

# Smart Home Surveillance



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## **Guide**

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# Breif !dea



- Smart Home Surviellence is a system to detect and identify activites that are going on inside a House/Organisation.
- It is a new and advance method used to replace current CCTV system.

# *inspiration*

- Generally in occurrence of any crime, the first step that people do for proof is go through CCTV.
- Be it in Home, on streets or in an organisation.
- This takes upto a lot of time.
- What if a family has a young child at home and cannot be left unsupervised?
- Thus role of Smart CCTV comes into play where it can detect the activities and respond to the concerned person.

# Technology Used

- Android Jetpack
- Firebase
- TensorFlow

Why use this technology?

# Android Jetpack



- We have used CameraX API from Android Jetpack to provide seamless analysis and preview.
- It reduces our efforts of coding as compared to the regular camera API
- We've used WorkManager to provide with background process
- We've also used DataBinding, LiveData and Room Database to provide us uninterrupted execution with UI.

# Firebase



- Firebase is a web and mobile platform to provide database, storage, authentication and ML APIs.
- We've used Firebase to put our custom tensorflow model for execution on the cloud.
- It helps us in interacting with the internet and also provides a scope for expansion.

# TensorFlow



- TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks.
- We've used TensorFlow to build our custom classification model.





- We are building a tool for behavioural analysis based on poses, gestures and activities.
- In organizations/malls/any place where people gather, it can be customized to recognize mass behaviour pattern for easy marketing of products, detect robbery, look at customer's response etc.
- At home also it can be customized for personal use like tracking activity, tracking objects in the house etc.

# What are we doing?

- For an activity detection, first we need to find the pose of a person.
- For pose detection, we first need to find the person.
- For person detection, first we need to find object.
- So the project starts with object detection and classification.

Object



Person

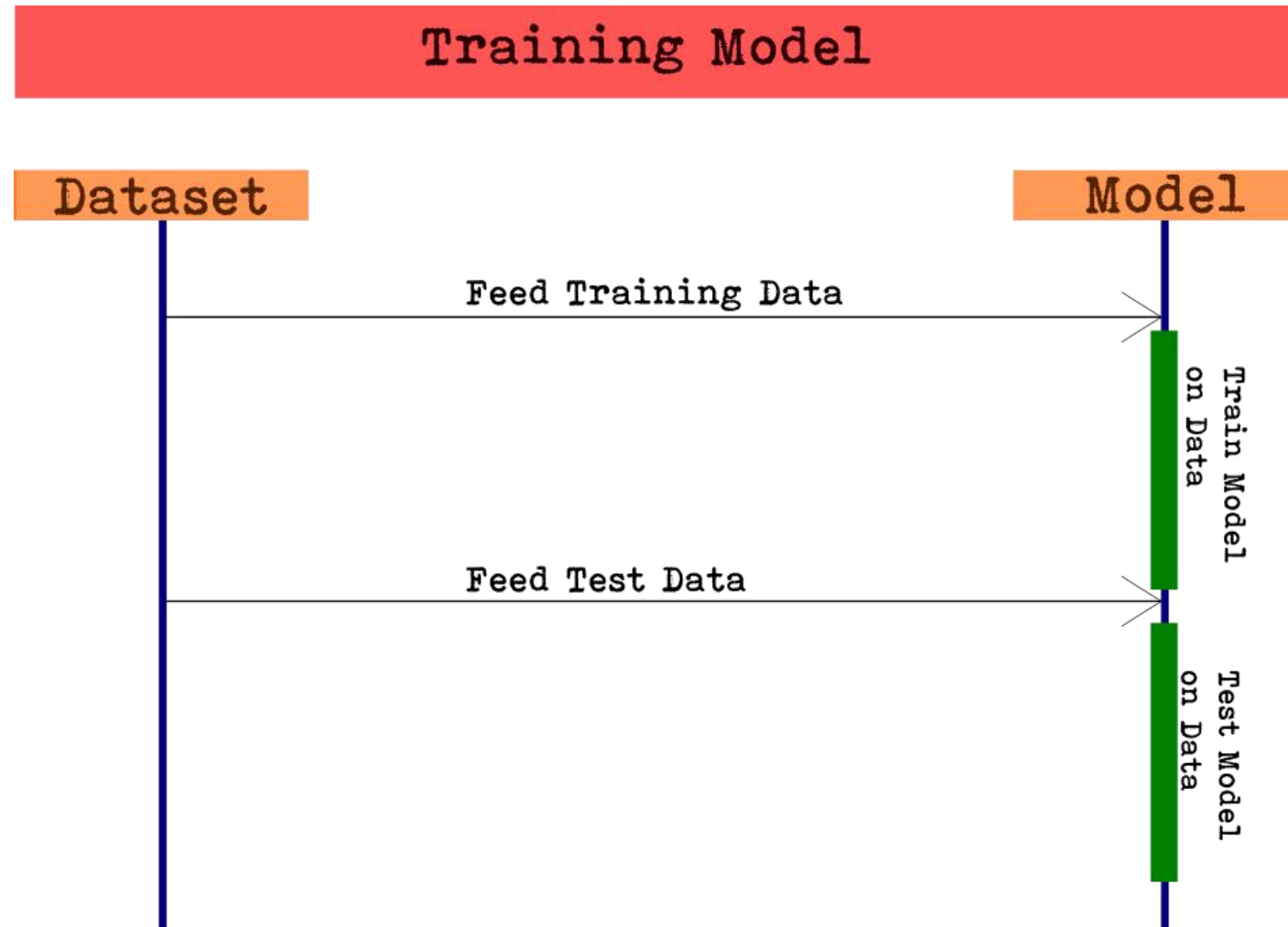


Pose

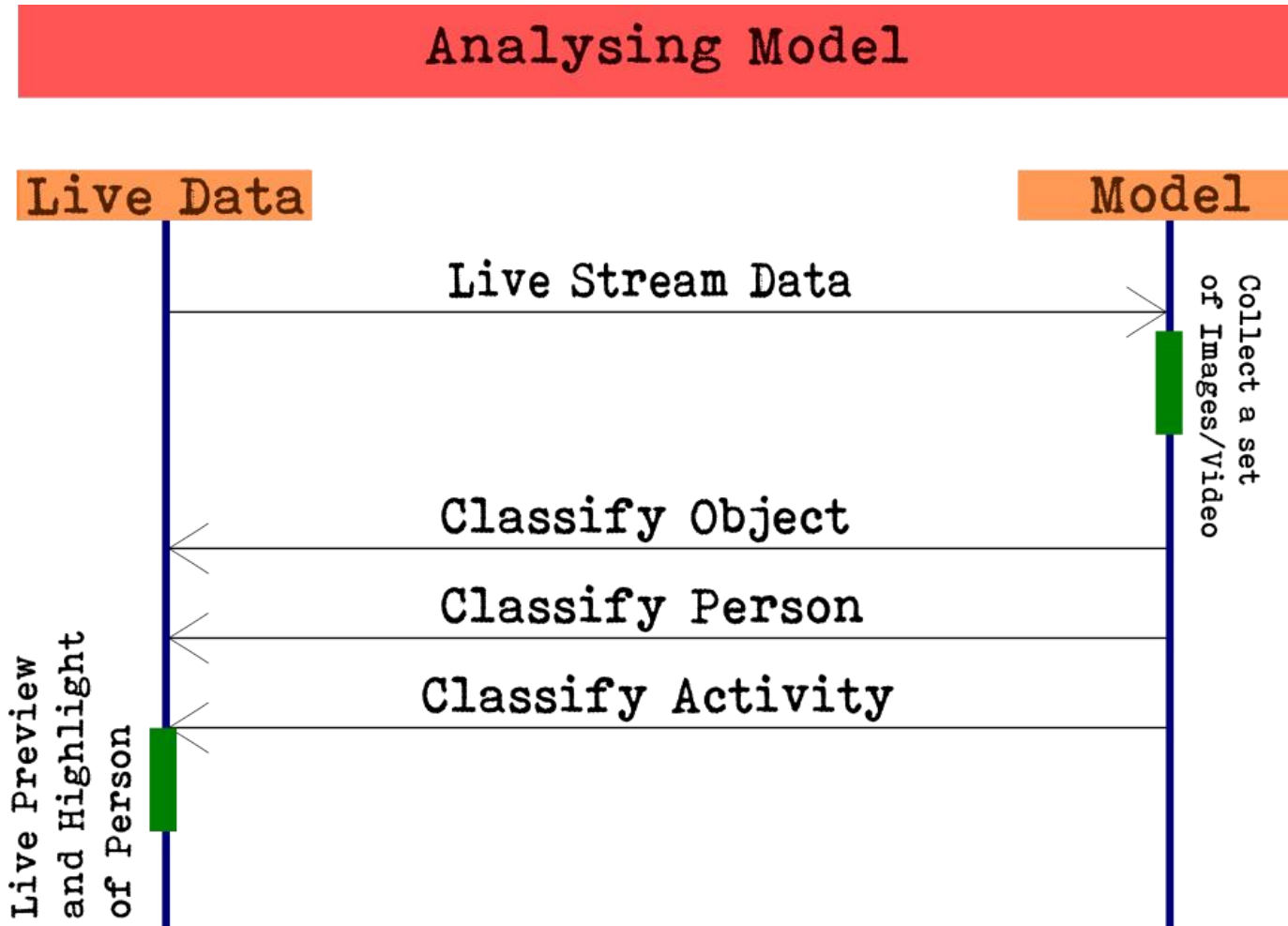


Activity

# Sequence Diag. for Training Model



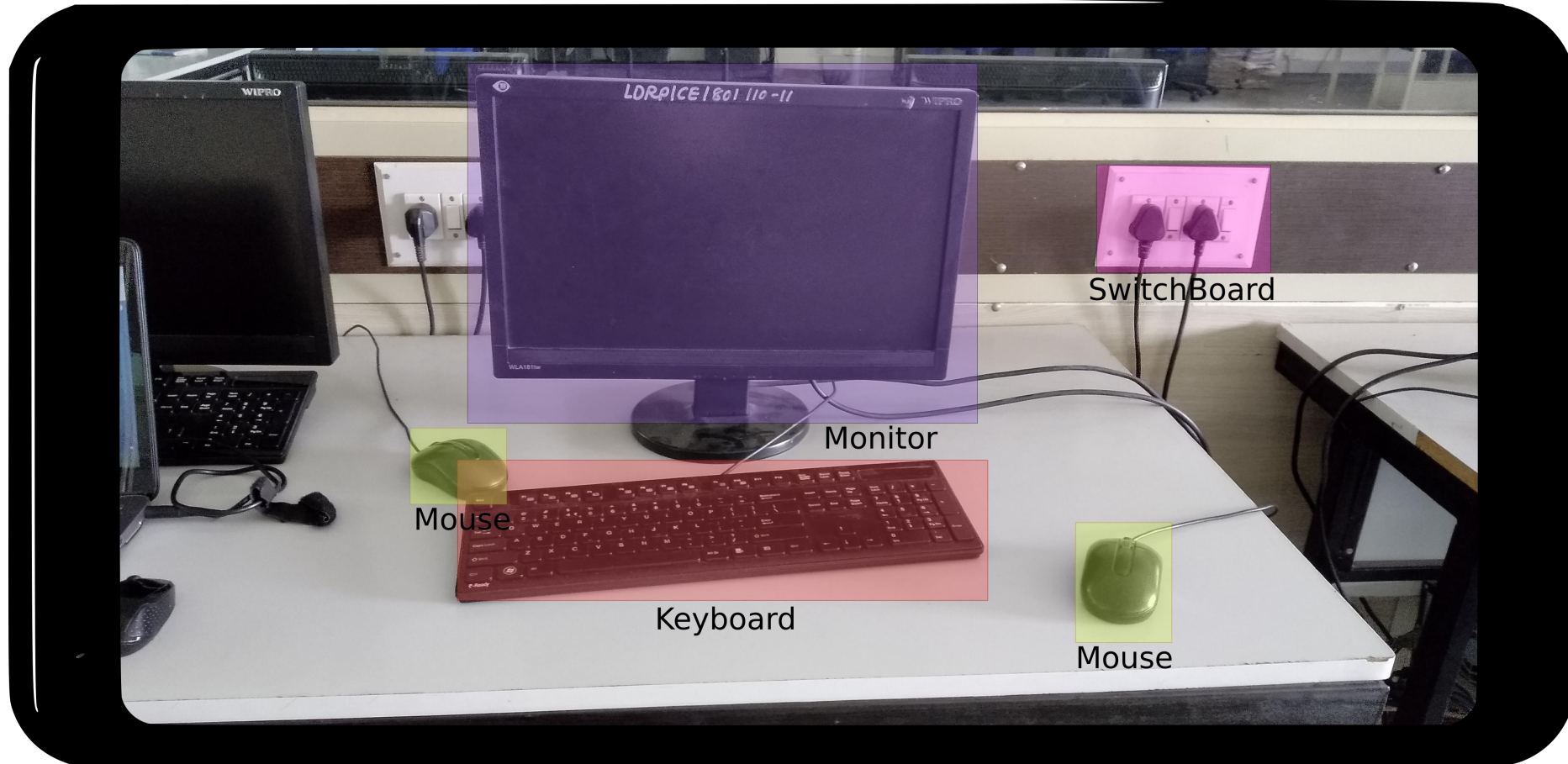
# Sequence Diag. for Live Data



# Steps

- Object Detection
- Person Classification (With unique person identity)
- Pose Classification
- Activity Classification

# Step 1 : Object Detection & Classification



# How is it done?

- Make a tensorflow model for object detection classification.
- Upload it as a custom model to firebase ML Kit.
- Integrate with Android App as a analysis Use Case for CameraX
- Upload Live Video to Firebase (set of images maybe) and get object category and its location on the image
- Expected output is boundary over detected object in the live video stream.