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CMPSC 445 Project 2: Predictive Modeling of Tariff Impact

Project Description

The purpose of the project is to create a web application that can be used for predictive modeling of the economic impact of tariffs using the following dataset from Kaggle: Trump Tariff Data 2025. It predicts two key economic indicators: GDP growth and Consumer Price Index (CPI) inflation, providing users with a simple visualization of the tariffs' impacts.

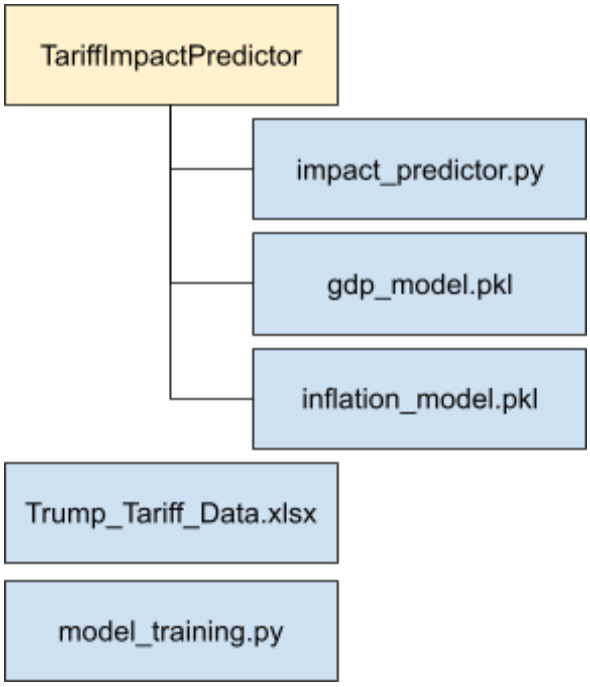
Project Significance

The project is contextually important given recent political and economical developments. The United States' President Donald Trump declared worldwide tariffs on all other countries during his second presidency. The world is now in a state of shock and confusion as many officials attempt to damage control the trade wars that are being waged. A tool such as this tariff impact predictor is useful for visualizing the dramatic changes that the United States is going through.

How to Use

1. Visit the hosted Streamlit web application here.
2. Select or input economic parameters.
3. Press the "Predict Impact" button.

Code Structure



Trump_Tariff_Data.xlsx: dataset used for training model.
model_training.py: program file to train the machine learning model; loads the dataset, preprocesses data, trains regression models, and exports the .pkl models.
gdp_model.pkl: model exported from model_training.py for GDP prediction.
inflation_model.pkl: model exported from model_training.py for CPI inflation prediction.
impact_predictor.py: Program file for the Streamlit application; loads the models and sets up the webpage.

Functionalities and Test Results

- User can input and adjust parameters as needed
- Model predicts GDP and CPI
- Results are returned immediately

Data Collection

Dataset used can be found here. The creator described the dataset as thus:

“This dataset compiles key data points related to the impact and policy measures surrounding U.S. tariffs proposed or implemented by Donald Trump, particularly during the 2024 campaign and policy forecast period. It includes economic and trade metrics that provide context on U.S. trade balances, tariffs, and their international implications.”

The dataset lists every country and their population. It also includes US deficit, export and import data in relation to every country, and finally, President Donald Trump’s tariff rates.

Data Processing

1. Feature engineering was performed to create two target variables: “Trade Balance” and “Deficit per Capita”.
2. The dataset is cleaned by removing rows with missing values.
3. Feature columns and target variables are defined.
4. Features are split into categorical and numerical.
5. Two pipelines are used to train the models using Random Forest Regression, one for Trade Balance and one for Deficit per Capita.
6. Once models are finished training, they are saved to .pkl files.

Model Development

- Input:
    - Country
    - Trump Tariffs Alleged
    - US 2024 Exports
    - US 2024 Imports (Customs Basis)

    - Population
- Output:
    - GDP
    - Inflation
- Algorithm:
    - Random Forest Regressor

Discussions and Conclusions

This project serves as a representation of our teachings in machine learning. We had to gather information on the topic and find a suitable dataset. It had to be properly analyzed, cleaned, and preprocessed before it could be fit into a pipeline for model training.

One difficulty with the project was coming up with an idea and finding a useful dataset for the project. Another issue was trying to figure out how to make it into a web application as we had no experience putting a machine learning model onto the web.