**RAT DETECTION – Overview of Working**

* **Data Collection & Preprocessing**

Large Sets of Images : Collect a large dataset of rat images and various backgrounds.

Preprocessing Techniques : Apply noise reduction, rotations, edge detection, texture analysis, and conversion to greyscale.

Image Adjustment : Resize images and ensure consistent quality.

* **Model Selection**

- CNN (Convolutional Neural Network) : The backbone of image and video detection processes. Models divide the image into grids and predict bounding boxes for detected objects.

* **Why YOLO?**

- Real-Time Speed : YOLO detects objects quickly by processing the entire image in one pass. This speed is beneficial for applications requiring immediate responses, unlike other models with slower, more complex processes.

* **Training and Testing**

- Conversion to Haar Cascade : Train and test datasets can be converted into Haar cascade datasets for model training. This involves creating a .xml file from positive and negative images.

- Haar Cascade Training : The result of the training process is a .xml file containing the trained model, which is used by OpenCV for detecting objects in new images or video frames.

* **Object Detection and Notification**

- Real-Time Detection : Use the Haar cascade model to detect rats in video frames or from a live camera feed.

- Notification Process :

- Twilio Setup : Sign up for a Twilio account, obtain your Account SID, Auth Token, and a Twilio phone number.

- Send SMS : Integrate Twilio’s API into your detection script to send an SMS alert to a specified mobile number whenever a rat is detected in the video frame.