**Title: Industrial anomaly detection of wood texture using unsupervised learning for quality assessment process automation**

**Introduction:** Accurate and swift quality inspection is very essential for meeting planned demand as well as maintaining good customer satisfaction scores in any manufacturing industry. Majority of the industries employee workers for manual identification of product defects. Though manual QA is works well for minor industrial units, heavy manufacturing industries which mass produces physical goods needs autonomous system for manufacturing as well as quality inspection. Manual inspection will not only slow down the manufacturing process but also has serious impact business operating cost. Growing human resource cost is also one of the major factors which signals business to move out of traditional manual QA to automated one. As occurrence of defects/anomalies is a rare instance hence less data to train models, this makes modeling anomalies very difficult. This business problem of anomaly detection under the presence of low or no-data needs unsupervised machine learning and deep learning techniques instead of traditional classification-based models. Especially for current the project purpose we will be using images of manufactured wooden objects for training unsupervised models to identify possible defects in the object’s texture

**Data Source:**

Source: Kaggle (by ITI-Instituto Tecnológico de Informática)

Link: <https://www.kaggle.com/datasets/itiresearch/wood-anomaly-detection-one-class-classification>

Method of Extraction: Direct download

## EDA & Model Development

**File Names:** Smart Customer Targeting – EDA.ipynb and Smart Customer Targeting\_Modeling.ipynb

**Folder:** code

**Description:** Smart Customer Targeting – EDA.ipynb has the code used for generating exploratory data analysis results while Smart Customer Targeting\_Modeling.ipynb has the code for model development and validation

**Programming Language**: Python

**IDE:** Jupyter Notebook

**Packages:** Pandas, Numpys, Matplotlib, Sklearn, Statsmodels, xgboost, imblearn and pickle

## Web Application Development

**File Names:** SmartCustomerTargeting.py and css\_styling.css

**Folder:** app\SmartCustomerTargeting

**Description:** This files/folder contains the code for web application development for the project. Python streamlit package has been used for application development.

**Programming Language**: Python

**IDE:** Visual Studio

**Packages:** Pandas, Numpy, Streamlit, PIL and Pickle