## Importance of Product Quality

Product quality is critical since it impacts the company's performance and helps develop its reputation in the marketplace. When businesses can consistently provide high-quality products that match consumer standards, they may reduce production costs, boost investment returns, and increase revenue.

Customers who rely on a company's attention to detail and customer demand value product quality. Companies manufacture items to suit market demand, and customers expect products to meet that need as advertised by the firm. In addition, they want things that assist them in forming a bond with a brand so they can trust what the firm has to offer. As a result, customers may handle their difficulties safely and effectively using high-quality items.

## Roasting machine

The roasting machine is an aggregate consisting of 5 chambers of equal size, and each chamber has three temperature sensors. In addition, for this task, you have collected data on the height of the raw material layer and its moisture content. Layer height and humidity are measured when raw materials enter the machine. Raw materials pass through the kiln in an hour.

## Why production quality prediction?

The project will help measure product quality when let into a roasting machine. The use-case will help factories detect good quality raw materials and discard the low-quality ones to produce a quality product.

## Dataset

The dataset includes 'Layer Height,' 'Humidity', and data acquired by the sensors in the roasting machine.

## XGBoost

The XGBoost algorithm was created as part of a University of Washington research effort.

In 2016, Tianqi Chen and Carlos Guestrin presented their article at the SIGKDD Conference, which ignited the Machine Learning industry.

Since its inception, this algorithm has been credited with winning a slew of Kaggle contests and serving as the brains behind several cutting-edge industrial applications.

Consequently, the XGBoost open source projects have a robust community of data scientists contributing to them, with 350 contributors and 3,600 contributions on GitHub.

The following are some of how the algorithm distinguishes itself:

1. A wide range of applications: Can be used to solve regression, classification, ranking, and user-defined prediction problems.
2. Portability: Runs smoothly on Windows, Linux, and OS X.
3. Languages: Supports all major programming languages, including C++, Python, R, Java, Scala, and Julia.
4. Cloud Integration: Supports AWS, Azure, and Yarn clusters and works well with Flink, Spark, and other ecosystems.

## Understanding Code

[Code]

[Code Explaination]

## Short Description

Product quality is critical since it impacts the company's performance and helps develop its reputation in the marketplace.

The project aims to predict the quality of materials used in production.

The dataset includes 'Layer Height,' 'Humidity', and data acquired by the sensors in the roasting machine.

'r2\_score' has been used to check the model's performance.

## Keywords

production quality prediction, production, quality, product, factory, industry, manufacturing, work, economy, making, assembly, mass production, productivity, customer, sensor, material, material quality, high quality, machine learning, xgboost, algorithm, prediction, supervised learning, structured data, price, boosting, regularization, artificial intelligence