PictoTranslator

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Table of contents

Title Page	1
Table of Contents	2
Problem Description	3
Research Summary	4
Solution Summary	5-6
Product Evaluation	7-8
Key Contributors	9
References	10

Problem Description

When visiting a new country that does not speak your language, the language barrier can make it hard for you to enjoy your stay. There will be newspapers, books, magazines, signs, billboards, and restaurant menus printed in a language that you can not read. This can cause frustration in the traveller because they are not able to properly communicate with others.

There are also countries such as India which have many different languages in the different parts. This will make it hard to even identify what language you are reading since there are so many.

Writing these out in google translate requires a lot of time and effort because you need to find all of the characters of a language that you are not used to writing and reading.

Because of this, many people do not want to travel abroad. In a survey carried out by hostileworld.com, “10% of UK adults say language barriers prevent them from travelling abroad.” (Mccarthy, 2017) Along with this, 20% of people said they had a harder time ordering at a restaurant and 9% said they got on the wrong bus, train and even airplane. These issues need to be minimized so more people will travel abroad.

Traveling is a lucrative business, so having people not travel because of a simple language gap is a big hit for all the companies in that industry. Airbnb for example, is worth around 26 billion dollars as of 2021 (Bmtoolbox, 2021), but it could be a lot more if that ten percent of people who are not traveling due to language barriers would travel and use an airbnb.

Research Summary

There are many solutions to this problem, but they all have one or the other component missing. The two best solutions for translating text you see outside are google translate and triplingo. Google translate is an app that will translate text between two different languages that you specify and are available in their database. Trilingo is an app where you can upload an image or send text to get translated.

Google translate is used by writing something on the top box in the language of your choice, which translates to another language of your choice in the bottom box. You can also switch the languages in the top and bottom box easily. You can also write the word you want to translate with your finger and insert a picture of what you want to translate.

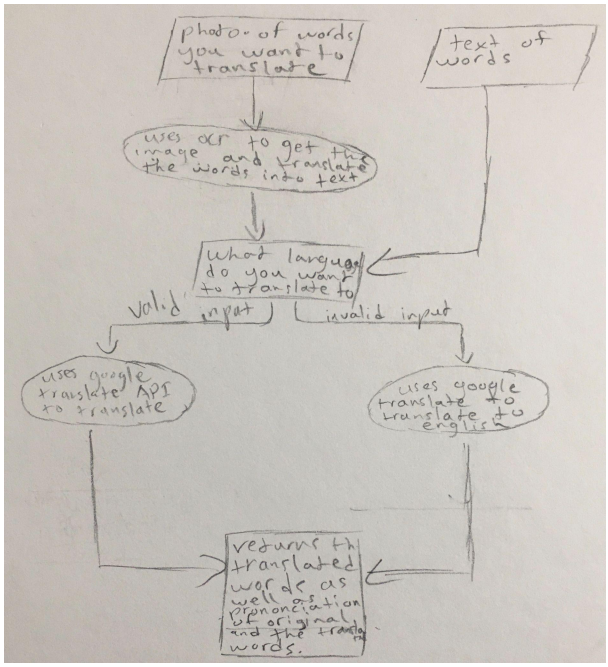
Triplingo is an app that is dedicated to making your trip better. It has a translator that can translate an image or text. It asks you to specify the language translated from and to, but has a very limited number of languages, unlike the vast number of languages that google translate has in its database. Although it has less languages, it does translate them a lot better than google translate does. It also shows you how to say words in a casual, slang, crazy, and professional tone. It also has a dictionary built into the app, that has definitions, synonyms, antonyms, and a sentence for every different language translation. Triplingo also has a hard time recognizing words that are written in traditional handwriting

Both of these methods are missing one feature or the other. Triplingo does not have a large amount of languages to translate into and google translate is missing the accuracy that triplingo has. Both tools do not detect the language you are writing in, rather you have to select what language you are writing in and translate to. The solution is something that can translate images into many different languages.

Solution Summary

My solution was to make a python program that uses ocr and google translate to translate images from one language to another. At first, the user will input text with either an image or text that they want to translate. Then the program will use ocr to extract all the words in the image and convert into text. It will ask you to specify a language that you want to translate the words into. If there is a valid input, then it will translate to the specified language, but if it is not then it will translate it into english. It will then display the text of the translated words and say the original and translated words out loud.

(Flow Chart)



To make this happen, I used three libraries: Python Image LIbrary (PIL), pytesseract, and googletrans. I used PIL to open the image with python and be able to save it as a variable. I used the pytesseract API to get all the words from the image and change it to a string format that can be used for translation. I used the google translate API to detect what language the input language is and then translate it into the specified output language. I also use pytesseract to say the words out loud.

(Code)

```
from PIL import Image
import pytesseract
import tensorflow as tf
from googletrans import Translator

def translate:
    wordwant = input("would you like to input a string press 1 or an image press 2 ")
    if wordwant == "1":
        text1 = input("enter text: ")
        InputString = String(text1)
    else:
        directory = input("What is the sourcepath of the image you want to translate? : ")
        im = Image.open(directory)
        InputString = pytesseract.image_to_string(im, lang="eng")
        im.show()
        print(InputString)
    try:
        translator = Translator()
        s = translator.detect(text=str(InputString))
        print(str(s.lang) + " detected")
        languagetranslate = input("What language do you want to translate it into? : ")
        k = translator.translate(InputString, dest=languagetranslate, src=s)
    except:
        print("There was an error translating the image")

    print(languagetranslate + " translation: ")
    print(k.text)
    engine = pyttsx3.init()
    engine.say(k)
    engine.runAndWait()

userinput = input("would you like to use our translation machine. Enter Y for yes and N for no : ")
while(userinput == "Y"):
    translate()
    userinput = input("would you like to use our translation machine. Enter Y for yes and N for no : ")

print("Thank you for using the translater")
```

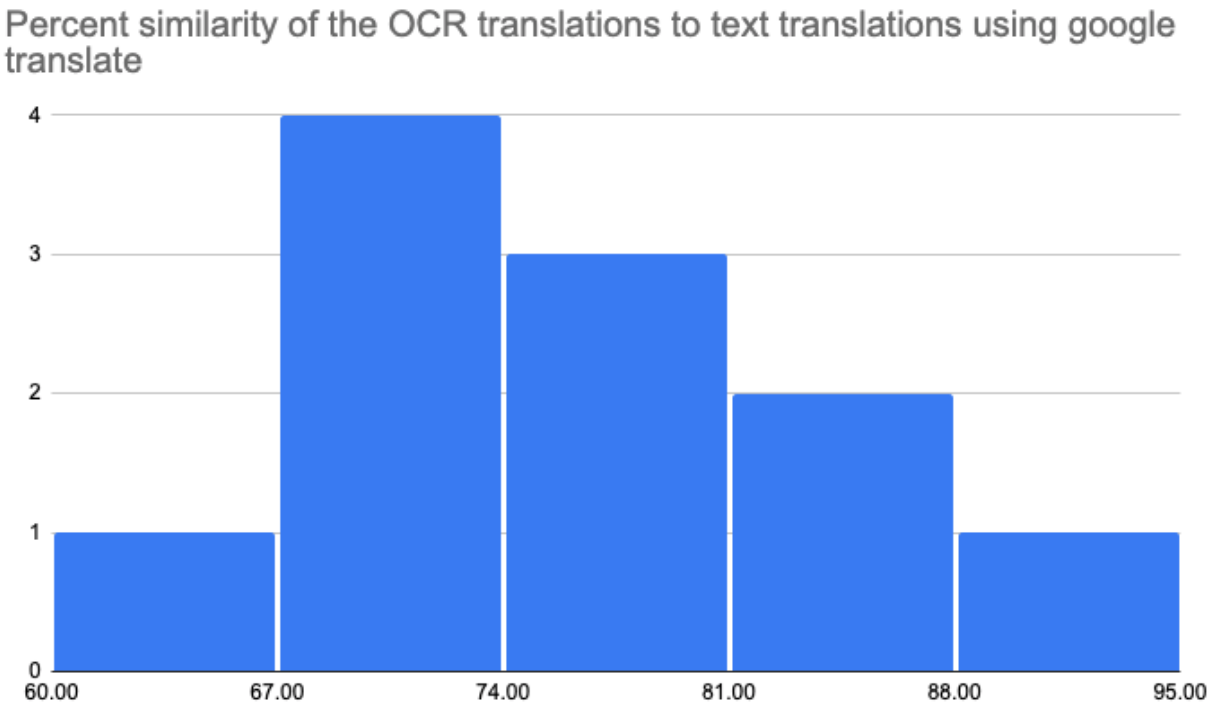
Output

```
would you like to use our translation machine. Enter Y for yes and N for no : Y
would you like to input a string press 1 or an image press 2 :  2
What is the sourcepath of the image you want to translate? : essay.png
portugese detected
What language do you want to translate it into? : english
English Translation:

In 1818, Abraham Lincoln was eight or nine years old, his mother Nancy Hicks had died. His mother's loss w
as terrible. However in 1819, his father married Sarah Bush Johnston and small abe developed a relationshi
p with her. They became very close so abe called her mother also.
would you like to use our translation machine. Enter Y for yes and N for no : N
Thank you for using the translater
```

Product Evaluation

I analyzed my solution by comparing how similar the translations are to google translate. I did this by using an app that checks the similarities of two texts. Although I used the google translate API, google probably uses a better translator than the version they released to the public. We had ten different images that got translated into english from various languages. I then entered the text of those images into google translate and compared the two english versions for similarity.



The results show that the translations made from my program are an average of around 76 percent similar to google translate. When the translations were analyzed further, it was revealed that the translations are not similar in wording, but do have very similar meanings as far as english goes. Sometimes there are a few parts left out in my translator. Most of the translations were between 67 and 81 percent similar to google translate. The lowest was 63 percent and the highest was 90 percent.

If I had more time to spend on this project, I would have made an artificial intelligence model that used machine learning to translate words and sentences from language to language. To use machine learning, I would have to train the bot extensively and in many different languages, which could take a couple months to even a year to get a

perfected model. I would also use python flask to make it into an actual app or website with a nice user interface.

Key Contributors

Sai Kolla: I came up with the idea for this project and created a flowchart of how it would work. I also completed all of the code for this project. Along with this, I completed the documentation and the video presentation for the project.

References

McCarthy, A. M. (2017, June 20). *Research suggests 10% of adults don't travel due to language barriers; here are some solutions*. Lonely Planet. https://www.lonelyplanet.com/articles/language-barriers-prevent-travel-survey.

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