

## PDE4434CW - Coursework 2

This repository contains a demonstration related to PDE4434 CW2 -showcasing the detection of UNO Cards using computer vision.

**Overview** This project aims to detect UNO cards from a camera feed or loaded images. UNO cards contain 15 types of classes, each with 4 color sets: blue, yellow, red, and green.

Workflow Here is the step-by-step workflow for this coursework:

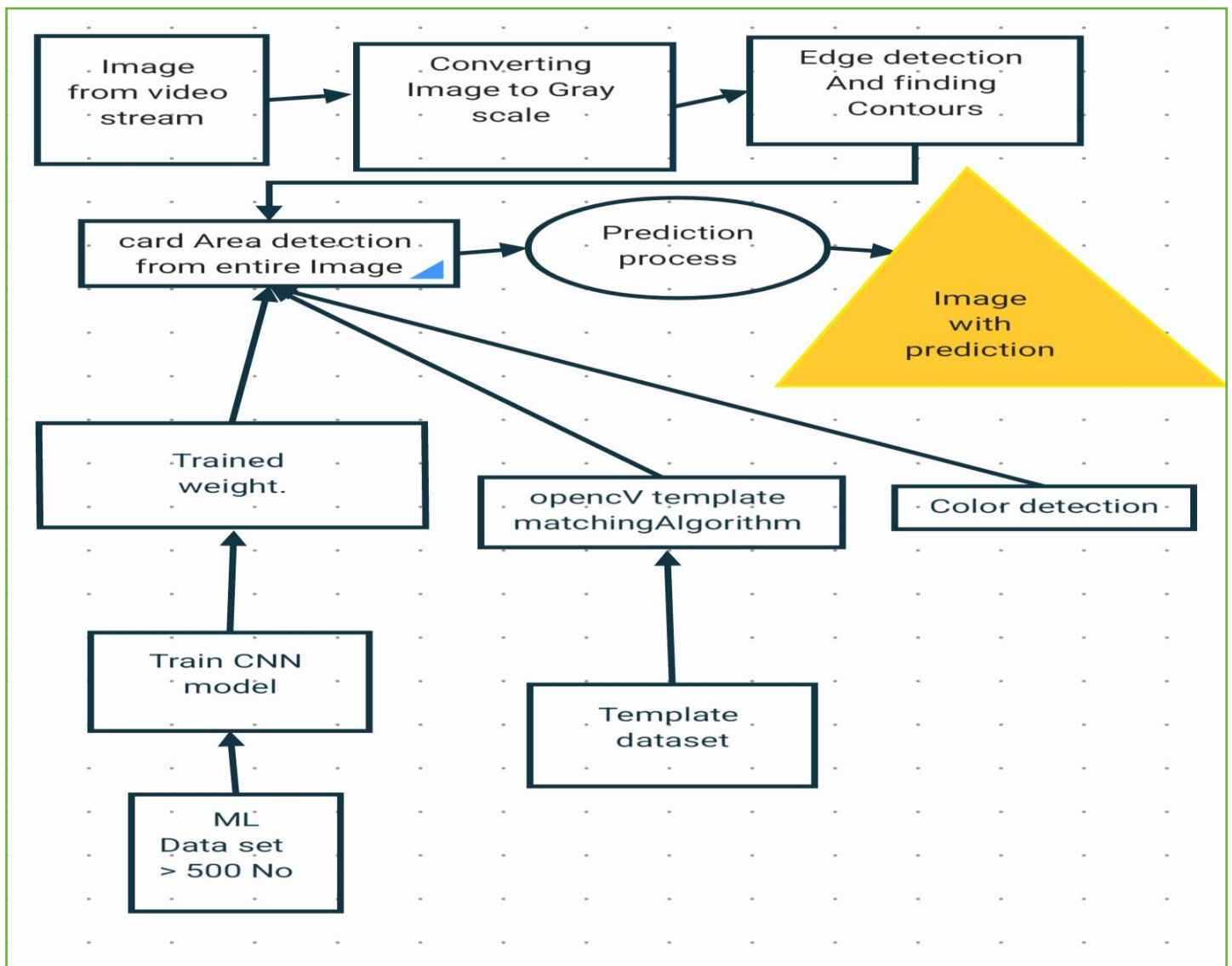
### **Approach of Card detection:**

Creating a dataset of 15 class images, which include: Numbers from 0 to 9 Wild Wild Take 2 Wild Take 4 Skip Reverse Two approaches are followed: OpenCV template matching method and Machine Learning approach. Both approaches have their advantages and disadvantages. OpenCV's built-in algorithms use feature matching through template matching libraries, requiring limited data. However, the resulting model may have limitations under different lighting conditions. The Machine Learning approach employs CNN (Convolutional Neural Network), which is more robust but requires a large amount of data for training, which may be challenging with limited PC resources.

### **Color Detection:**

Color detection is handled by OpenCV's HSV (Hue, Saturation, Value) algorithm. Hue represents the color, saturation indicates the greenness in the image, and value represents the brightness of each pixel. This method provides better performance in color detection compared to the RGB format.

### Flow chart



### Execution Instructions:

Launch [CW2\\_UNO\\_card\\_detection.ipynb](#) to run the card detection program.

Launch [SaveImagefromwebCam.ipynb](#) to capture dataset from the camera.

Run Model training in [UNO\\_Card\\_CNN\\_CW.ipynb](#).

**Limitations:**

The behaviour of card detection may be affected by lighting conditions and background.

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