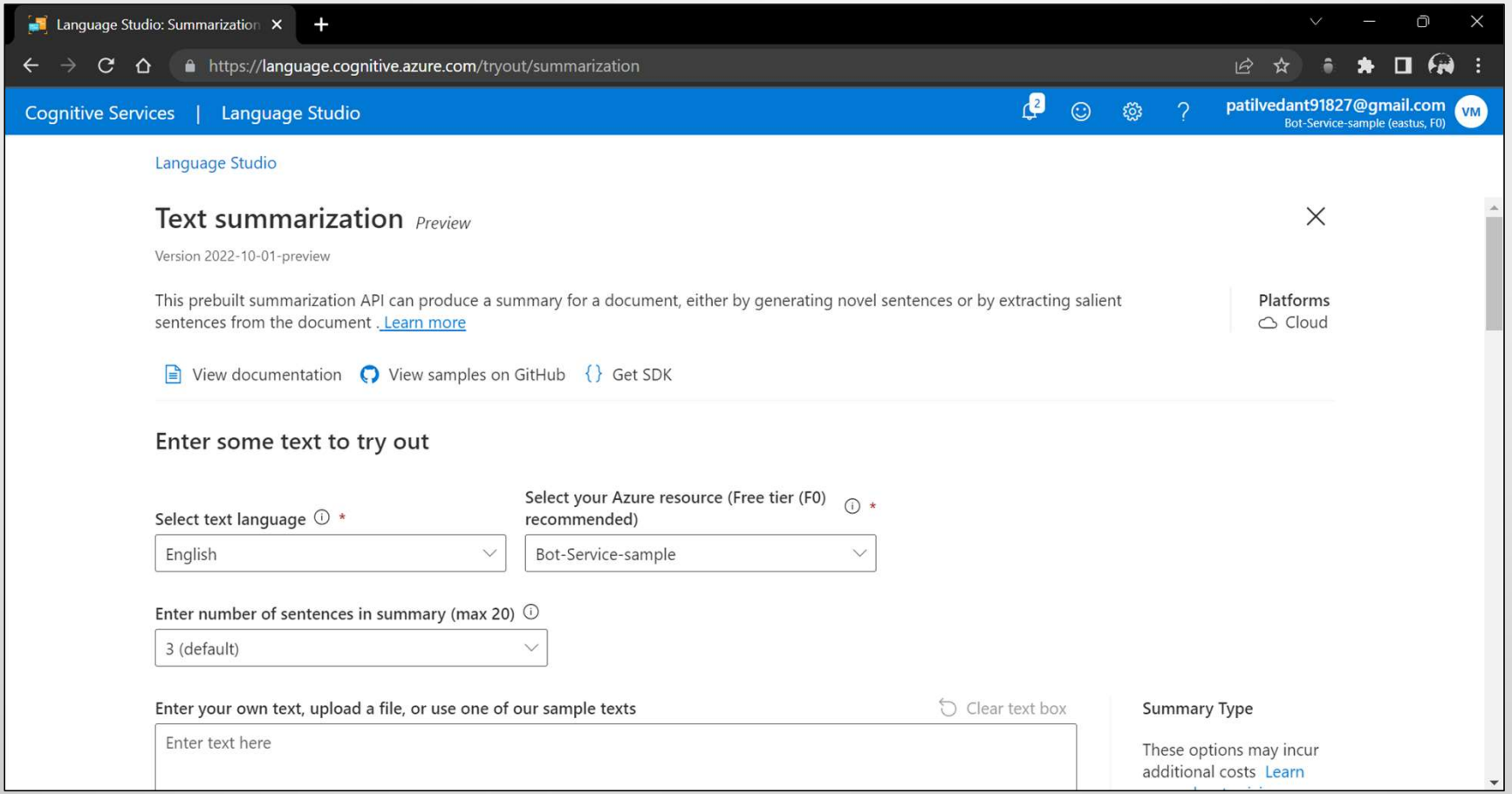
Language Detection

- Language detection is one of the features offered by Azure Cognitive Service for Language.
- It is a collection of machine learning and AI algorithms in the cloud for developing intelligent applications that involve written language.
- Language detection can detect the language a document is written in, and returns a language code for a wide range of languages, variants, dialects, and some regional/cultural languages.


Language Studio - Microsoft Azu
https://language.cognitive.azure.com/home
Cognitive Services | Language Studio
patilvedant91827@gmail.com
Bot-Service-sample (eastus, F0)
VM
Language Studio
Featured
Extract information
Classify text
Understand questions and conversational language
Summarize text
Translate text
Use Natural Language Understanding (NLU) to detect the language or classify the sentiment of any piece of text you have. You can also classify your text documents by customizing a classification model over your dataset. Learn more about custom text classification.
Analyze sentiment and mine opinions
Detect positive, negative and neutral sentiment in text. Get more insights by mining opinions.
Try it out
Detect language
Evaluate text and detect a wide range of languages and variant dialects.
Try it out
Custom text classification
Train a classification model to classify text using your own data.
Open Custom text classification

Text Summarization

- Document summarization uses natural language processing techniques to generate a summary for documents. It is done by API: extractive and abstractive
- Extractive summarization extracts sentences that collectively represent the most important or relevant information within the original content.
- Abstractive summarization generates a summary with concise, coherent sentences or words which are not simply extract sentences from the original document.

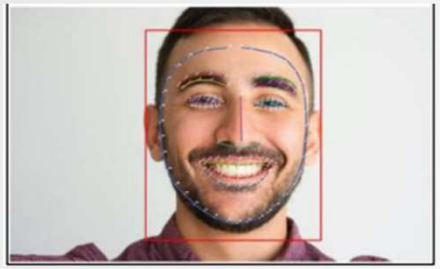


Text Summarization in Console

Face Recognition

- Facial recognition uses computer-generated filters to transform face images into numerical expressions that can be compared to determine their similarity.
- Face recognition is used in various circumstances including security, regular UI, picture content examination and organization.
- The Face recognition can also organizes feeling affirmation, affections for each face in the image, for instance, shock, disdain, irritate, fear, euphoria, neutral, pain and surprise.

Example of Face Recognition



Detection result :
1 face detected
JSON:
[
{
"faceRectangle": {
"top": 56,
"left": 123,
"width": 59,
"height": 59
},
"scores": {
"anger": 6.932031E-08,
"contempt": 1.34474765E-09,
"disgust": 9.843048E-08,
"fear": 1.65876812E-10,
"happiness": 0.9999997,
"neutral": 4.23310347E-08,
"sadness": 2.851677E-10,
"surprise": 1.01985542E-07
}
}
]

Conclusion

- Computing in cloud computing makes it a reality. Organizations can currently only pay for what they use.
- This enables a reduction in investment in IT and leads to more efficient use of the Services.
- Microsoft Azure provides the necessary cloud platform that reduces not only the time to discovery, but also the cost of discovery.
- AI and ML services Such as Face API Services , Language Services are easy to use in application with or without code.

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