Real Time Identity Ribbon Detection Based on Histogram Oriented Gradient and Linear Supported Vector Machine

PRESENTED BY

TAMIM HASAN

ID:181-35-2432

DEPT OF SWE,DIU

SUPERVISED BY

KAUSHIK SARKER

ASSISTANT PROFESSOR AND ASSOCIATE HEAD

DEPT OF SWE ,DIU

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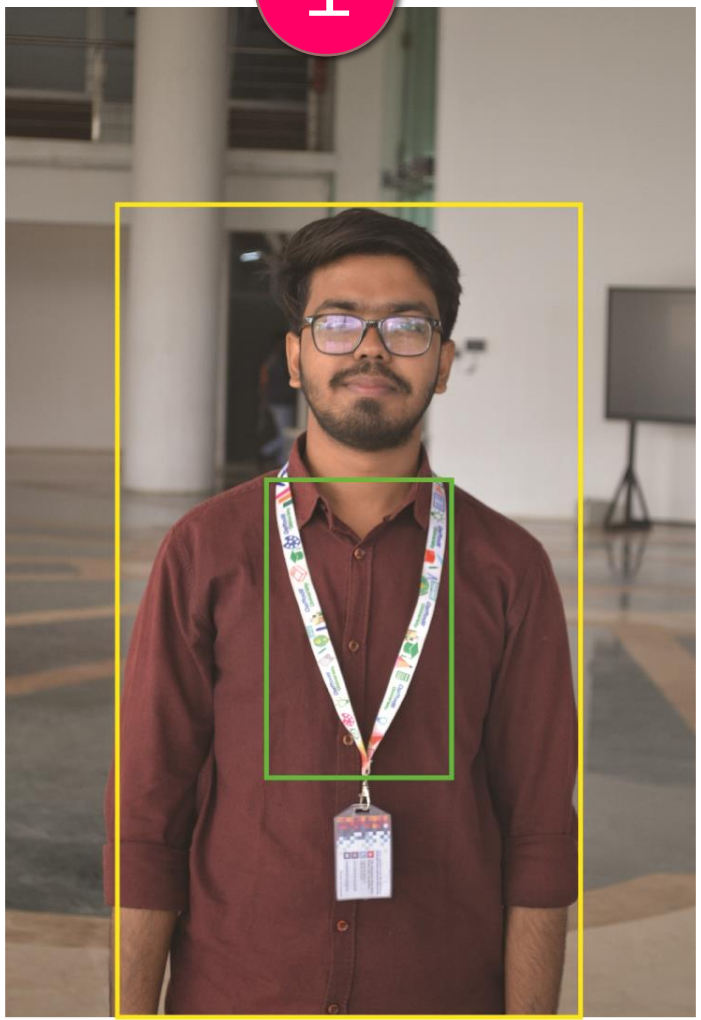
Background

PLAN 1

In recent years, there has been a significant increase in research interest supporting the development of the object detection, which is an AI platform capable of sensing and reacting to it's immediate environment in an attempt to navigate roadways without human intervention. Object detection is a computer vision technique that works to identify and locate objects within an image or video. I propose a novel attention-based convolutional neural network which regulates multiple object parts among different input images. Ribbon detection and characterization, is a key procedure in many nephropathologist studies. In this thesis, semantic segmentation based on convolutional neural networks is proposed to detect RIBBON.



Motivation

PLAN 2

01 Want to analyze the previous year's research HOG and Linear SVM for object detection in related topic.

02 Predict the Object based on these features by using deep learning approach.

03 Provide some favorable suggestions regarding this issue.

Hopefully, this research would be helpful for the all kind of stakeholders related to the Object recognition issue.

Literature Review

PLAN 3

NO	Author	Paper	Method	Year	Finding Lacking's
1	Nikola Tomikj Andrea Kulakov	Identity card with HOG and Linear SVM	HOG and Linear SVM.	2021	64×64 pixels
2	Sai Krishna Chadalawada	Real Time Object Detection and Recognition Using Deep Learning Methods	Fast R-CNN. Faster R-CNN.	2020	Average Recognition Rate is: 76.43%
3	Kaiming He, Xiangyu Zhang, Shaoqing Ren, Jian Sun	Deep Residual Learning for Image Recognition	Residual Networks (ResNet)	2016	The training error ResNet is: 80%
4	Jianlong Fu, Heliang Zheng, Tao Mei	Look Closer to See Better: Recurrent Attention Convolutional Neural Network for Image Recognition	Recurrent Attention Convolutional Neural Network (RA-CNN)	2017	Overall accuracy in RA-CNN: 82.5%
5	Prem Kumar Bhaskar Suet-Peng Yong	Image Processing Based ID card detection and Tracking Method	YOLO Faster R-CNN OpenCV	2014	Low Accuracy in CNN: 86.5%

Literature Review

PLAN 3

NO	Author	Paper	Method	Year	Finding Lacking's
6	Zhong-Qiu Zhao Peng Zheng, Shou-Tao Xu, and Xindong W	Object Detection With Deep Learning: A Review	Region-based Convolutional Neural Networks (R-CNN)	2019	It achieves 85.14% accuracy
7	Chieh-Ling, Huang Heng-Ning, Ma	A Moving Object Detection Algorithm for identity card detection.	Object Detection Algorithm Faster R-CNN	2015	The experiment is repeated more than 5 times to produce an average result
8	Jian Gong Fuqiang Liu Chunlin Song	Moving object detection Algorithm Based on the Motion Vector	Faster R-CNN Fast R-CNN Optical Flow Method architecture method used in this paper	2020	Overall accuracy found: 68.3%
9	Jianlong Fu, Heliang Zheng, Tao Mei	A Large-Scale Car Dataset for image Categorization and Verification	Recurrent Attention Convolutional Neural Network (RA-CNN)	2015	Accuracy level not found
10	Xuewen Chen, Huaqing Chen, and Huan Xu	Identity card Based on Multifeatured Extraction and Recognition Adopting RBF Neural Network on ADAS System	Multifeatured Extraction and Recognition Adopting RBF Neural Network on ADAS System	2020	Low Accuracy found in CNN: 76.6%

Scope

PLAN 4

Dual priorities: object classification and localization. The first major complication of object detection is its added goal.

1 Scope1

Scope2 2

Different level attentions focus on different characteristics of the image, which are complementary and boost the classification accuracy.

The user can easily trac diu members on different background images.

3 Scope3

Scope4 4

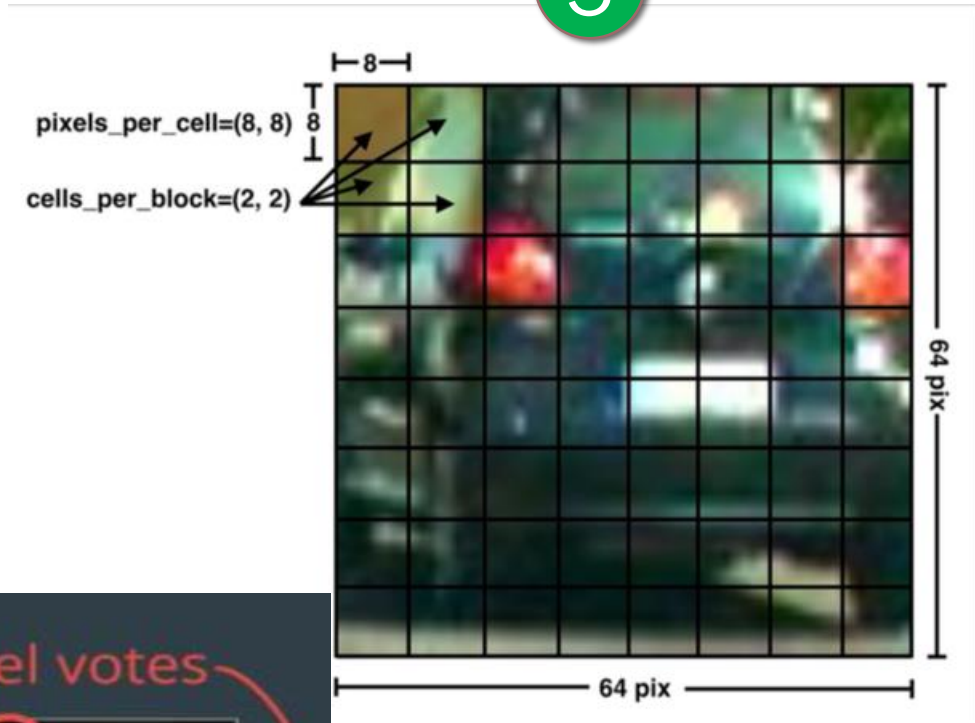
It can play very important role in identifying diu students, and teachers.

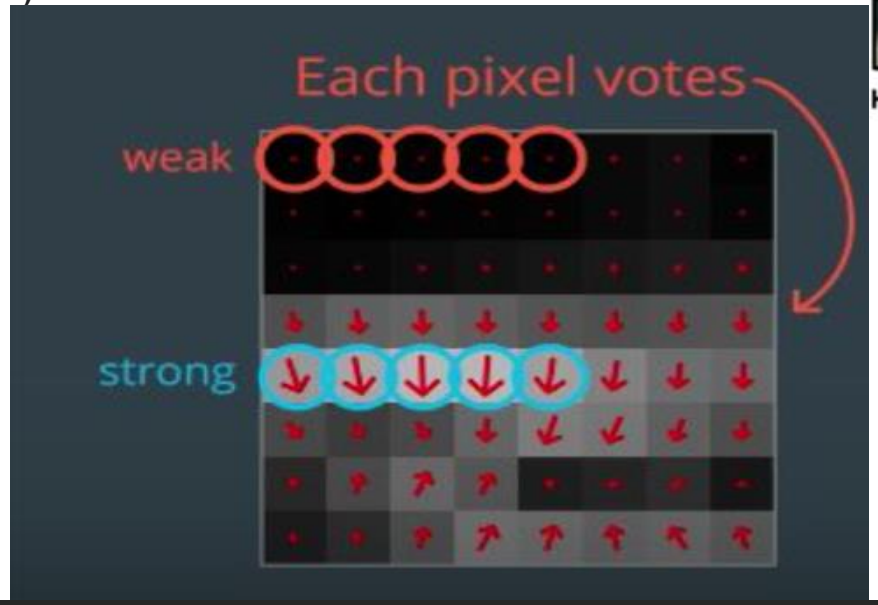
Methodology

In this section, I present my proposed method which can efficiently and accurately attend discriminative regions despite being trained only on image level labels. As shown in 2 image.

the framework of our method is composed by two parts:

1. Histogram of Oriented Gradients (HOG)
2. Support-Vector Machines(SVM)





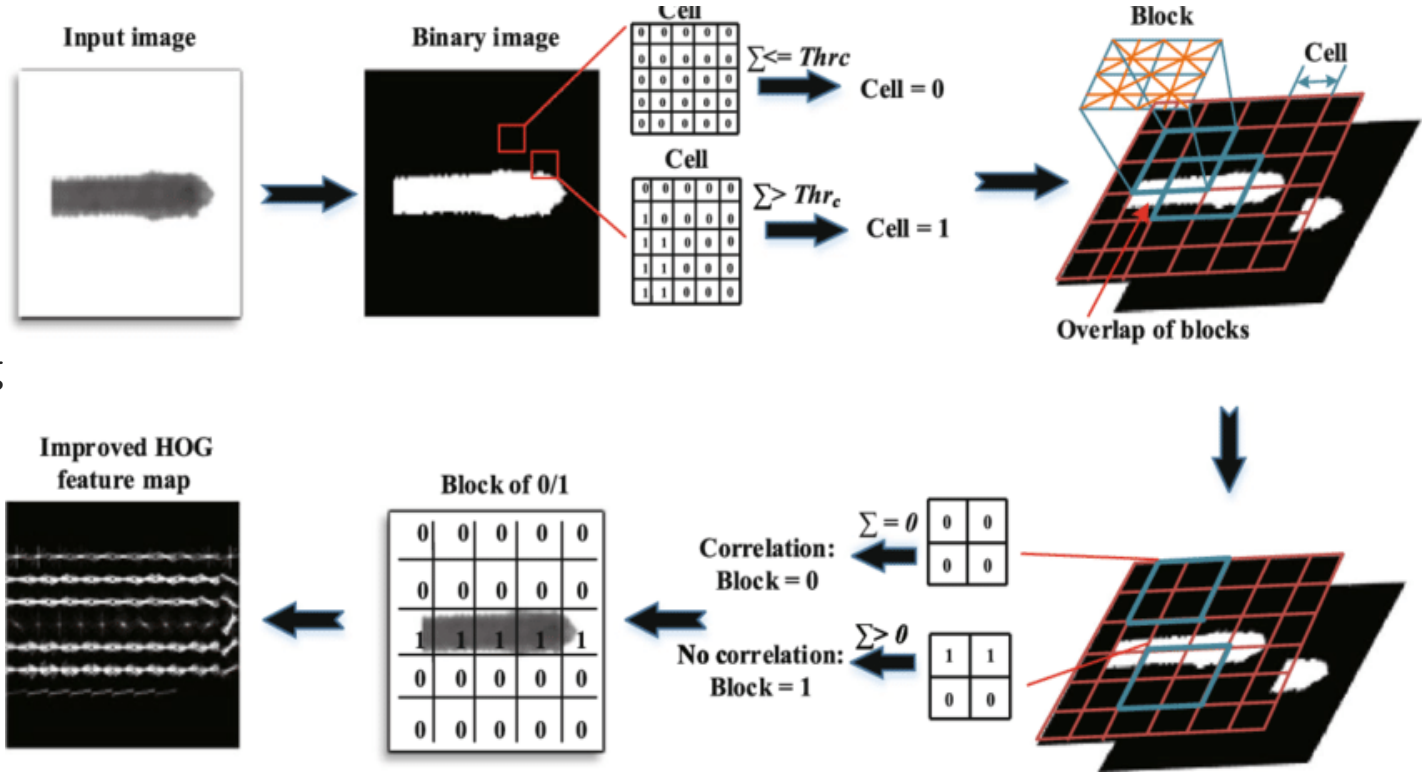
Methodology

PLAN 5

Histogram of oriented gradients (HOG)

HOG, or Histogram of Oriented Gradients, is a feature descriptor that is often used to extract features from image data. It is widely used in computer vision tasks for object detection.

- Preprocess the Data (64 x 128)
- Calculating Gradients (direction x and y)
- Calculate the Magnitude and Orientation
- Different Methods to Create Histograms using Gradients and Orientation
- Calculate Histogram of Gradients in 8×8 cells
- Normalize gradients in 16×16 cell (36×1)
- Features for the complete image
- Implementing HOG Feature



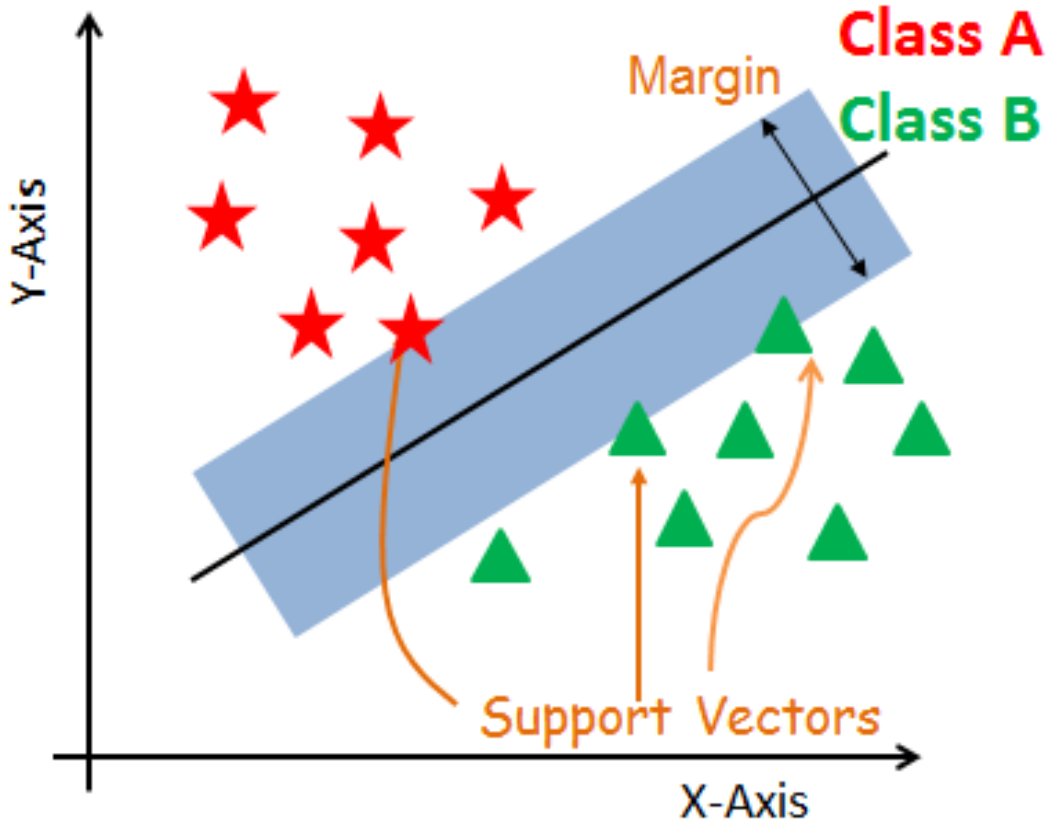
Methodology

PLAN 5

Support Vector Machine(SVM)

SVM or Support Vector Machine is a linear model for classification and regression problems. It can solve linear and non-linear problems and work well for many practical problems.
The idea of SVM is simple: The algorithm creates a line or a hyperplane which separates the data into classes.

- Import the dataset
- Explore the data to figure out what they look like
- Pre-process the data
- Split the data into attributes and labels
- Divide the data into training and testing sets
- Train the SVM algorithm
- Make some predictions
- Evaluate the results of the algorithm

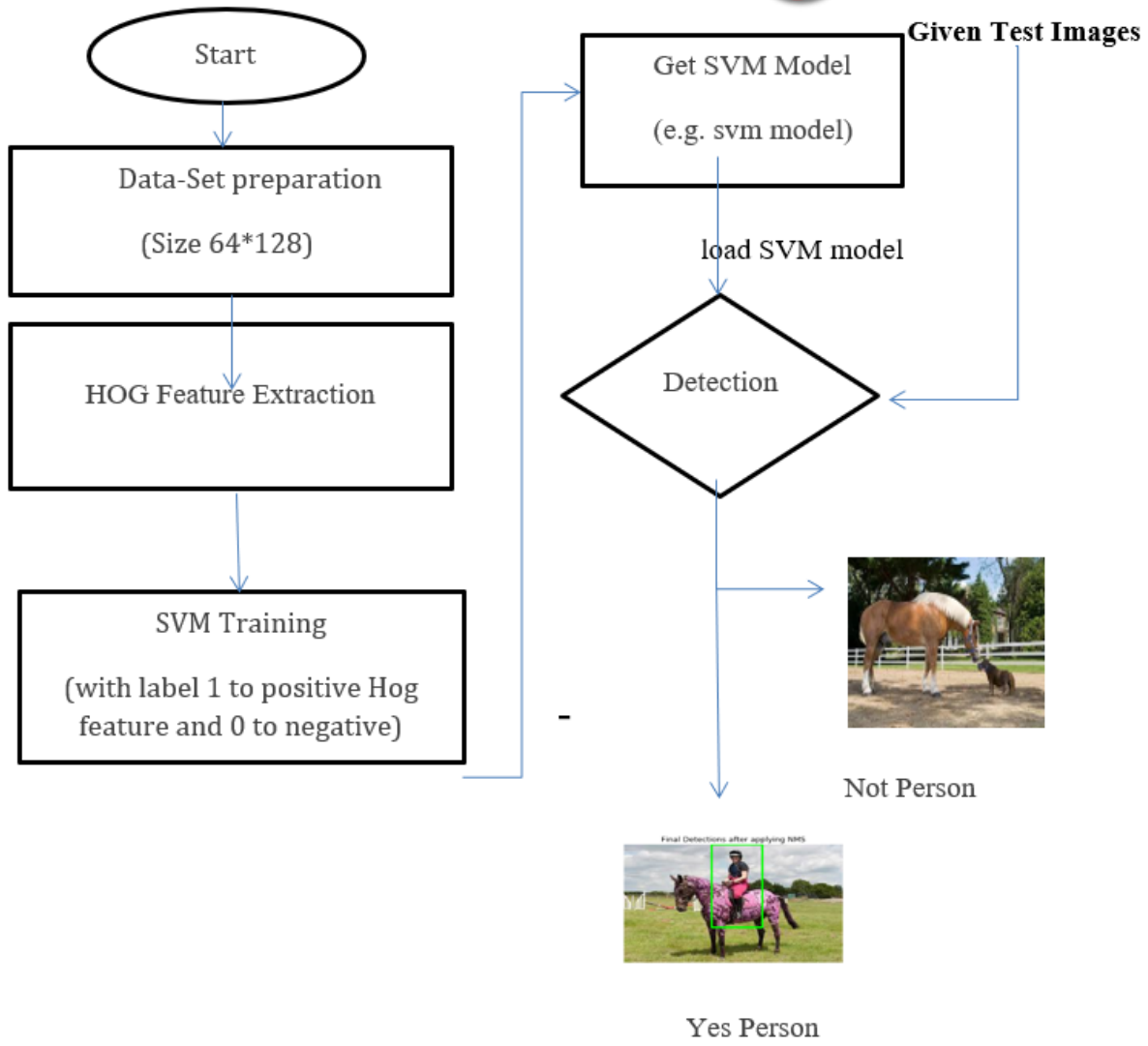


Methodology

PLAN 5

Full Process for Object Detection Using HOG and SVM

- Performed a Histogram of Oriented Gradients (HOG) feature extraction on a labeled training set of images.
- Trained a classifier with the set of ribbon and ribbon images.
- Implemented a sliding window to get subregions of a single video frame.
- Used my trained classifier to detect ribbon on subregions.
- Created a heat map of recurring detections frame by frame to follow and detect ribbon.



Implementation

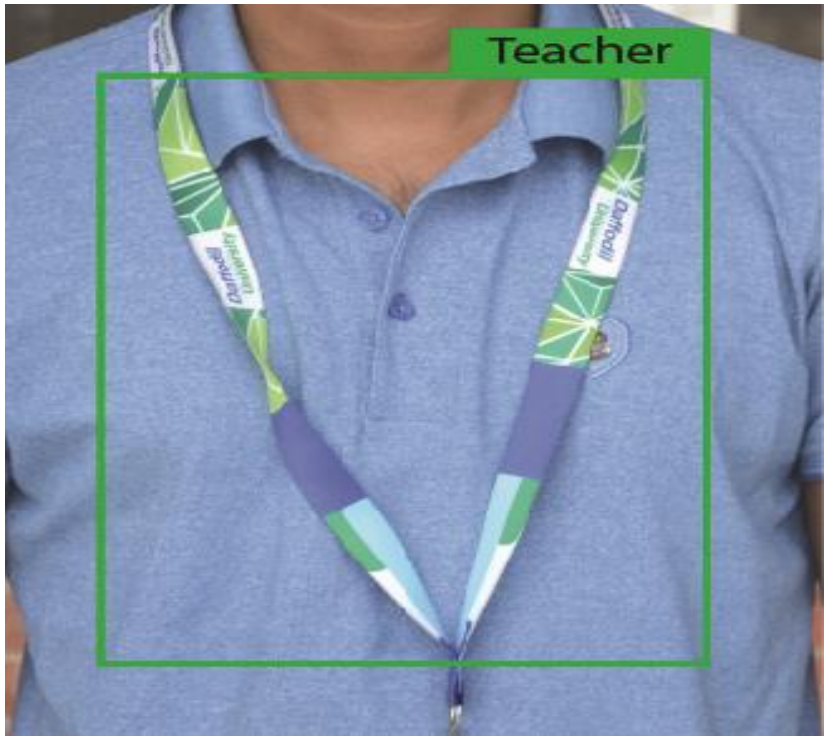
PLAN 6

Test	Result	Accuracy
Student1.jpg	Match	100%
Student2.jpg	Match	100%
Student3.jpg	Match	100%
Teacher1.jpg	Match	100%
Teacher2.jpg	Match	100%
Teacher3.jpg	Match	100%

Implementation

PLAN 6

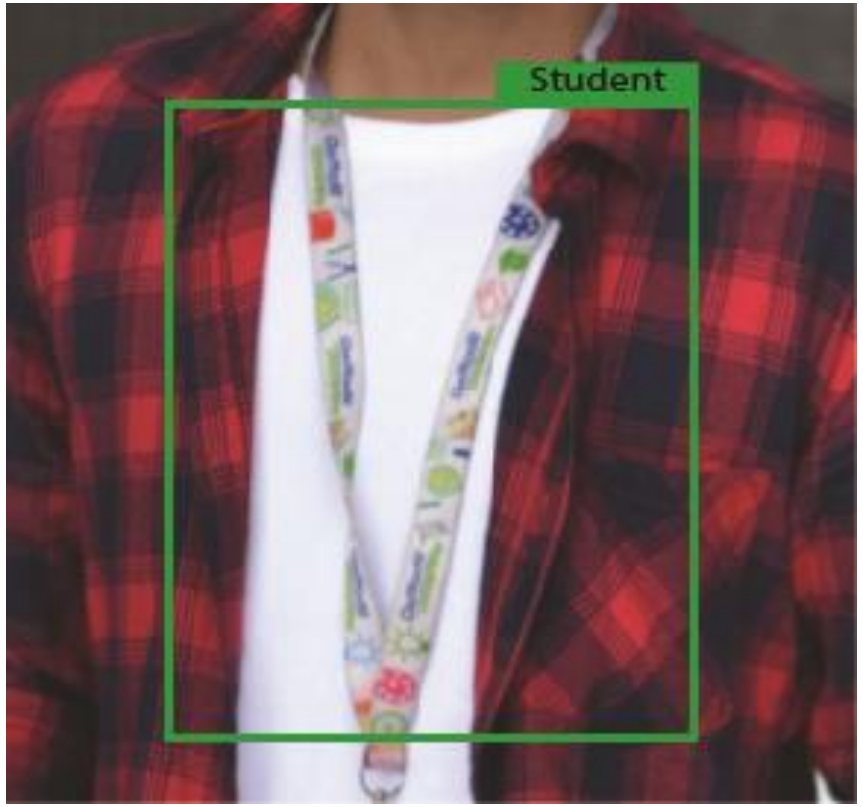
Output of Teacher.jpg picture



Implementation

PLAN 6

Output of Student.jpg Picture




THANK YOU