Week 13 - Project development

Project Overview:

In this project, I have built an **Anomaly Detection System** using **Teachable Machine** and integrated it into a **Streamlit app**. The system is designed to detect anomalies in a **manufactured product**, similar to how an inspection system might be used to identify defects or irregularities in products during production.

Steps Followed:

1. **Teachable Machine Setup**:
    - I selected a **manufactured product** (different from the dataset used for InspectorsAlly) for this project.
    - I uploaded images of the product to Teachable Machine's **Image Project** and trained the model with two classes: one for **Normal** (no anomaly) and one for **Anomalous** (with defects).
    - After training, I exported the model from Teachable Machine as a **TensorFlow Lite model (.tflite)** and saved the class labels in a text file.
2. **Streamlit App Integration**:
    - I then created a **Streamlit app** to integrate the trained model to perform anomaly detection.
    - The app allows users to **upload an image** to check if the product is **Normal** or has an **Anomaly**.
    - Additionally, I implemented a **live camera feed** functionality (bonus point) to allow real-time anomaly detection using the webcam, without the need to upload an image.
3. **Model Optimization**:
    - I fine-tuned the model parameters, such as **Epochs**, **Batch Size**, and **Learning Rate,** to optimize the model's performance and accuracy in detecting anomalies.
4. **Deployment**:
    - The final Streamlit app was deployed, and users can now use the system to detect product anomalies by uploading an image or using the camera feed in real-time.

Streamlit App Link:

You can try the live application here: Anomaly Detection System