Project Group Name: Verispor

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*Abstract*— In this project, we worked on the data in the train.csv file. We first examined the data and used various methods to make the data analyzable. We used data preprocessing steps. We have done the necessary work to analyze, organize and clean up the missing data. After cleaning the data and making it analyzable, we observed the relationship of the data with each other with some correlation methods. After that, we tried to analyze and understand our observed correlation results visually. Finally, we built a model by using machine learning techniques and evaluated our model.

Keywords—data, data cleaning, data analyze, correlations. machine learning techniques

# Introduction (*Heading 1*)

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# Steps

## Data cleaning:

Firstly, we struggled with editing the missing data in the dataset. there were too many missing data from many columns in the data set, we filled these missing data according to the type of each column. For example, for numeric values, we filled in the missing values by averaging, and for categorical variables, we filled in the missing data by taking the mode. In addition, by using the pipeline method to fill in the missing data, we both saved time and got a cleaner code terminal.

## Explore Data:

After making the dataset analyzable, we observed the correlation between the columns. We filtered the columns greater than 0.8 and less than -0.8 and visualized them to see the relationship between them. We deleted some columns with strong positive and negative correlations with each other because highly correlated features can lead to overfitting, which will adversely affect the performance of the model.

## Feature Engineering:

We rearranged Continuous, Binary and Categorical variables in numerical form to increase the power of the model.

## Split the Data:

We split the data into training and testing. Our target variable is the last column and our independent variables are the remaining columns.

## Model Selection:

We use Random Forest Classifier and Logistic Regression to make predictions.

## Model Evaluation:

Finally, we evaluated the performance of the model according to the model's accuracy parameter.

# Challenges Encountered

The data columns were not named, and we had a hard time analyzing them because we didn't fully understand the purpose of the dataset. For example, we could not understand which columns to analyze with each other for the correlation heatmap. When we look at the correlation heatmap of the whole data set, there is no meaningful result because there are too many columns, and the resulting graph cannot be read. Still, we showed correlation values greater than 0.8 on the heatmap with the filtering method, and the output was cleaner.

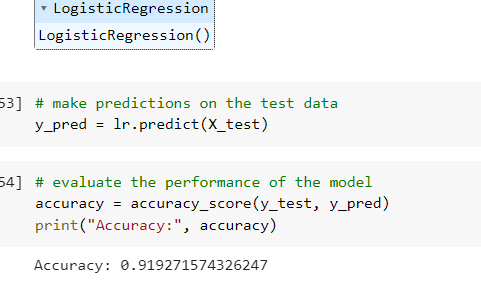
It was also difficult to analyze and organize the missing data correctly, as the number of missing data was relatively high. More research has been done to address this issue to identify the causes of missing data and how this data can be changed. In addition, it was difficult for us not to know the logic and purpose of the dataset.

# Conclusion

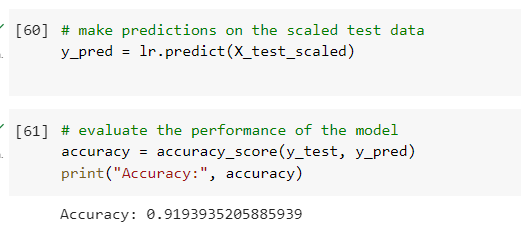
To conclude, we analyzed the data set, applied the data preprocessing steps. We made the model suitable for creating using the Feature Engineering step. Finally, after model selection and model evaluation, we reached 3 different accuracy values.

## Figures and Tables

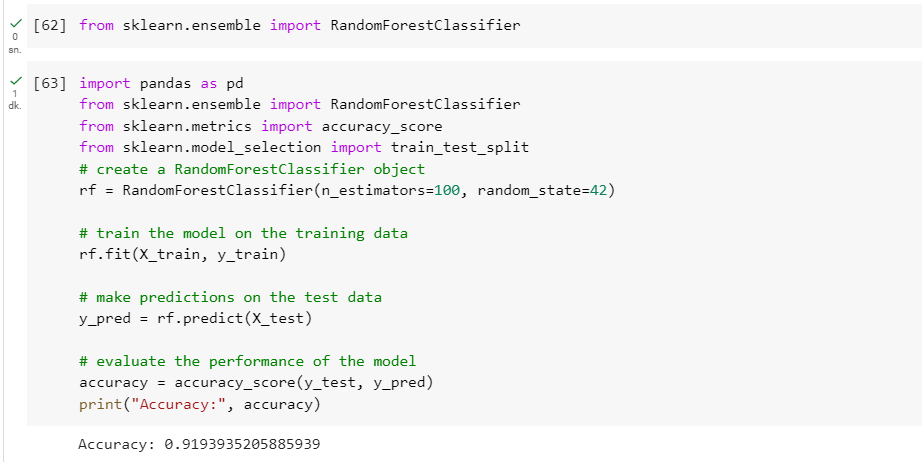
#### Accuracy Rate with Linear Regression



#### Standardization of Data:



#### Accuracy with Random Forest Classifier Algorithm:



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