Security and Surveillance Installation Guide

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Introduction

Security and Surveillance is a solution for detection, tracking and recognition of various objects and humans in live or recorded video streams to facilitate the task of surveillance and security involved with it.

This solution provides base framework for Security and Surveillance(SnS). It is designed in modular way where every involved component acts independently. Due to its independent nature it can be easily tuned to solve problems specific to different domains. E.g Retail, Security etc.

SnS solution can be easily integrated in existing infrastructure(existing camera grid). No additional surveillance hardware is required. It can easily access and connect to existing DVRs to detect and capture stream from connected cameras. It can be configured to connect to IP cameras as well.

SnS will help user to detect and analyse Humans, Objects present in particular area of interest. Humans can be classified based on gender, age group etc with help of face detection and recognition.

SnS solution can also be used to track and identify humans. It is also possible to track movement across different areas. Admin can view and analyze historical reports based on detection during specified duration.

A. High Level Architecture.
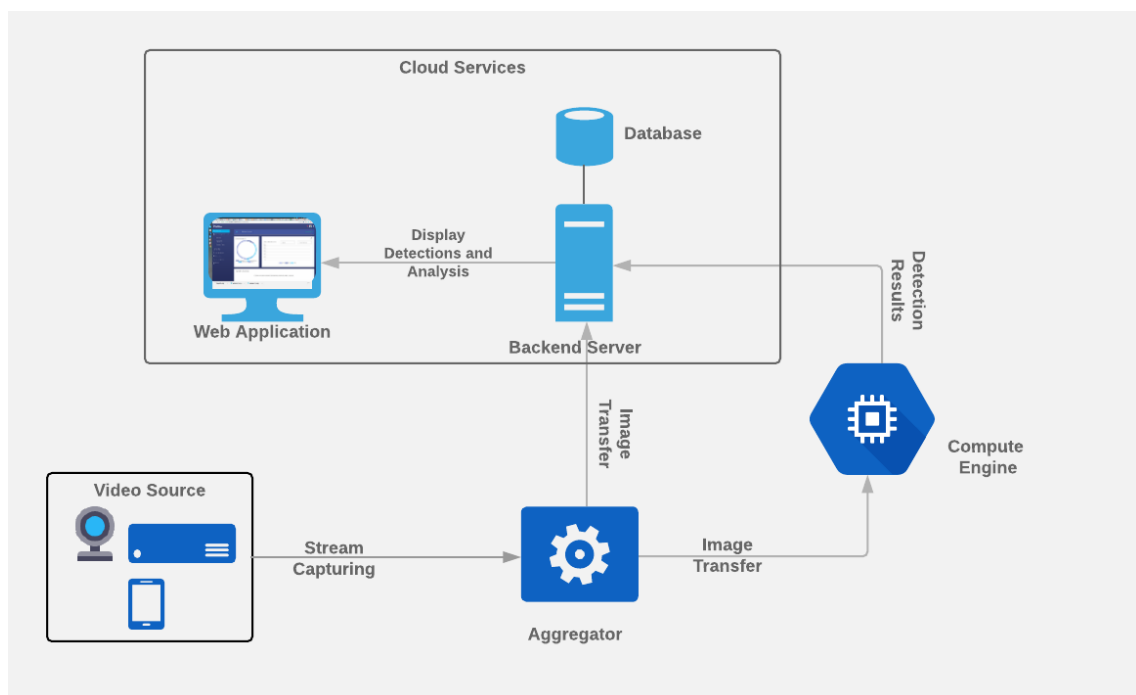
B. Modules of Security and Surveillance.

1. Aggregator Module:

This module is a node server which captures stream from video sources like DVR (Digital Video Recorder) used with CCTV cameras, IP cameras , etc. The aggregator extracts frames from these video streams and provides them to Compute Engine for detection and tracking. Aggregator also sends these frames to back-end server for displaying on the web application.

2. Compute Engine Module:

This module is responsible for the main detection and tracking feature. It uses deep learning algorithms to detect humans, objects, tracking person and face recognition. It generates bounding boxes around the detected entity and sends them to the back-end server.

3. Back-end Server :

It is a node server which provides required REST end points. It provides communication between all the internal components (aggregator, compute engine, database,etc). It also aggregates various micro-services used for different use cases like detection , recognition and tracking. This server is responsible for all the database related operations.

4. Web Application:

Web application is the user interface for on-boarding/off-boarding of devices/components, connecting to wide range of video streams, displaying the detection results and analytics over them. The web application allows user to select video source, area of interest for detection and type of detection. The analytics as per user selections are generated on the web application. The live streaming of videos with detection are also displayed by the Web UI.

C. Supported Hardware:

1. Video Streams:

   i. DVR and NVR with camera grid (Stream types - rtsp, mp4,etc).

   ii. IP cameras

   iii. Webcams.

2. Compute Engines:

   i. Nvidia Jetson TX2

   ii. Movidius Neural Compute Stick. (Less Accurate)

3. Aggregator:

   i. Linux system.

D. Feature Matrix

Feature	V 1.0 OnCloud	V1.0 On Premise
Object Detection	Yes	Yes
Human Detection	Yes	Yes
Face Detection	Yes	No
Face Recognition	Yes	No
Video Analysis	Yes	No
Path Tracking	Yes	No
Tripline Crossing	Yes	Yes

E. Operating Environment

- ❖ Four Bounding box per Jetson
- ❖ Separate Camera for Tripline and Other shapes
- ❖ Similar Feature for individual Camera. (Face detection or Human/Object detection)
- ❖ Draw Floor Map Eyesight in clock wise (TopLeft to BottomRight)