# Intro. To Machine Learning & Computer Vision
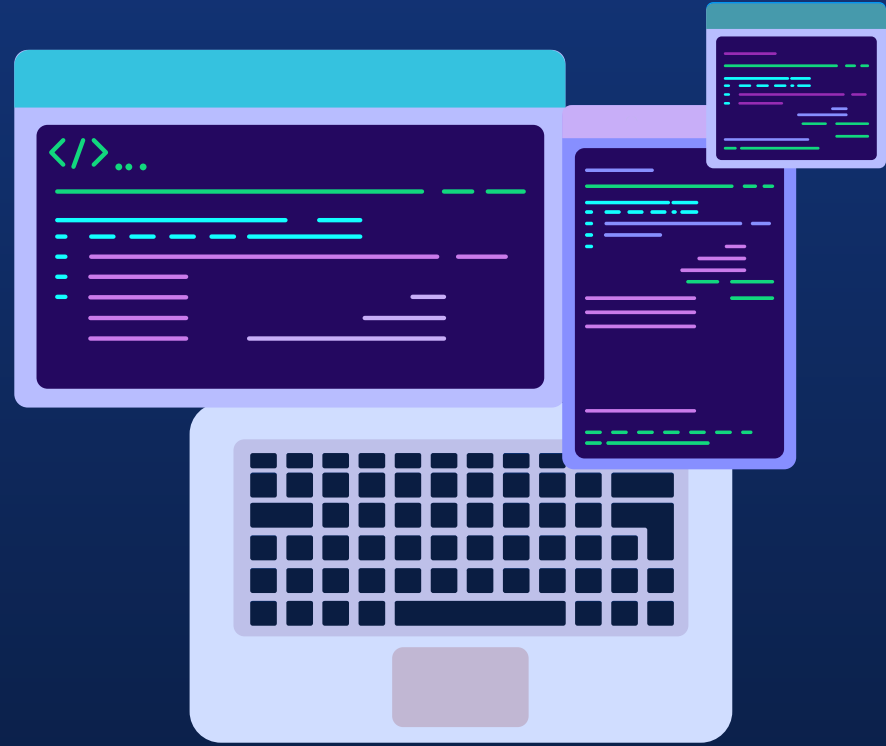
# TABLE OF CONTENTS

# 01

## Environment and Setup

# Environment

Go, here: https://github.com/BigThinkAI-UMD/BitCamp/tree/main

Follow the read me if you haven't, and we will walk around and help you if you need

# 02

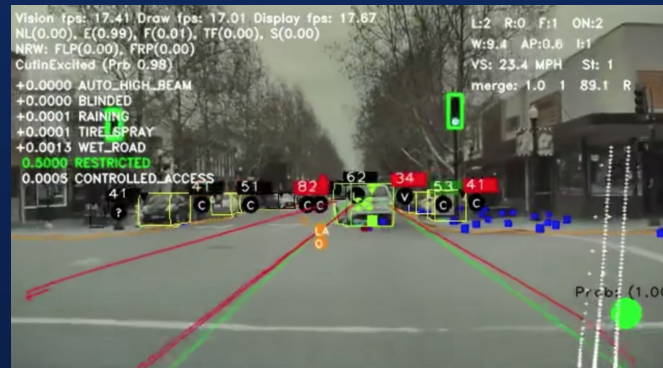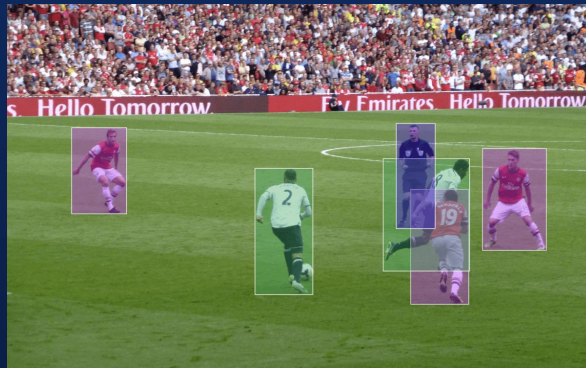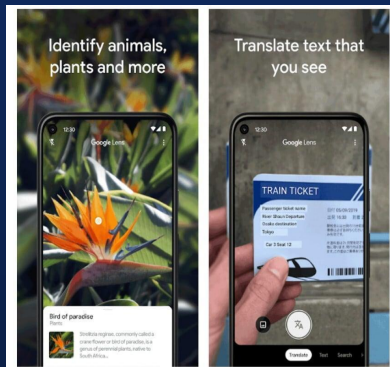## Recap of
## Computer Vision

# What is Computer Vision?

- New development of Neural Networks pave way for computer vision
- Computer vision detects patterns and objects in images by identify each pixel to learn patterns
- Common applications are image segmentation, classification, object tracking, and detection

Examples:

# How does it work?

- We are given photos. The model will analyze the photos by each pixel
- Each pixel has 3 channels (for RGB) that ranges from 0 - 255 in red, green and blue
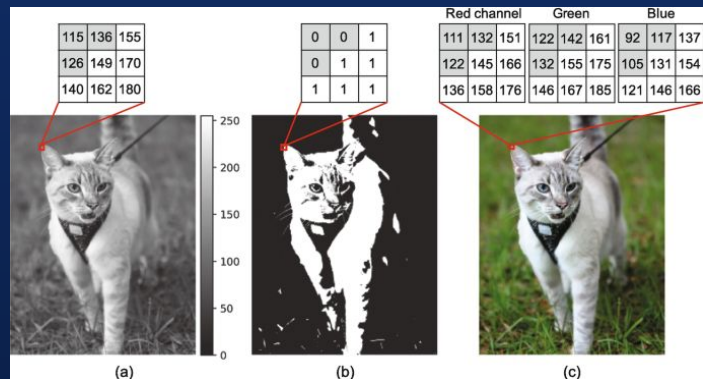- We then flatten the image to a single vector to feed into our model

# 03

## MNIST Example

# MNIST Dataset

- Contains 70,000 images of digits written by high school students and U.S. Census Bureau employees
- Often called the "Hello World" in Machine Learning due to frequent use in courses
- Original images were 128 by 128 binary images, later downscaled to 28 by 28 grayscale images
- Each image has a label of the digit it represents
- Problem: Classify digits in the images (Supervised since it's labeled)
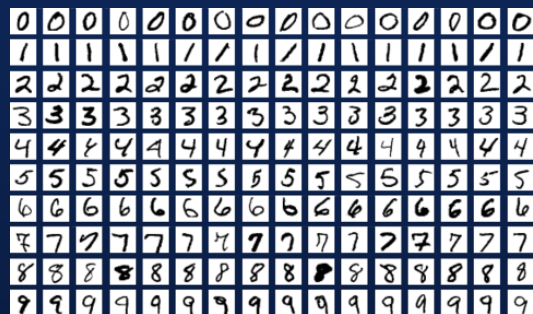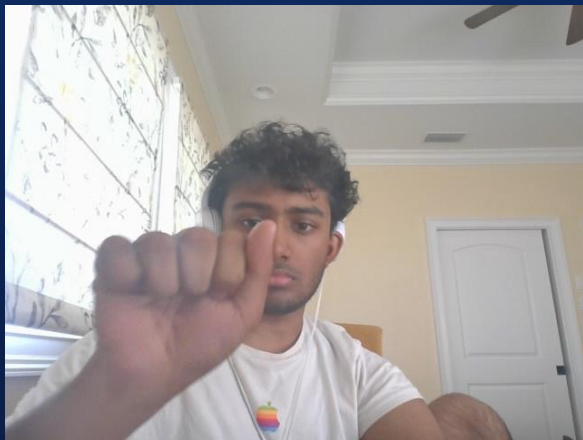
# 04

Sign Language
Project
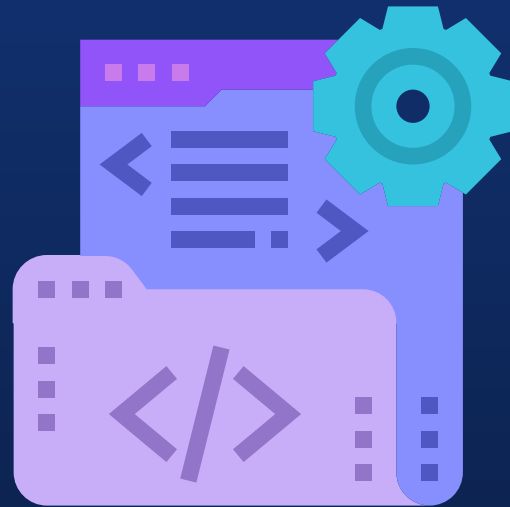
# What are we doing?

- Classifying the sign language alphabet in real time
- We will classify every letter except J and Z, because they are motions
- We have provided a dataset for the model to train on

Dataset:

A:



B:

# Demo

# The Pipeline

- Step 1: Get your training data!
  - We won't do "J" or "Z" because they are motions
- Step 2: Create the dataset in python to feed into our model
  - Use the mediapipe library for hand detection
  - Normalize and flatten the dataset
  - Save the dataset using the pickle library
- Step 3:  Train our model
  - Use the Scikit-Learn library to import RandomForestClassifier
  - Split our dataset into train and test sets
  - Evaluate and save our model
- Step 4: Use your model!

# Coding!

## Run collect_imgs.py

Make sure you create an empty data folder!

# THANK YOU!

Join BigThink AI!