**Task – ML Apprentice (MLA) (Vest)**

*Format:*

The round of selection consists of a case study on utilizing ML algorithms. The case study that is meant to solve the tasks and provide experience on using different ML algorithms that are fulfilled at Zypl.AI.

Time series are analysed to understand the past and to predict the future, enabling managers or policy makers to make properly informed decisions. A time series analysis quantifies the main features in data and the random variation. These reasons, combined with improved computing power, have made time series methods widely applicable in government, industry, and commerce.

In most branches of science, engineering, and commerce, there are variables measured sequentially in time. Reserve banks record interest rates and exchange rates each day.

There are two time series data should be analyzed and forecasted.

1. USD/RUB exchange rate
2. Gold price

The features in this dataset include the following:

|  |  |
| --- | --- |
| # | Variable |
| 1 | Date |
| 2 | Open |
| 3 | High |
| 4 | Low |
| 5 | Close |
| 6 | Adj.Close |
| 7 | Volume |

**Tasks**

**I. Statistical description.**

1. Produce a numerical summary of the variables in the data set. Explain the results.

2. Provide Exploratory Data Analysis

3. Using different tests check for the seasonality, autocorrelation, stationarity

4. Construct models with different time series models

4.1. Types of time series forecasting methods include:

a) Simple linear model

b) Exponential Smoothing

c)Autoregression (AR)

d) Moving Average (MA)

e) Autoregressive Moving Average (ARMA)

f) Autoregressive Integrated Moving Average (ARIMA)

g) Seasonal Autoregressive Integrated Moving-Average (SARIMA)

5. Try to forecast 5,10,15 values future values. Explain the obtained results

*Logistics:*

* Overview: phone/Zoom calls with ML finalists will take place over the course of the week to provide more details about the case study solutions and address any outstanding questions.
* It gives one day for completing these tasks. Depending on this the submission should be defined.
* Submissions should be e-mailed to [azimi@tajrupt.org](mailto:azimi@tajrupt.org) with [director@tajrupt.org](mailto:director@tajrupt.org) CC’ed.