

# Welcome to Computer Vision Club!

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CV Officers

# Club Officers

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# What is Computer Vision (CV)?

- A field of AI working on extracting information from visual inputs
  - Ex. Images and Videos
- “Eyes of a Computer”
- Converts visual information into data the machine can work with
- Used to accomplish many crucial tasks:
  - Object Detection
  - Object Classification
  - Semantic Segmentation
  - Instance Segmentation

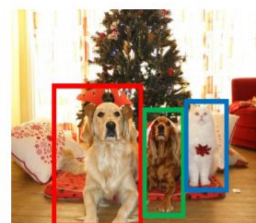
**Classification**



**Semantic Segmentation**



**Object Detection**



**Instance Segmentation**



# What do we do?

Our club's value are:

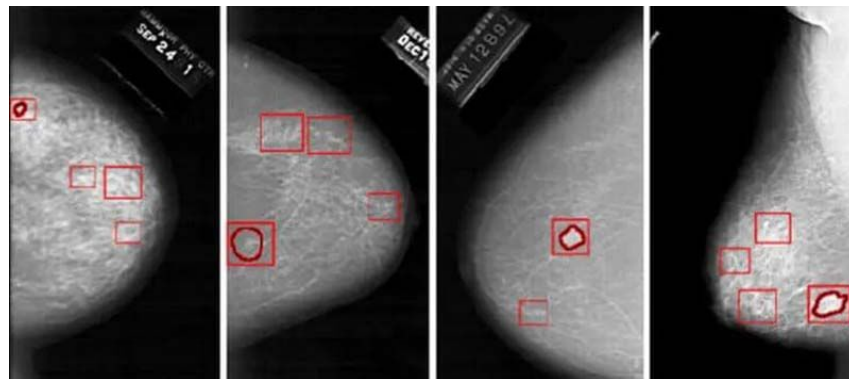
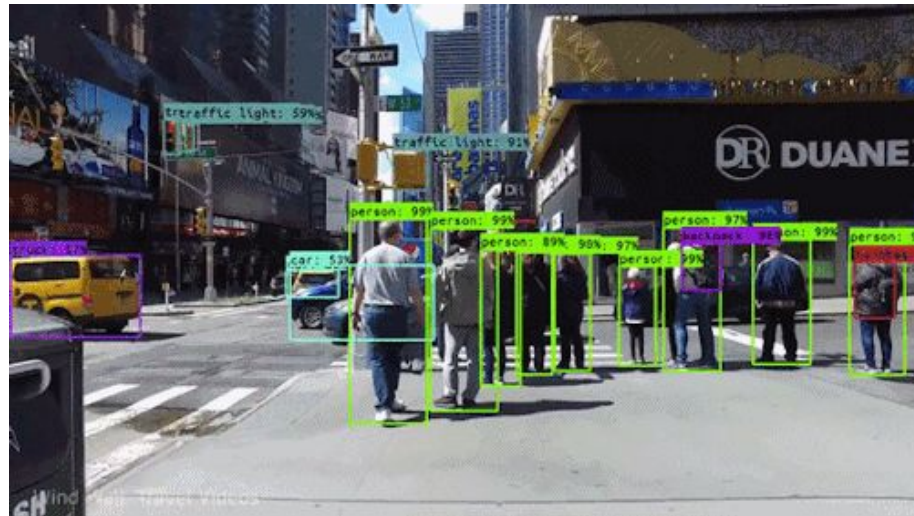
- Making the complex field of **computer vision accessible** to high school students through engaging lectures
- Supporting student **research** and **development** efforts to use computer vision in real world projects from apps to research
- Fostering a **community** of passionate thinkers **discussing** and **working** with computer vision so we can further our **knowledge** of the field

# How will we do that?

- Lectures
  - Introduce new concepts every meeting
  - Focus on both applications and implementations
- Competitions
  - Provide regular in-club Kaggle competitions
  - Working hands-on with algorithms
- Research Support
  - Offer valuable resources and guidance for CV-related research
  - Advice for research framing and development, presentations at science fairs and conferences
- Discussions
  - Go over materials as a group to further understanding
  - Guest lectures and Q/As

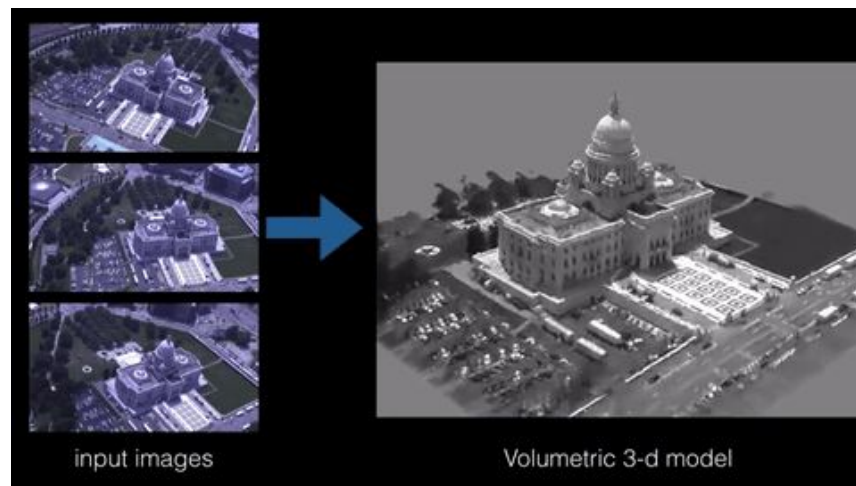
# Cool Applications of CV

- Self driving cars
  - Visual input processing is crucial for intelligent decision-making
- Facial/Human recognition
- Dynamic object detection
- Diagnosing diseases



# More Cool Applications of CV

- Sports
  - Automatic scoreboard and referee
  - Posture detection and correction
- 3D Reconstruction
  - Medical imaging (i.e X-rays)
  - Architecture
  - Virtual/Augmented Reality



# Our Experience with CV (and how we can help you!)

- Science fair experience competing at the school level up to ISEF
- Peer-reviewed presentations at professional conferences
- Publications in major conference archives
- Filing and obtaining patents
- Senior lab projects in the field of CV
- Computer Vision classes
- Mentored research internships





# Contact Information

**Site:** <https://activities.tjhsst.edu/computervision/>

**Email:** [tjcomputervision@gmail.com](mailto:tjcomputervision@gmail.com)

**Github:** <https://github.com/tjcomputervision>

# Installing OpenCV

## Linux/Mac:

```
sudo easy_install pip (if pip not already installed)
```

```
sudo -H pip install opencv-python (comes with numpy)
```

## Windows:

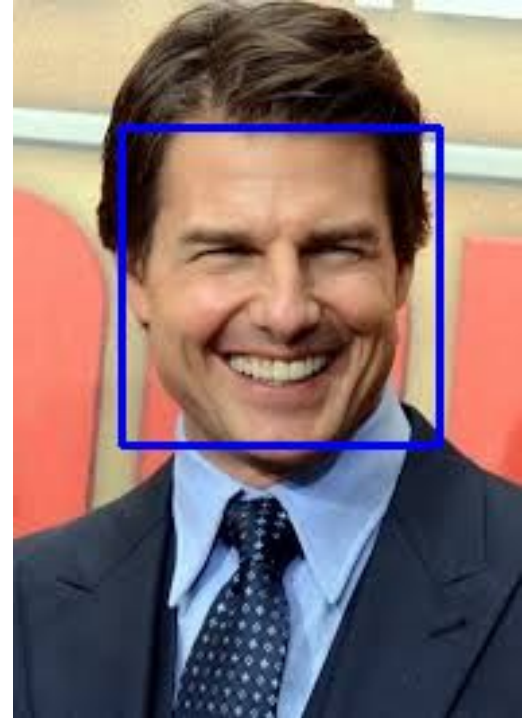
```
pip3 install opencv-python
```

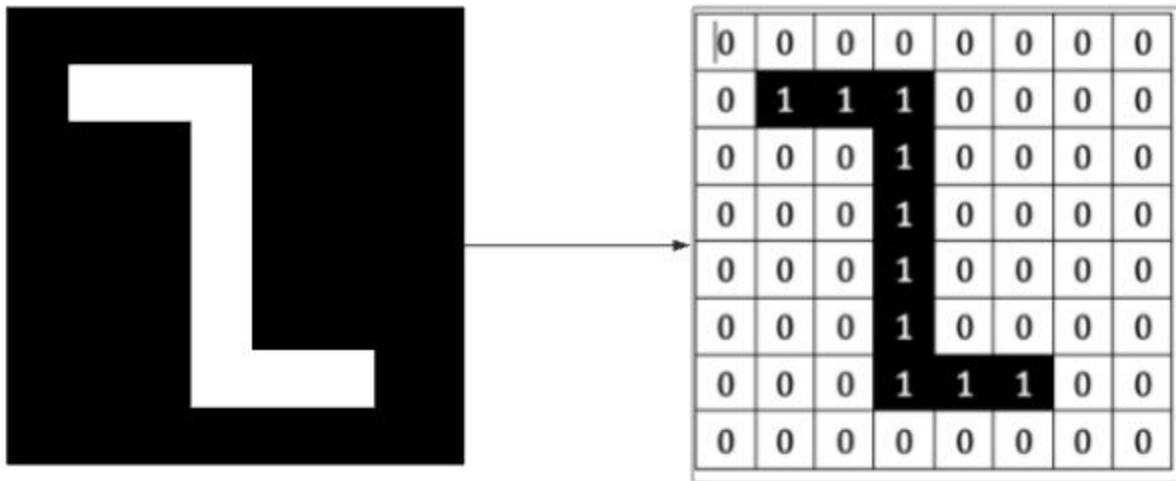
## Testing:

```
Run import cv2
```

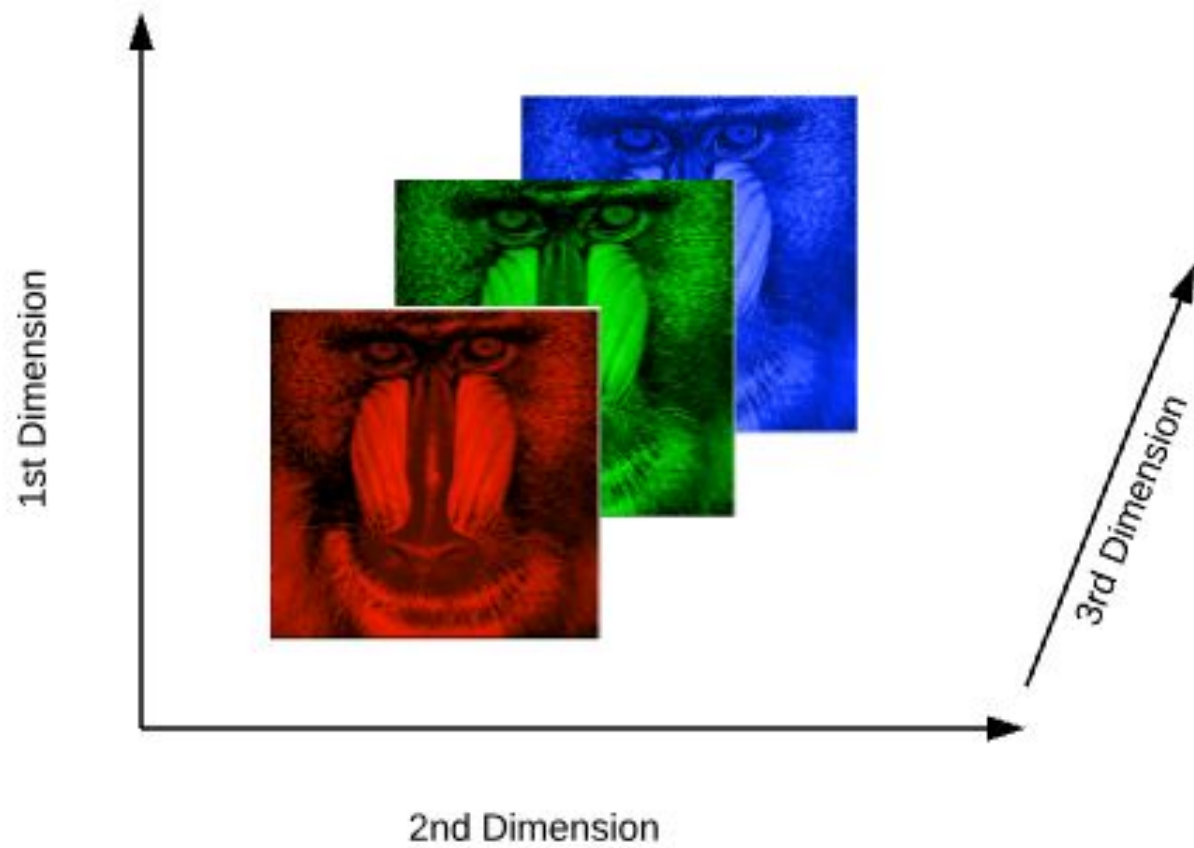
# Activity for Today: Designing a Face Detection App

- Detection vs. Recognition: What's the difference?
- Images: What is a picture? How is black-and-white different from color?
- Detection: How will our algorithm actually work?





Representation of a black and white image in form of a binary where '1' represents pure white while '0' represents black. Here the image is represented by 1 bit/pixel which means image can be represented by only 2 possible colours since  $2^1=2$

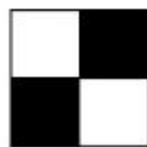




(a) Edge Features



(b) Line Features



(c) Four-rectangle features

