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ADVANCED PROGRAMMING LAB MINI PROJECT (ICT-3166)

REAL-TIME CURRENCY CONVERTER USING PYTHON

Submitted by:

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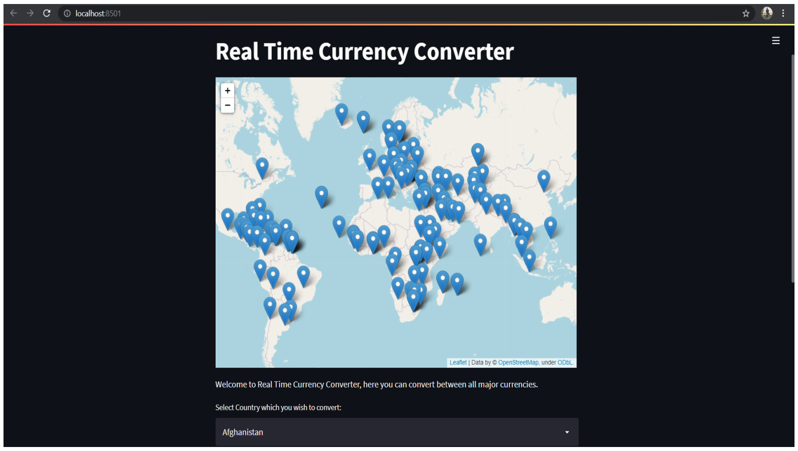
INTRODUCTION

Different countries use different currencies, and there is daily variation in these currencies relative to one another. Those who transfer money from one country to another (one currency to another) must be updated with the latest currency exchange rates in the market.

Currency converter mini project is built keeping this thing in mind. It is a simple app developed using Python's web features. In this application, there is a regular update of the currency of every country using a real-time exchange rate API, by which it displays the present currency's market value and conversion rate.

Such an application can be used by any user, but it is mainly useful for business, shares, and finance related areas where money transfer and currency exchange takes place on a daily basis.

In this currency converter app, users are provided with an option to hover around the world map to check the value of a particular currency in USD. Along with this, the user can use the calculator below the map to convert their preferred currency to another, i.e. from "this" currency to "that" currency. This simple feature allows users to enter the amount to be converted (say currency in Dollars), and display the converted amount (say currency in Euro).



Real Time Currency Converter

Welcome to Real Time Currency Converter, here you can convert between all major currencies.

Select Country which you wish to convert:

Afghanistan

LITERATURE SURVEY

Sample project referred:
https://github.com/dansbecker/weather-analytics/blob/main/streamlit_app.py
Website referred for maps:
https://python-visualization.github.io/folium/quickstart.html

Creating a real-time currency converter that will take data from authenticated sources that are looking to invest abroad or perhaps going on holiday will reduce the time it takes to serve customers and they need local currency to buy goods.

Forex Market & Currency Exchange Rate System The foreign exchange market is fundamentally classified as a liquid market where the information is public and accessible for all traders equally (Andrew & Victor, 2003). They share the same expectations which make the forex exchange rate more dependent. At the same time central banks of each country and many more agencies around the world working closely to stable or increase the value of their currencies (Znaczko, 2013). For instance, the Federal Reserve Bank of New York is responsible for foreign exchange rate related activities in U.S. The bank monitors and analyzes the global financial market changes, it manages the U.S. foreign currency reserve and intervenes in the market whenever demanded from time to time. The bank buys dollar and sells foreign currencies to support the value of the dollar or sells dollar and buys foreign currencies to apply descending weight on the cost of the dollar (FRB,

Dr. S. Kumar Chandar, Dr. M. Sumathi, Dr S. N. Sivanandam, “Forecasting of Foreign Currency Exchange Rate Using Neural Network” [2], The foreign exchange market is the largest and most important in the world. Foreign exchange transactions are the simultaneous sale of one currency and the purchase of another currency. It is essential for currency trading in the international market. In this paper, we have examined predictive modeling based on artificial neural techniques based on foreign exchange rates using five different training algorithms. The model was trained using historical information to estimate the four foreign exchange rates against the Indian rupee. Predictive performance of the proposed system is performed using statistical metrics and compared. From the results it became clear that the new approach provides a technique to improve foreign exchange rate forecasting. It is also an effective tool and can be predicted significantly closer using simple design. Out of the five models, the Levenberg-Markart based model lags behind the other models and achieves comparative results. It also demonstrates the power of the proposed approach and makes more accurate predictions. Finally, the proposed scheme can significantly improve estimation performance when calculated on three commonly used metrics.

METHODOLOGY AND IMPLEMENTATION

We have used Python as our programming language along with the real-time exchange rates API (https://api.exchangerate-api.com/v4/latest/USD) and Streamlit to deploy the application along with the map.

Why we chose Streamlit over Tkinter:

- Streamlit provides integration of maps with normal GUI applications.
- It has a much more user-friendly, modern and clean UI.
- It is possible to deploy our app for public use with ease.

1.) We are extracting all the currency rates from the API using an http request, into a JSON file. We are matching the the rates we have with the countries we have in our database using the currency code (eg. INR for India). This is done in the extract_key function defined in the rates_extract.py file.

2.) We convert the currencies using the convert function defined in the rates_extract.py file, where we get the currency rate for both the inputs (‘from’ currency and ‘to’ currency) by using ‘argwhere’ which returns the index of the row which matches with the currencies.

3.) We use the refresh function in the same file to fetch the latest currency rate in real-time from the API and update the database we have.

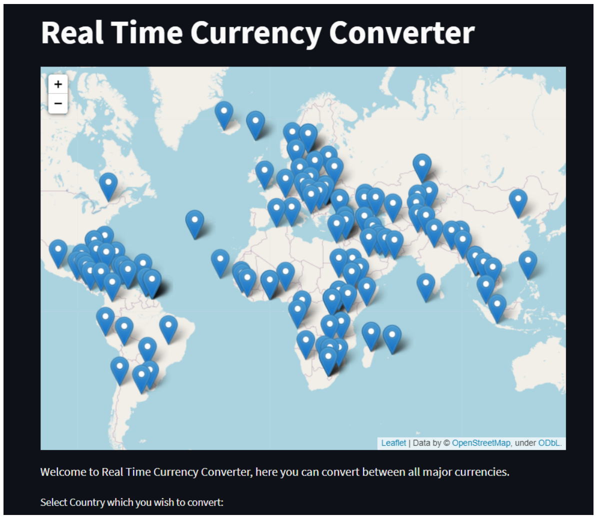
4.) We use the save state function in the file to save the current rates with all the country codes and the country names in the same file, which is a new file created using to_csv function.

5.) Finally we come to the ‘Streamlit’ file (app.py) where we implement the map and integrate our previous file. We define the make_map function to build an interactive map into the app. We used ‘Marker’ to create a hoverable marker which shows the current currency rate for that country.

6.) Finally, we integrated all the functions into the main app.py file.

RESULT

A world map with markers put on the capital of each country is displayed on top of the page. The user can hover around this world map and see the price of the currency of that country in USD. The prices are updated in real time.

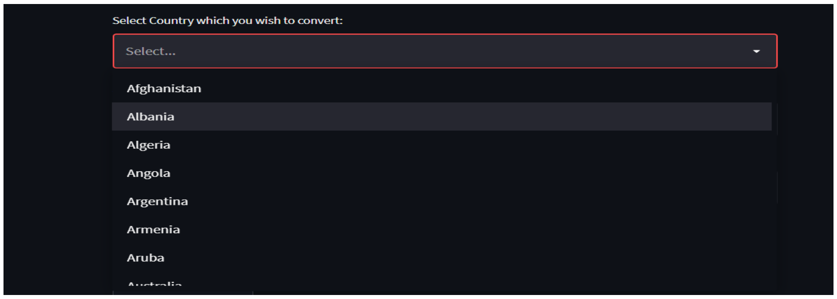


Real Time Currency Converter

Welcome to Real Time Currency Converter, here you can convert between all major currencies.

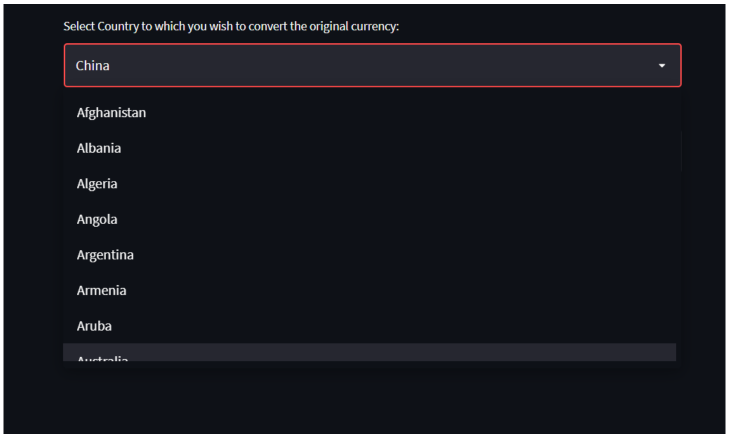
Select Country which you wish to convert:

Below the map is a drop-down menu which has a list of all the countries of the world sorted in alphabetical order. The user can choose to convert the currency of any of these countries.



Select Country which you wish to convert:

Another drop-down menu can be seen below, which also contains the countries of the world ordered alphabetically. From this, the user can choose the country whose currency they want to change the original currency to.



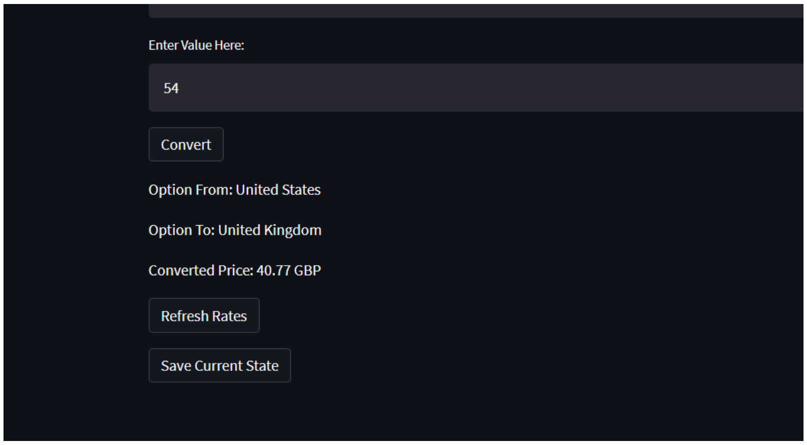
Select Country to which you wish to convert the original currency:

China

An input box is provided, which takes input of the value of the original currency from the user. The value can be an integer or a float.

A ‘Convert’ button is present below the input box. On clicking this button, the application performs the conversion of the original currency. The original country and the country the user chose to convert the currency to is displayed. Post this, the converted price is displayed.

Right below the ‘Convert’ button, there is a button provided to refresh rates. The ‘Refresh Rates’ button fetches the real time values from the API-exchange-rate website. On clicking the ‘Save State’ button, which is right after the ‘Refresh Rates’ button, the real time values are saved in the database and the application is ready to be used again.



Enter Value Here:

54

Option From: United States

Option To: United Kingdom

Converted Price: 40.77 GBP

CONCLUSION

Currency exchange, as we know, is widely used in various domains, industries and most importantly for the convenience of people. In the current scenario, people are always looking for methods and developing systems which can help make complicated tasks much easier and save time to do work more efficiently.

Similarly through this project we aim to make it more convenient for the users to be able to exchange currencies by using our web designed application.
A simple click on the countries to perform the exchange on, along with the value to be exchanged will give us our result. Our app is made more interactive by using a map to show the currency rates of various countries across the world.

This project helped us understand Python extensively and in a much more practical sense. It helped us strengthen our skills in using APIs, http requests, Numpy, Pandas and we got introduced to Streamlit which helped us make our GUI extremely interactive with maps with the currency exchange value mentioned as we hover around it.
Streamlit is a new framework to create interactive python applications into deployable web apps very easily. Streamlit was by far the biggest learning through this project as it played a key role in integrating a map into the main application.

We used most of our Python knowledge in the application, including classes, functions, modules, dictionaries, file handling along with additional knowledge mentioned above. This learning experience has made us much more confident about using Python for real-life applications! Interestingly, we could deploy our app after which you will be able to use the application anywhere, i.e your phone, your PC etc!