



# Data Science Project

## Manufacturing Industry

**Group:**

DS\_G12

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## **Project Outline**

Brief introduction to the project  
and its outcomes

01

## **Data Preprocessing**

Data cleansing process prior to  
analysis

02

## **Descriptive Analysis**

What are the direct indications of  
the data set?What has happened?

03

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## **Diagnostic Analysis**

Why something has happened?  
Reasons for that occurrence.

05

## **Predictive Analysis**

What will be happen in future, by  
taken into consideration the past  
data

06

## **Conclusion**

What is delivered to the business  
out of this project

# 01

## Project Outline

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Summary of the step wise implementation of the project



# 01- Project Outline

- In the competitive environment in FMCG market, having competitive advantage and ensuring profitability is the key to survival.
- For the manufacturing industry, maintaining **Overall Equipment Efficiency(OEE)** is a direct indication that imply, particular business unit is profitable.
- Dataset related to Ice cream Stick(Candy) machine is analysed in this project in terms of Descriptive, Diagnosis and Predictive methods.





# 02

## Data Pre-Processing

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Preprocessing is that step in which the data gets transformed, or Encoded, to bring it to such a state that now the machine can easily parse it. In other words, the features of the data can now be easily interpreted by the algorithm.

# Data Pre-processing Steps



## Derive useful features

Useful indicators can be derived from the existing measurements



## Inconsistent columns

Dataset itself contains columns that are irrelevant or useless columns that can drop them to give more focus on the other columns



## Remove duplicate values

Unique  
Categorical data should be available in the dataset



## Missing values

Estimate the missing value from other values or remove entire column.



## Data normalization

The goal of normalization is to change the values of numeric columns in the dataset to a common scale.



## Remove outliers

An outlier indicates a data point that is significantly different from the other data points in the data set.



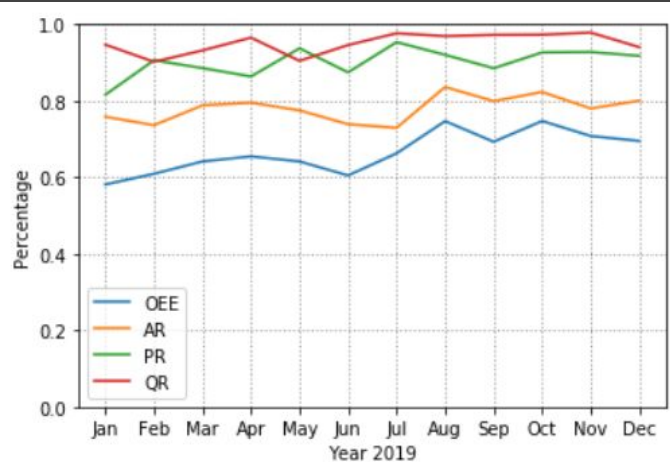
# 03

## Descriptive Analysis

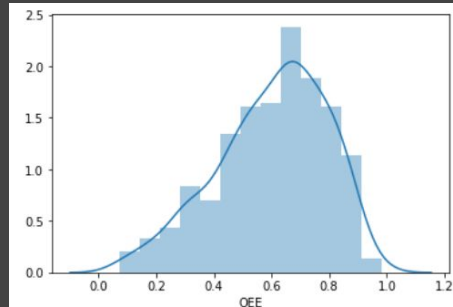
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Describe and understand the features of a specific data set by giving short summaries about the sample and measures of the data.

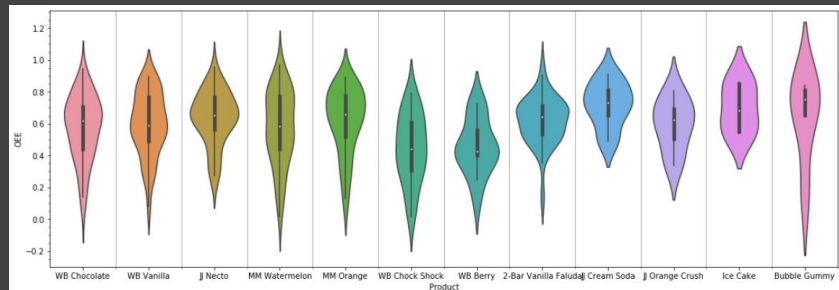
# Data Distributions



**Performance Indicators  
Throughout the year 2019**



**OEE Distribution**



**OEE violin plots**



# 04

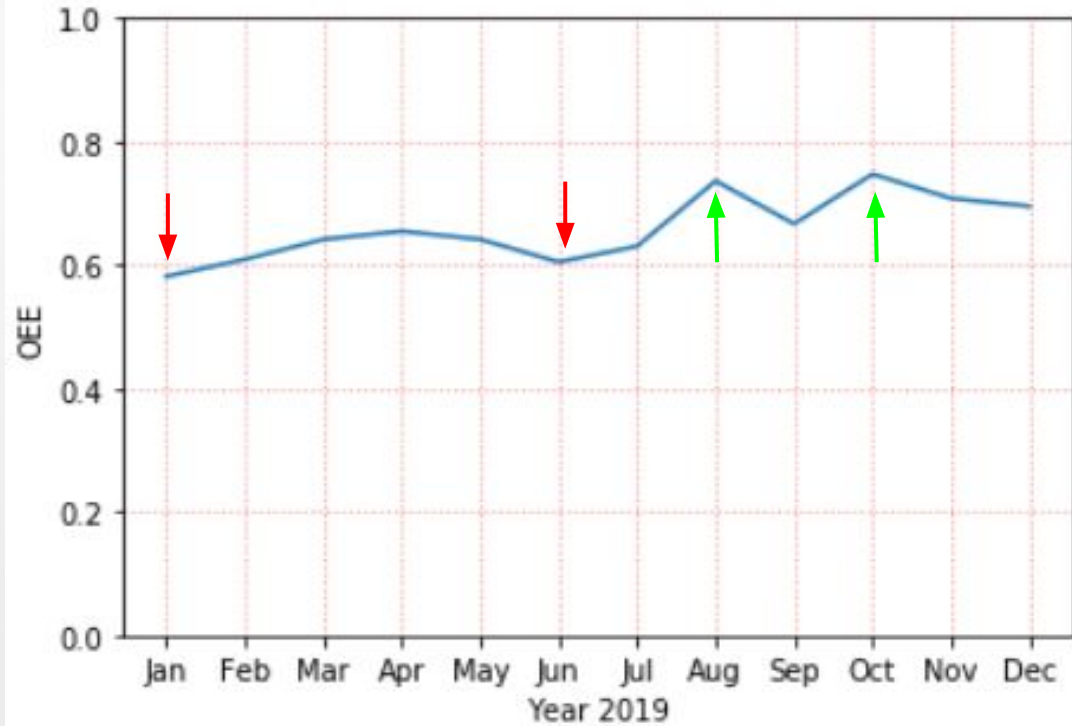
## Diagnostic Analysis

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Advance analytics which examines data or content to answer the question "Why did it happen?"

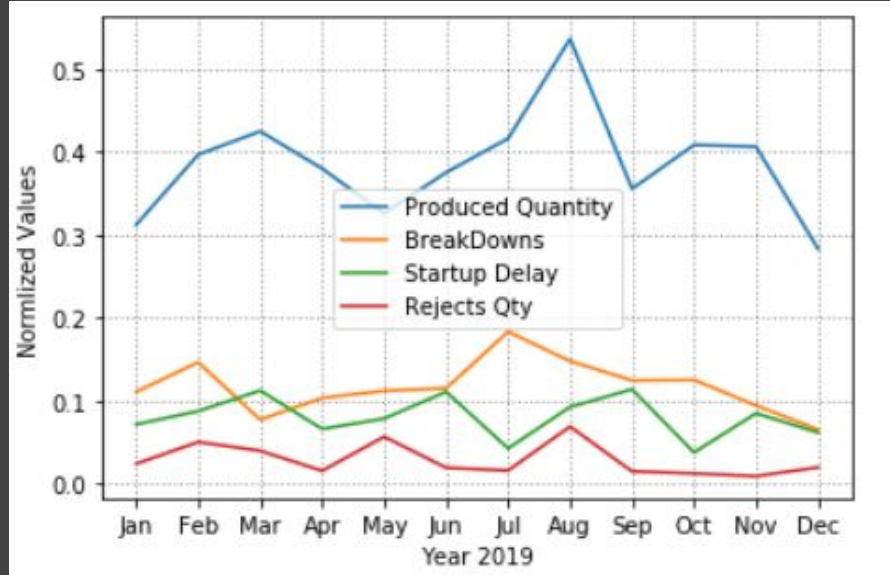
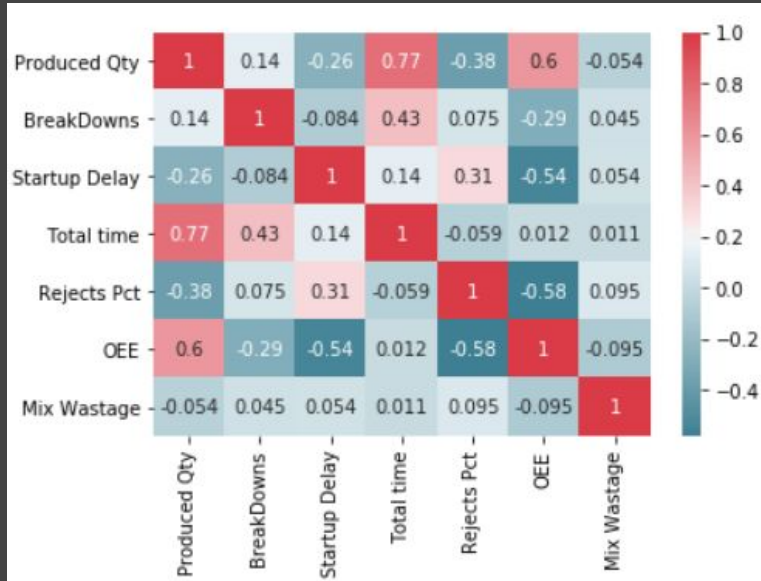


# OEE last year



**Why?**

# Correlation Graph



**High Positive correlation - Produced Quantity**

**High Negative correlation - Rejects Pct, Startup Delay, Breakdown Delay**

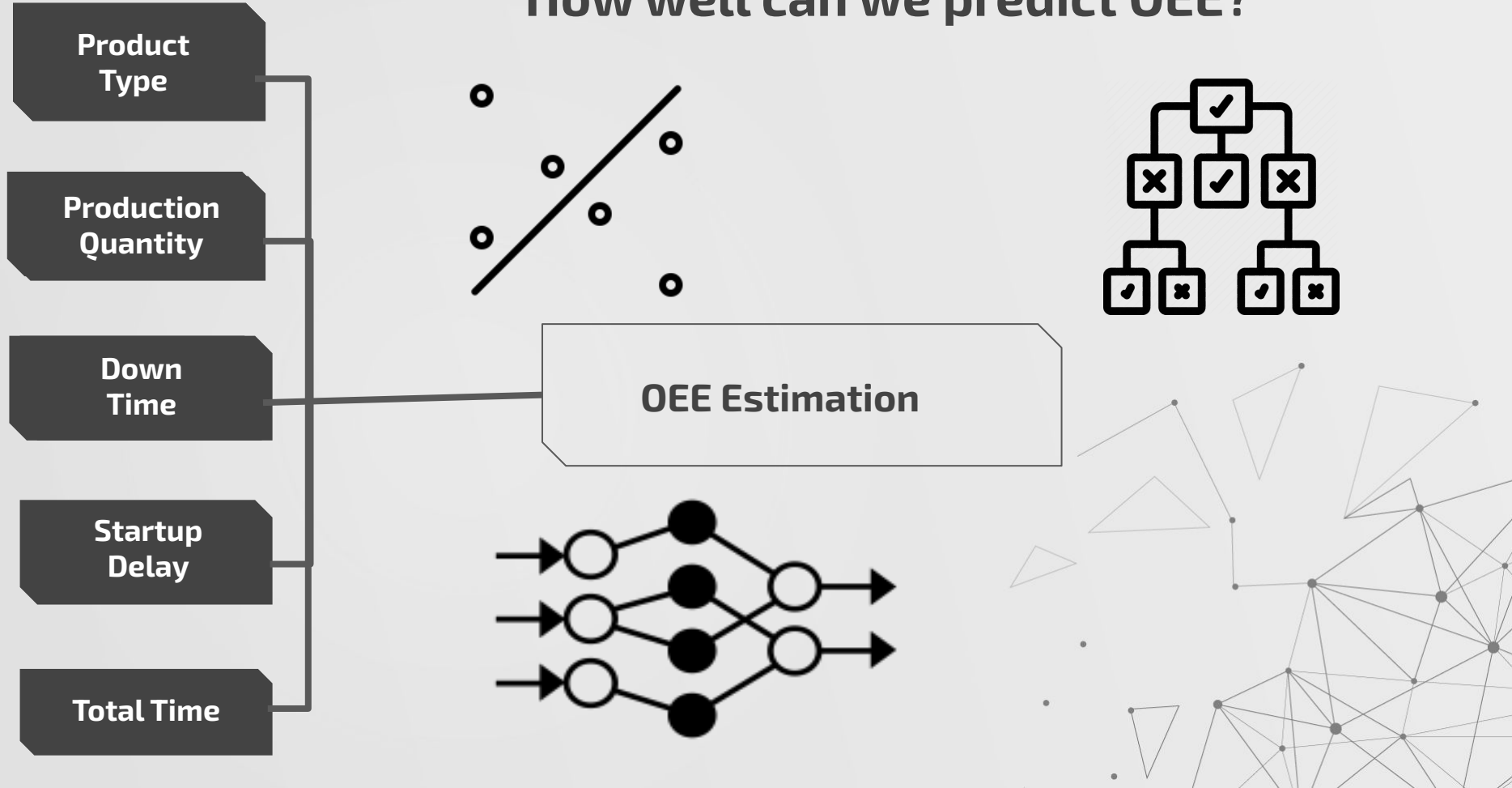


# 05

## Predictive Analysis

How to use data, statistical algorithms and machine learning techniques to identify the likelihood of future outcomes based on historical data.

# How well can we predict OEE?



## Predictions Using Different Methods

94.2%

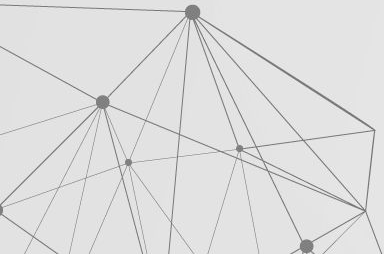
Deep Neural Networks

88.5%

Random Forest

84.4%

Linear Regression





# 06

## Conclusion

What are been delivered to the Business out of this project



# Conclusion

- Better business decision making using the results of data analytic methods.
- Create competitive advantages over competitors
- Managerial and leadership positions rely on data-driven decision making.



The background features a complex network of thin, light gray lines connecting various-sized dark gray dots. These dots are scattered across the slide, with some appearing as larger hubs and others as smaller peripheral nodes. The lines form a web-like structure that fills the background, particularly concentrated on the left and right sides, leaving the center more open for the text.

# THANKS

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