

Time Series Forecasting and Health Demand

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Abstract

Time series modeling and forecasting has fundamental importance to various practical domains. Thus a lot of active research works is going on in this subject during several years. The aim of our project is to forecast demand by Syrian Refugees and Lebanese Citizens on Primary Health care centers in Lebanon on Data provided by the ministry of Public Health. We have discussed and implemented basic issues related to time series modeling, stationary, trend and seasonality. We have proposed that ARIMA Model is the most proper so far in predicting time series.

Overview of the Proposed Approach

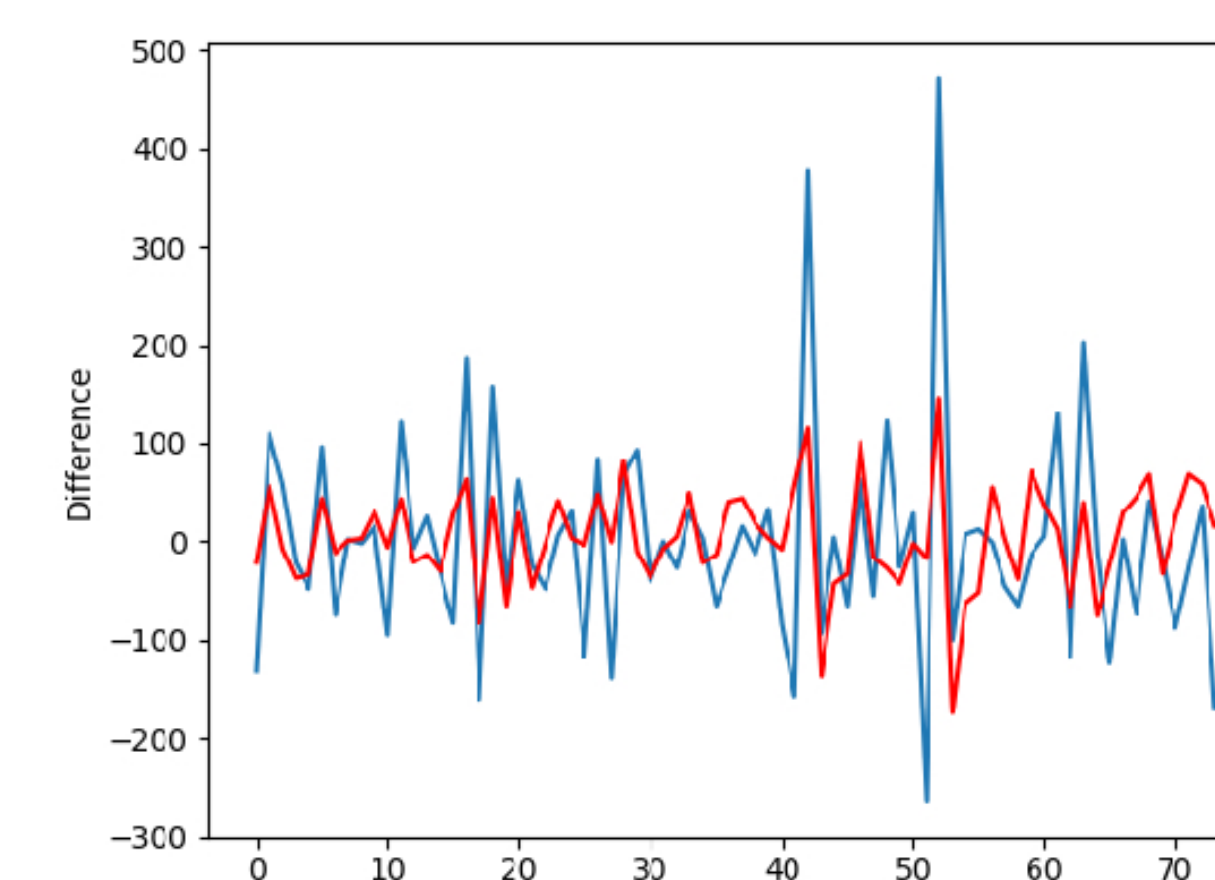
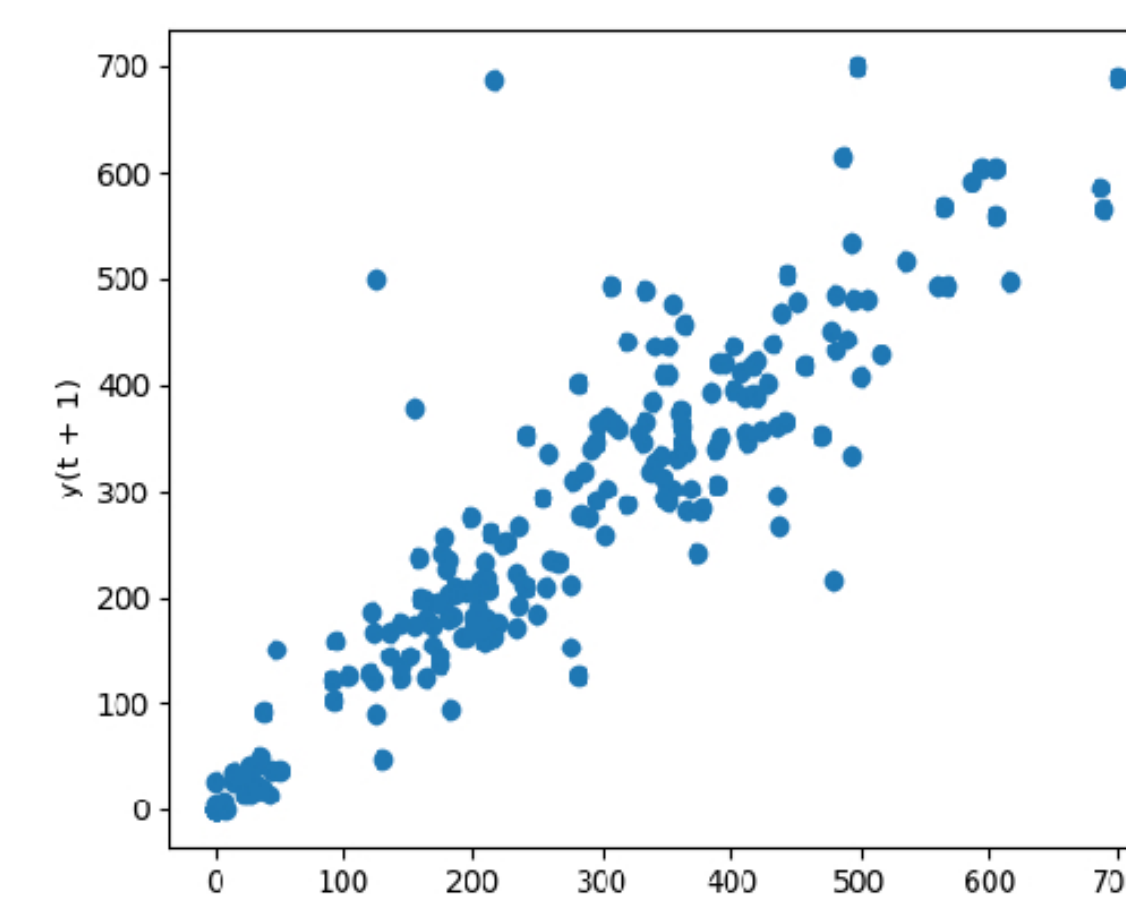
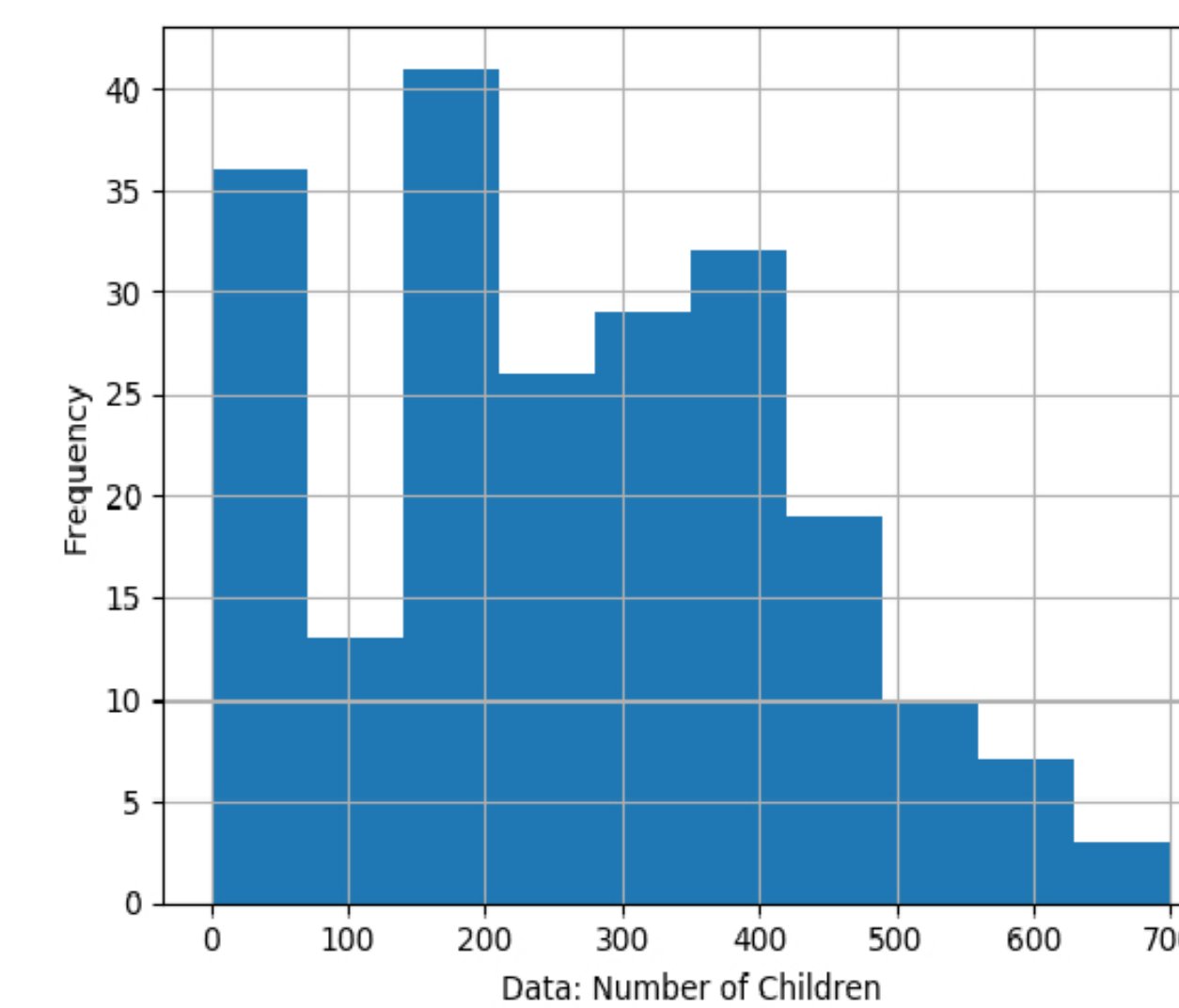
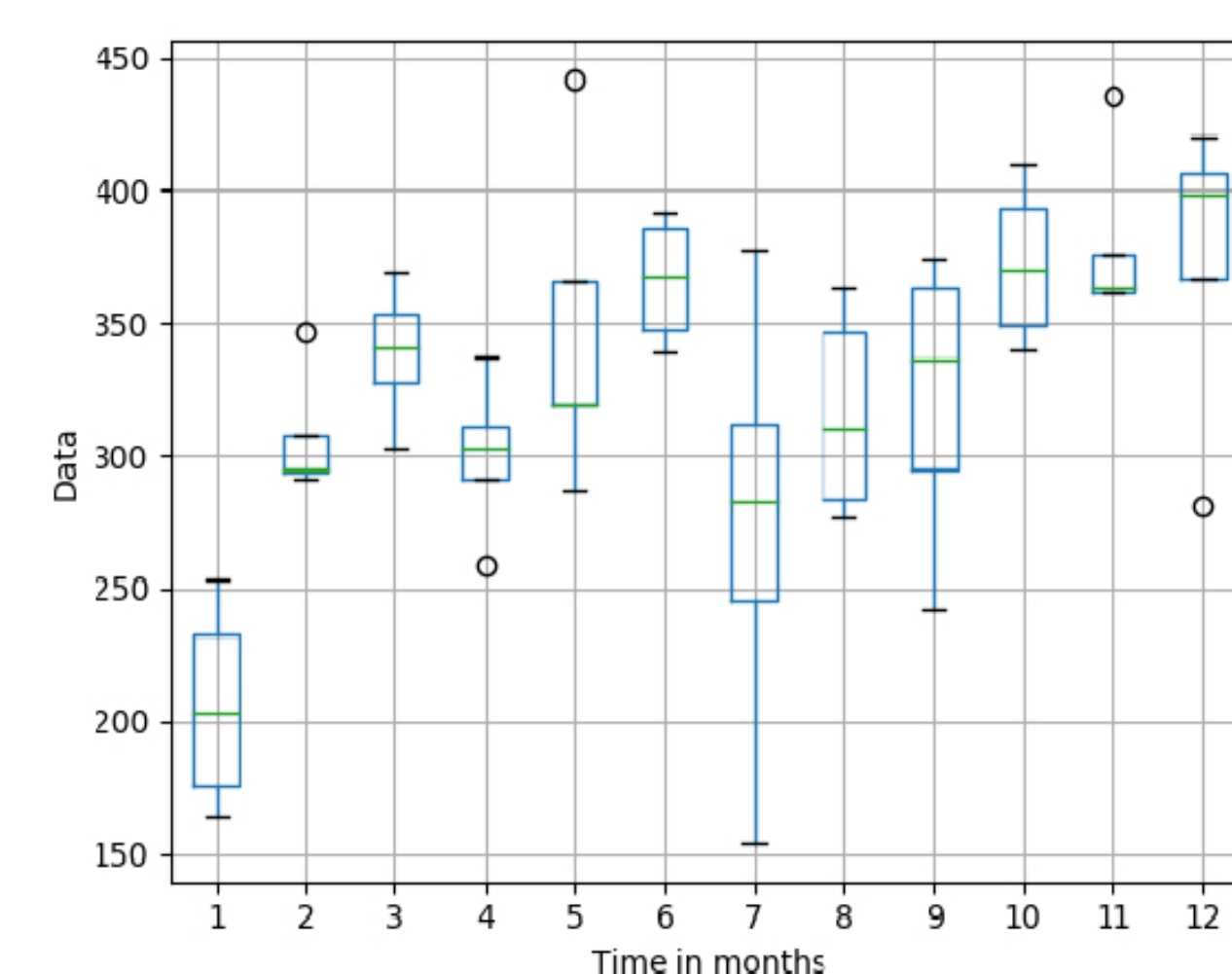
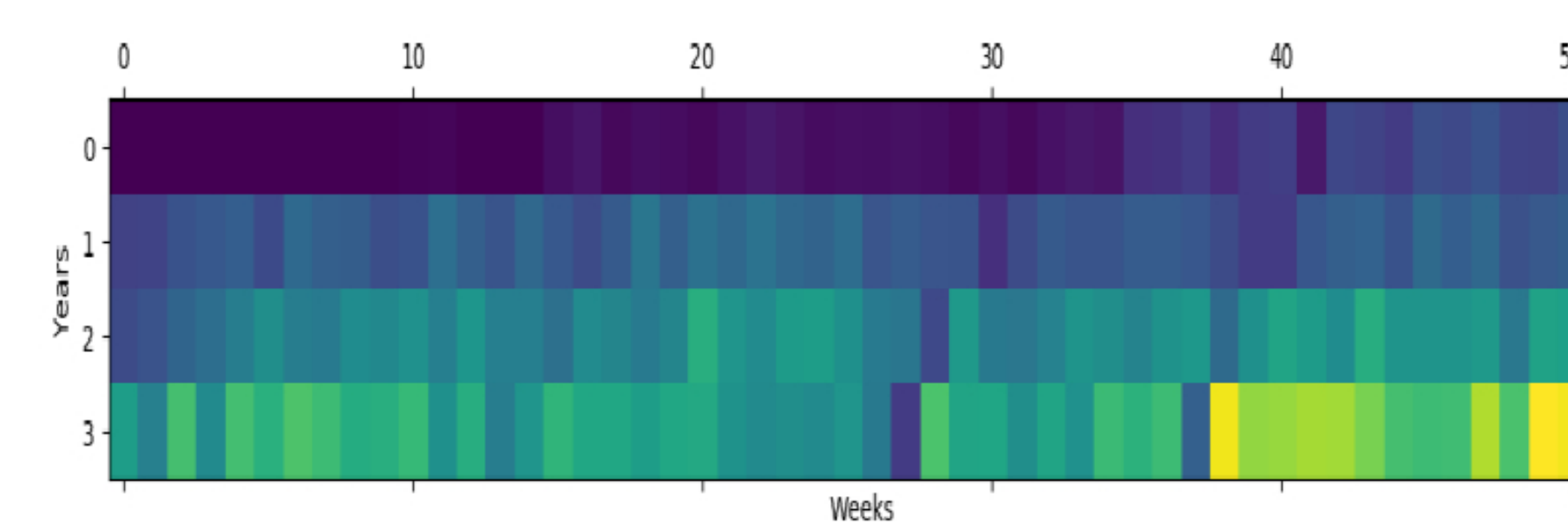
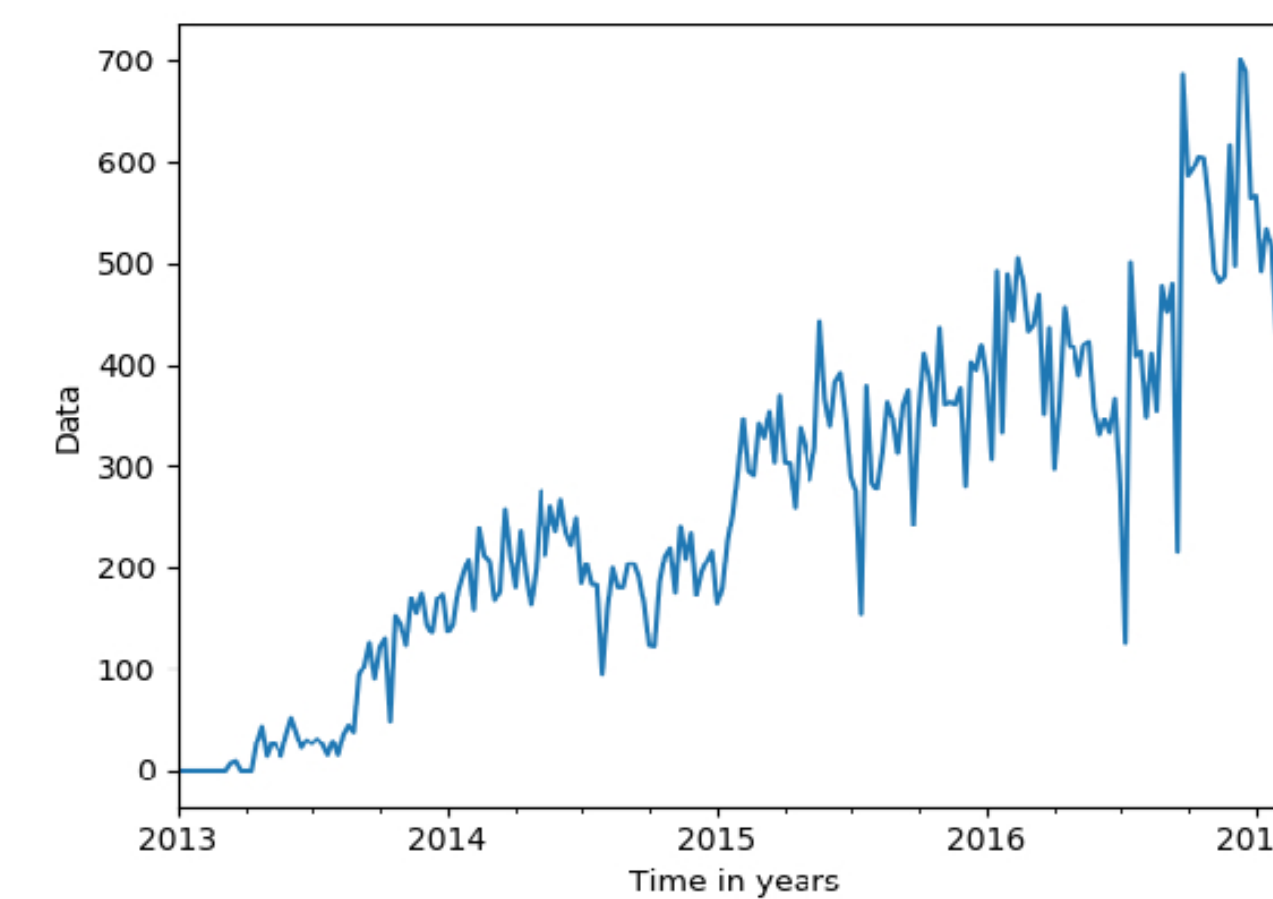
Our approach was based on analyzing the time series given with respect to its weekly, monthly data and predicting what its values will be. Briefly:

- Data Visualization: Plots were used to know more about the time series in means of trend, seasonality, autocorrelation and data frequency.
- terms of Prediction:
- White Noise: Detecting whether the time series can be predicted or not.
- Random Walk : Analyzing the dataset to know if the values are dependent on each other.
- ARIMA: (Auto Regressive Integrated Moving Average Model)

Conclusion

We were able to manipulate data where we worked on cleaning it; removing trends and seasonality, therefore making it stationary. This helped us in predicting a specific time series with a small RMSE.

Process



Implementation, Resources and Tools

- Scikit : Simple and efficient tools for data mining and data analysis.
- Pandas: An open source, easy-to-use data structures and data analysis tools for the Python programming
- StatsModel: Python module that provides classes and functions for the estimation of many different statistical models, as well as for conducting statistical
- Matplotlib: Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms.
- Numpy: The fundamental package for scientific computing with Python.
- Math Library: It provides access to the mathematical functions
- For Back-end: Python, PHP, SQL.
- For Front-end: HTML, CSS.



References

- "Introduction to Time Series Forecasting with Python" by Jason Brownlee.
- <https://machinelearningmastery.com>