

# Fuel Price Insights : Analysing Historical Trends And Predicting Future Price Movements

## Team Members:

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## Objectives:

- ❑ Implement time series forecasting models (e.g., ARIMA, SARIMA) to predict future fuel prices for different types of products.
- ❑ Decompose the time series data into trend, seasonality, and residuals to understand the underlying patterns in fuel prices.
- ❑ Analyze the volatility of fuel prices over time, identifying periods with the highest fluctuations.
- ❑ Identify significant change points in fuel price series, correlating them with external events like taxation changes or global oil price fluctuations.
- ❑ Evaluate the accuracy of the models and assess their performance in predicting short-term and long-term price trends.
- ❑ Develop an interactive dashboard (using Dash) for visualizing trends, comparing prices between fuel types, and displaying forecasted prices.
- ❑ Provide user-friendly features for exploring historical data and forecasted trends.

## Project Description

### Usefulness:

Our fuel price prediction app sets a new standard in the realm of fuel cost forecasting, making it uniquely positioned alongside notable platforms like the U.S. Energy Information Administration[\[1\]](#), GasBuddy[\[2\]](#) and OPIS Fuelstradamus[\[3\]](#). While these services provide valuable data, they often stop short of offering in-depth analysis tailored to the everyday user needs. Our application transcends this limitation by utilizing Dash to craft an interface that simplifies complex forecasting models into intuitive, interactive visualizations, accessible even to those without extensive technical knowledge. By combining a variety of forecasting techniques, we enhance the accuracy and reliability of our predictions. This approach ensures our app not only matches the precision of platforms like OPIS Fuelstradamus but also stands out for its user-friendly design, making advanced fuel price forecasts accessible to everyone, from industry professionals to the public seeking to navigate fuel price trends with ease.

### Dataset:

The dataset available for our project consists of weekly fuel prices in Italy, spanning from March 2005 to November 2022. It was compiled by Rafael Belokurows and published on the

Data World[4] platform three years ago. The original data source is the Ministry of Environment and Energy Security - General Directorate for Infrastructure and Security[5]. The ministry collected this data for monitoring and analyzing fuel price trends. It is documented and accessible with weekly and monthly recorded entries. This dataset is not generated data but actual recorded prices over time. It is openly available under the terms of the IODL 2.0 license. You can access the dataset through the following URL: [Weekly Fuel Prices in Italy](#).

### **Sharing:**

We will use will a GitHub repository to share the work. Here is the link to the repository: [GitHub Repository](#).

### **Group Contribution**

Name	Tasks	Average Time Spent (per milestone)
Ayana Holla Pandeshwara	<b>Project Dataset section:</b> identified the dataset for the project and completed the description.	1 hour
	Formatted the document and edited the contribution table for proofreading.	30 minutes
	Explored the suitability of using Dash for inclusion in the project.	1 hour and 30 minutes
Shubham Patil	<b>Usefulness Section:</b> Detailing the significance and practical application of the project.	1 hour
	Set up the GitHub repository and MS Teams for our collaborative work.	30 minutes
	Explored the suitability of using Shiny for inclusion in the project.	1 hour and 30 minutes
Vineela Kunisetti	Created the proposal document layout with team details and coordinated team meetings by scheduling calls and meetings.	30 minutes
	<b>Objectives section:</b> elaborated on the project's	1 hour

	aims and its overall structure.	
	Explored the suitability of using Streamlit for inclusion in the project.	1 hour and 30 minutes

### **Citation:**

- [1] *Gasoline and diesel fuel update*. Gasoline and Diesel Fuel Update - U.S. Energy Information Administration (EIA). (n.d.). <https://www.eia.gov/petroleum/gasdiesel/>
- [2] *Gas station price charts - local & national historical average trends*. Gas Station Price Charts - Local & National Historical Average Trends - GasBuddy.com. (n.d.). <https://www.gasbuddy.com/charts>
- [3] *Gas price prediction service: Opis Fuelstradamus*. OPIS, A Dow Jones Company. (2022, February 27). <https://www.opisnet.com/product/pricing/retail-fuel-prices/fuelstradamus/>
- [4] *The Data Catalog Platform*. data.world. (n.d.). <https://data.world/>
- [5] Italian Government. (n.d.). *Ministero dell'Ambiente e della Sicurezza Energetica*. Open data - Statistiche energetiche e minerarie - Ministero dell'ambiente e della sicurezza energetica. <https://dgsaie.mise.gov.it/open-data>.