CREATING A CLOUD BASED TRANSLATOR FROM TEXTS AND IMAGES

Problem Statement:

To detect and translate the information from various languages and signboards into a language that users can comprehend.

Introduction:

Effective communication and translation services face significant hurdles due to the vast diversity of languages spoken worldwide. The absence of a common language can hinder communication and collaboration among individuals speaking different languages. This issue is evident in scenarios such as:

Case 1: In educational settings with diverse student populations or international exchange programs, language barriers can hinder learning and academic success. Translation tools can support students by providing access to educational materials, lectures, and instructions in their native language, promoting inclusivity and enhancing learning outcomes.

Case 2: Organizing multicultural events such as conferences, festivals, or workshops requires effective communication with attendees from diverse linguistic backgrounds. Translating event materials, presentations, and signage ensures that all participants can fully engage and benefit from the event experience.

This translator can be useful in accessing educational resources, language learning apps, and online courses in multiple languages. It also helps in facilitating diplomatic negotiations, cultural exchanges, and international collaborations by bridging language gaps and promoting mutual understanding. Additionally, it aids travelers in understanding directions, ordering meals, and engaging with locals, enhancing their overall travel experience.

Methodology:

For this cloud translation, Python Boto3 is being used which is a software development kit (SDK) provided by Amazon Web Services (AWS) for developing applications and services that interact with AWS services. Boto3 includes modules for various AWS services, including Amazon S3, Amazon EC2 and makes it easy to work with AWS services from within Python code and makes it possible to build high-performance applications.

This project utilizes two S3 buckets and a Lambda function. The Lambda function triggers whenever a text or image file is uploaded to the input S3 bucket. Subsequently, the translator function processes the content within the uploaded file and generates a translated version, which is then saved with the same filename in the output S3 bucket.
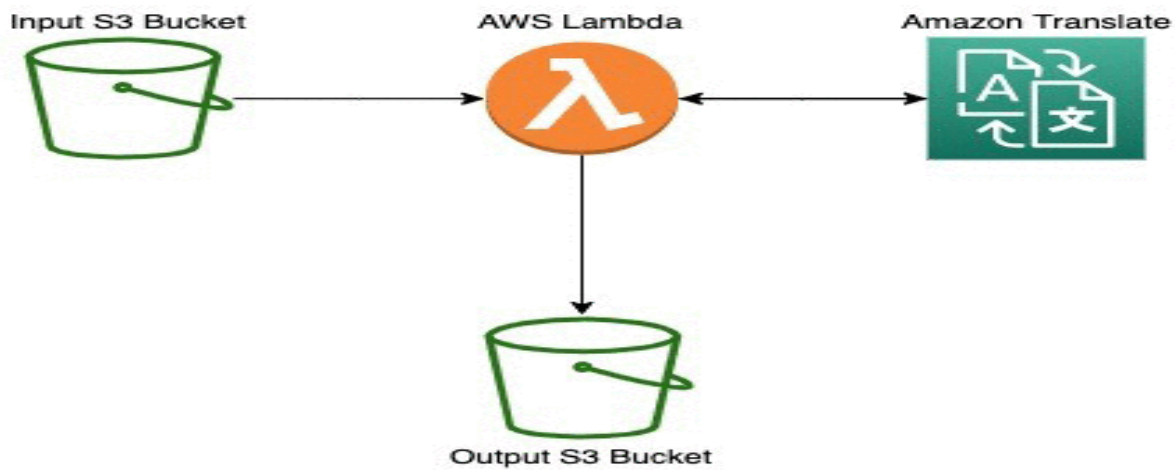
Cloud Services Used:

The cloud services used in this project are –

- Amazon S3 - Amazon Simple Storage Service (Amazon S3) serves as internet storage, enabling users to store and access vast amounts of data seamlessly from any location on the web.

- IAM - AWS Identity and Access Management (IAM) is a web service designed to facilitate secure control over access to AWS resources. IAM enables centralized management of permissions, dictating which AWS resources users can interact with. By utilizing IAM, users can regulate authentication (sign-in) and authorization (permission levels) for accessing resources.

- Lambda - AWS Lambda is a serverless, event-driven compute service that enables the execution of code for a wide array of applications or backend services without the need for server provisioning or management. Lambda functions can be triggered by more than 200 AWS services and software as a service (SaaS) applications, with users only paying for the resources consumed.

- AWS Translate - Amazon Translate empowers users to localize content for a diverse global audience by facilitating the translation and analysis of large volumes of text. This enables seamless cross-lingual communication among users.

- AWS Cloud Watch - Amazon CloudWatch serves as a comprehensive monitoring and management service, offering valuable data and actionable insights for AWS, hybrid, and on-premises applications, as well as infrastructure resources.

- Amazon Rekognition - Amazon Rekognition boasts the capability to identify text within images and videos. It can subsequently convert the identified text into machine-readable format. For detecting text within images in JPEG or PNG format, the DetectText operation is employed. Both image and video text detection operations support a wide range of fonts, including highly stylized ones. Upon text detection, Amazon Rekognition generates a representation of the detected words and lines of text, illustrates the relationship between them, and provides information on the location of the text within an image or video frame.
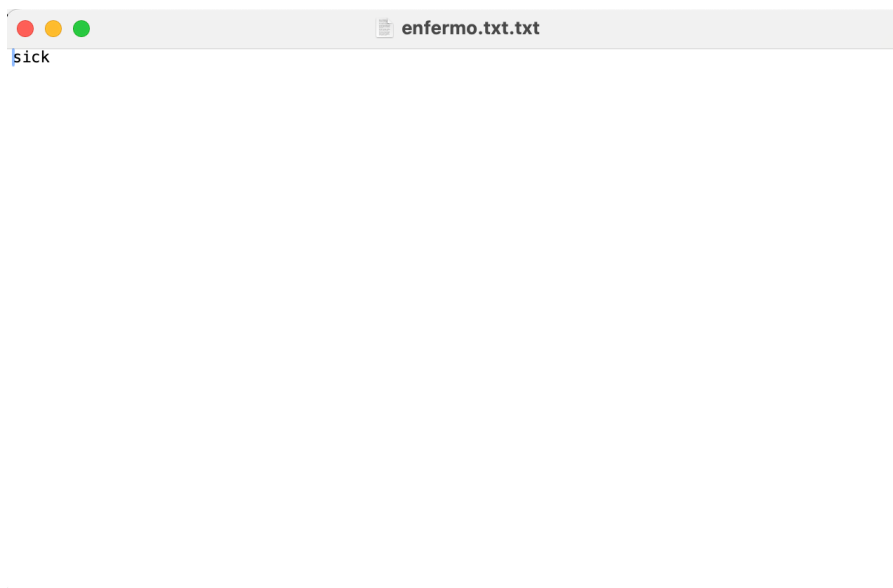
Performance:

The performance of this cloud-based translator has been pretty good with some accurate results. However, there are issues with a few languages where the translation to those languages may have few errors. This is due to the insufficient information of those languages in AWS Translate Service. These errors will hopefully be corrected with the improvement in AWS Translate service day by day.

Here are some of the testcases which have been used to check the translation of text and images using the cloud-based translator –
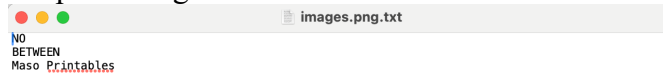
- Input in Spanish –

●●●   📄 **enfermo**

enfermo

Output in English –

●●●   📄 **enfermo.txt.txt**

sick

- Input in Spanish –

Output in English –

| images.png.txt |

NO
BETWEEN
Maso Printables

- Input in Hindi –

सभी मनुष्यों को गौरव और अधिकारों के मामले में जन्मजात स्वतन्त्रता और समानता प्राप्त है। उन्हें बुद्धि और अन्तरात्मा की देन प्राप्त है और परस्पर उन्हें भाईचारे के भाव से बर्ताव करना चाहिए।
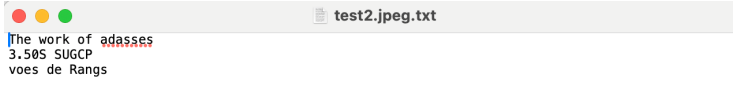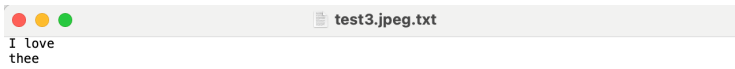
Output in English –

| test1.png.txt |

DIPP I pltt & محمد thish THE في Palk LP for
II WHIH up BUK THE balls (cp
Radrad 31R 3 عالم glast 317 HERRI

- Input in Telugu –

బంధమనేది
మన ఎదుట నిజాయితీగా
ఉండడంకాదు.మన వెనుక కూడా
అంతే నిజాయితీతో
ఉండడం...

Output in English –

The work of adasses
3.50S SUGCP
voes de Rangs

- Input in German –

Output in English –

test3.jpeg.txt

I love
thee

- Input in English –


```
●●●                        📄 teste2c
This has been a very productive day.
```

Output in French –


```
●●●                        📄 teste2c.txt.txt
Cette journée a été très productive.
```
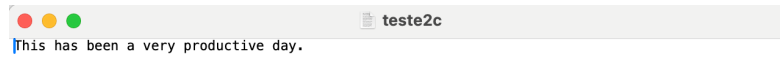
Conclusion:

The development of a cloud-based translator utilizing text and image inputs has addressed the critical need for effective cross-lingual communication. By leveraging AWS services like Amazon S3, Lambda, Translate, and Rekognition, the system efficiently detects and translates diverse content into comprehensible formats. The methodology involving Python Boto3 SDK ensures seamless integration with AWS services, enhancing the scalability and flexibility of the translator.

While the performance of the translator has demonstrated overall effectiveness, there are minor discrepancies in translations for certain languages due to limitations within the AWS Translate service. Continuous improvement in the translation service is expected to mitigate these errors over time.

Overall, this cloud-based translator holds significant promise in various domains including education, multicultural events, international collaborations, and travel, fostering inclusivity, and enabling seamless communication across linguistic barriers. Further refinements and updates can ensure its continued utility and reliability in facilitating global interactions and enhancing user experiences.