Angry Nerds Prototype Presentation

Theme:

Computer vision application in delivering excellent customer service in a commercial establishment.

Overview

Computer vision, an AI technology allows computers to understand and label images. It's application can be seen in convenience stores, driverless car testing, daily medical diagnostics, and in monitoring the health of crops and livestock.

Researches been made show that computers are proficient at recognizing images, and for that, top companies such as Amazon, google, Microsoft, and Facebook are investing billions of dollars in computer vision research and product development.

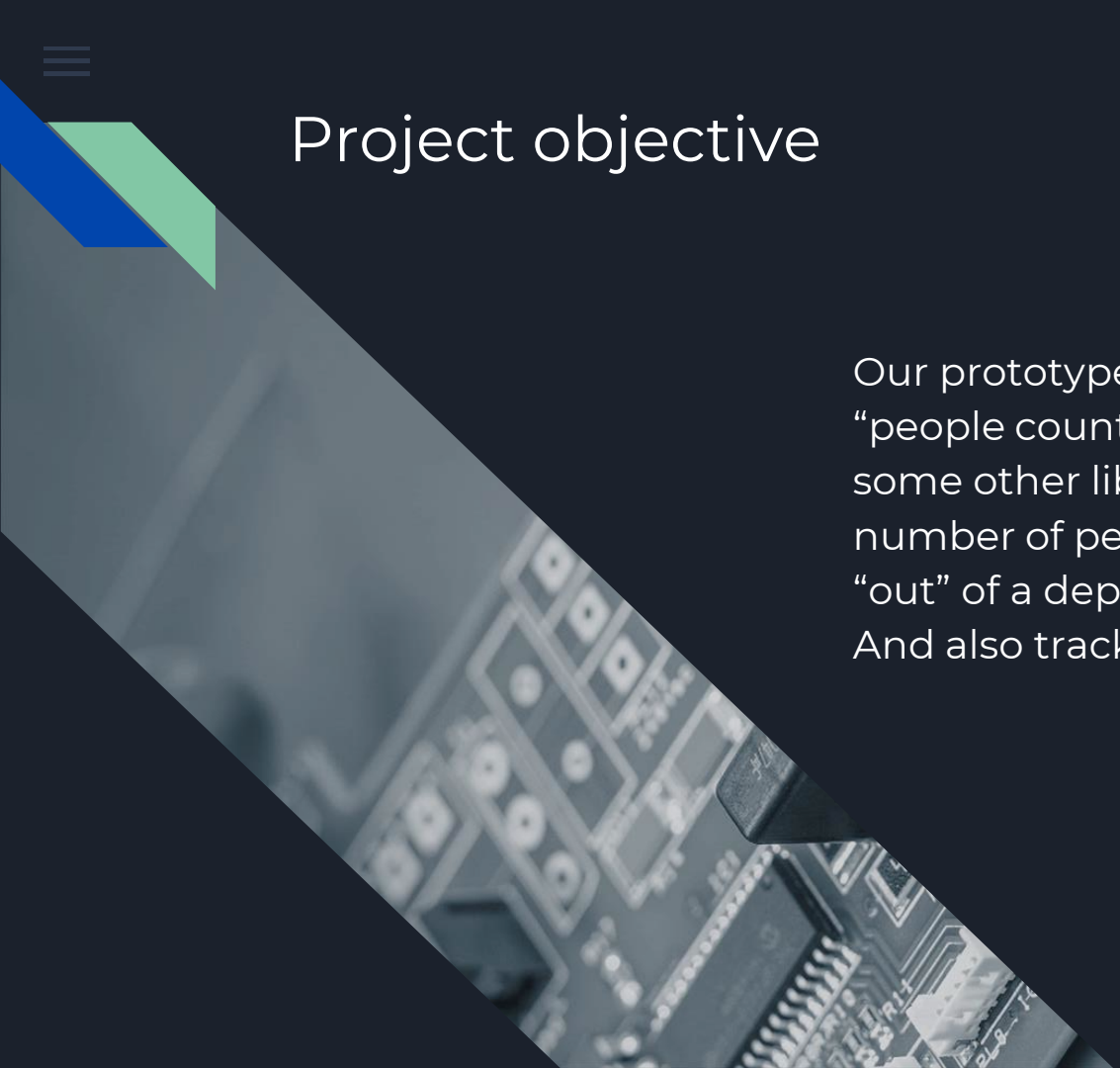
In this presentation, we decided to tackle a use case of computer vision in a commercial store.

Problems Solved By Computer Vision

01 Stock visibility - the awareness of what is basically happening at the store. The camera system coupled with technology is able to see all kinds of fraud attempts and identify customers who behave suspiciously. The result is simple - minimising theft losses.

02 Merchandising - Computer vision technology is able to analyse behavioural patterns in the store and on this basis create heat-maps of stores. Thus, the analysis of customer behaviour makes it possible to determine issues such as the best store layout to maximise profits,

Project objective



Our prototype objective is to build a “people counter”. Using OpenCV, Dlib and some other libraries, we will count the number of people who are heading “in” or “out” of a department store in real-time. And also track them as they enter or leave.

How effectively the prototype addresses the issue in concern?

- This project was carried out in two phase. During the detection phase we are running our computationally less expensive object tracker to (1) detect if new objects have entered our view, and (2) see if we can find objects that were “lost” during the tracking phase. For each detected object we create or update an object tracker with the new bounding box coordinates. To make our object detector less computationally expensive, we only run this phase once every N frames.

- In the second phase which has to do with tracking, each of our detected objects, we create an object tracker to track the object as it moves around the frame. Our object tracker is faster and more efficient than the object detector. We continue tracking until we’ve reached the N-th frame and then re-run our object detector. The entire process then repeats.

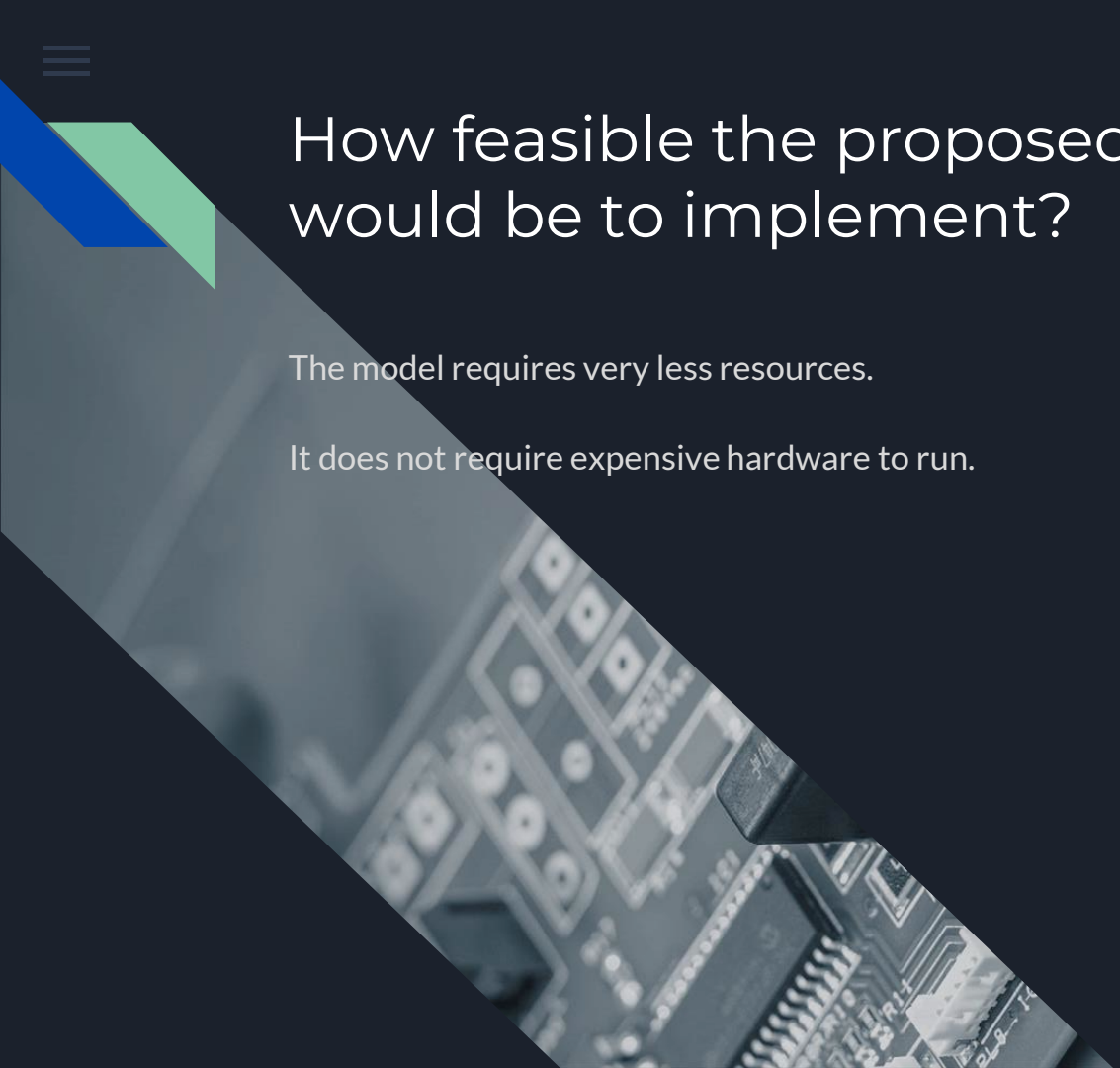
- By so doing , we can assign a unique ID to that object.
- And track the object as it moves around the video stream, predicting the new object location in the next frame based on various attributes of the frame
- Bounding box coordinates for people in a detection are taken and the centroid is calculated and stored. Euclidean distances between the position of people in the new frame detected and the position of the detection in the old frame are calculated.
- The person in the new frame with the minimum Euclidean distance is assigned the same id (identified as the same person by the model). The new position or centroid is then updated. This continues till the person is out of sight.

- To increase the speed of the model, 30 frames are skipped before a detection is made.
- When a person detected in a previous frame is undetected for 40 consecutive frames, the person is marked as disappeared and the id assigned to the person is removed.
- The person can be recorded as entering or leaving the establishment by the model by calculating the difference in y-coordinates of the person for change in position in two consecutive frames and their movement towards an imaginary line drawn by the model.

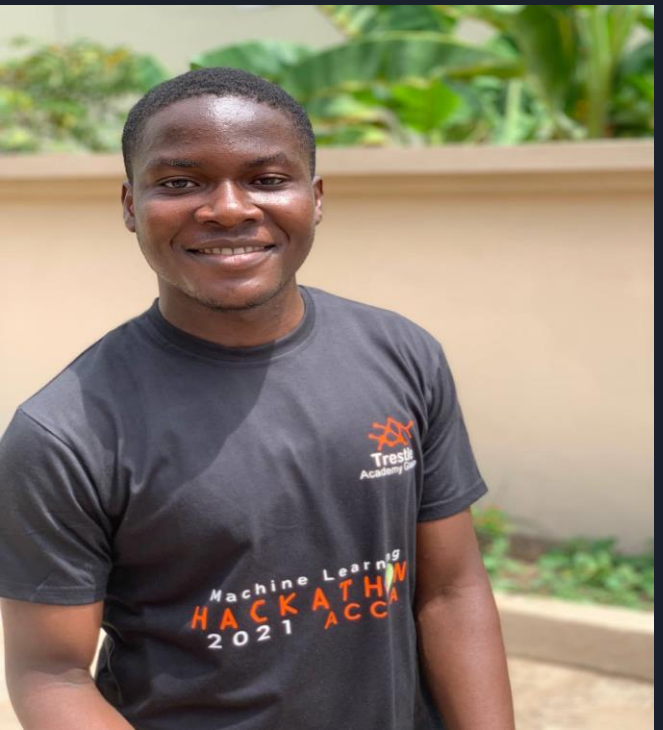
How feasible the proposed business model would be to implement?

The model requires very less resources.

It does not require expensive hardware to run.

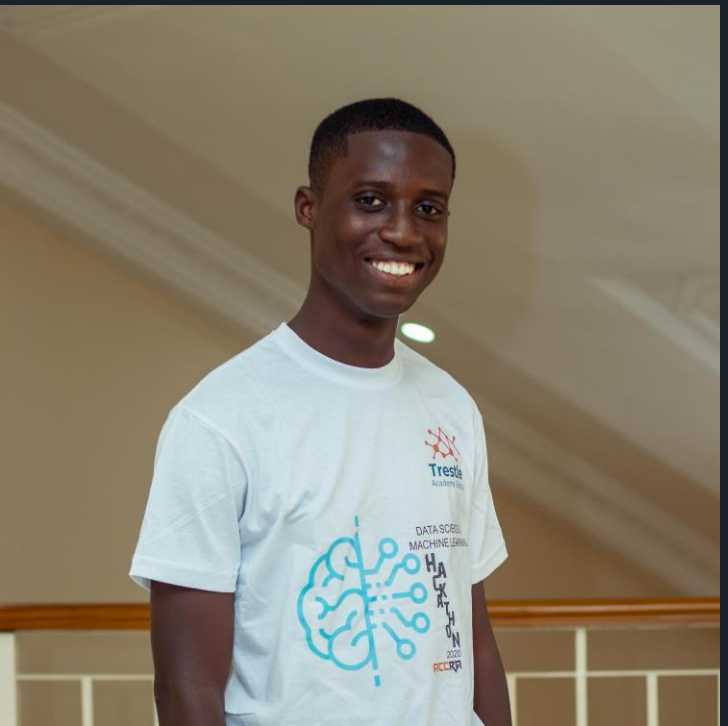


RAYNARD DODZI – TEAM REP



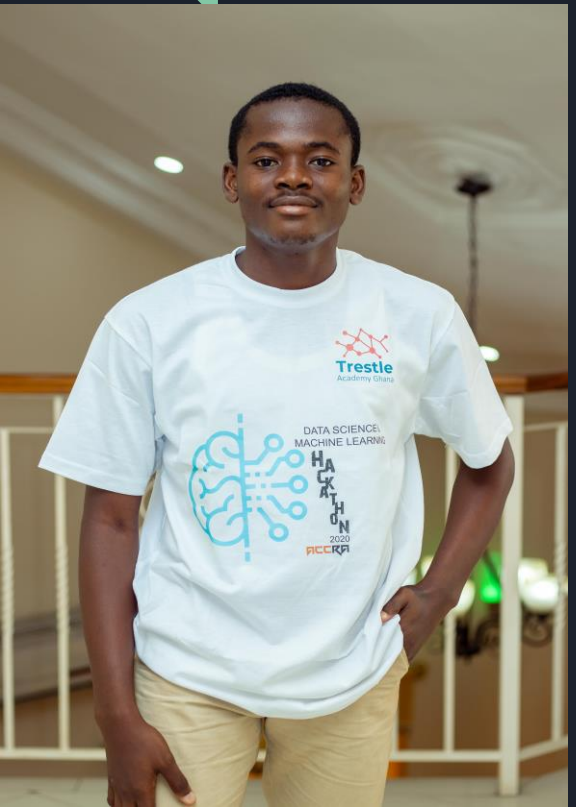
- I am a computer science student at the University of Ghana and a full-stack web and mobile developer. My research interests include artificial intelligence and computer vision. Python, Java, C++, and JavaScript are my major programming languages
- I outlined the steps involved in the development of the model.
- I participated in the development of the model.
- I reviewed the final code.

RUSSELL QUAICOO – TEAM MEMBER



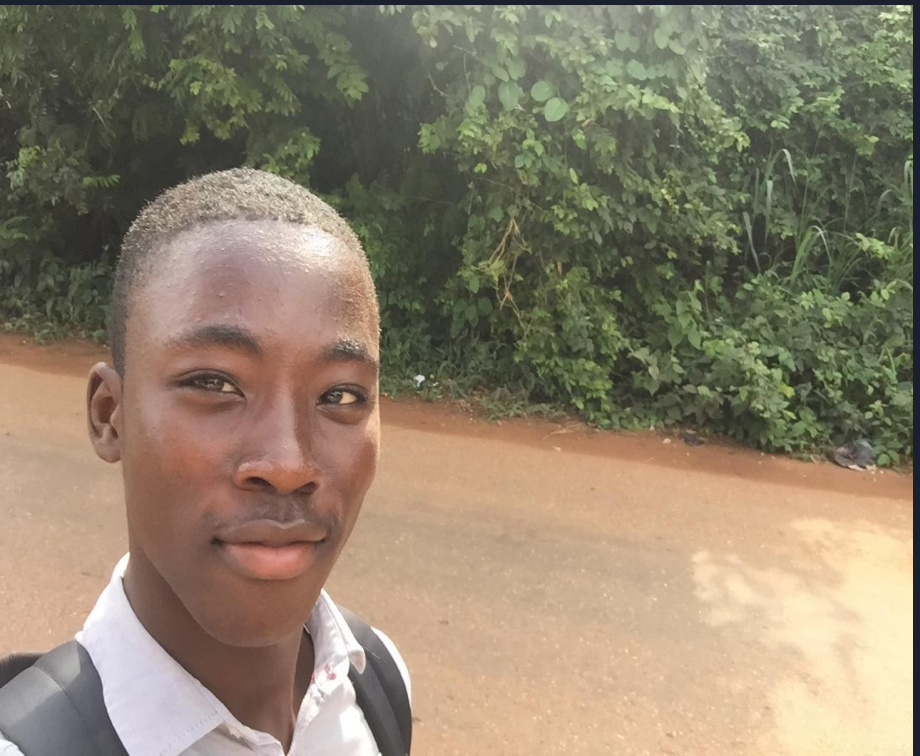
- I am a Computer Science student at University of Ghana. I am interested in natural language processing, computer vison and software engineering. I can program in Python and C++. I develop web applications.
- I spearheaded the development if our computer vision model.
- Made the presentation to the panel.

MICHAEL KORANTENG – TEAM MEMBER



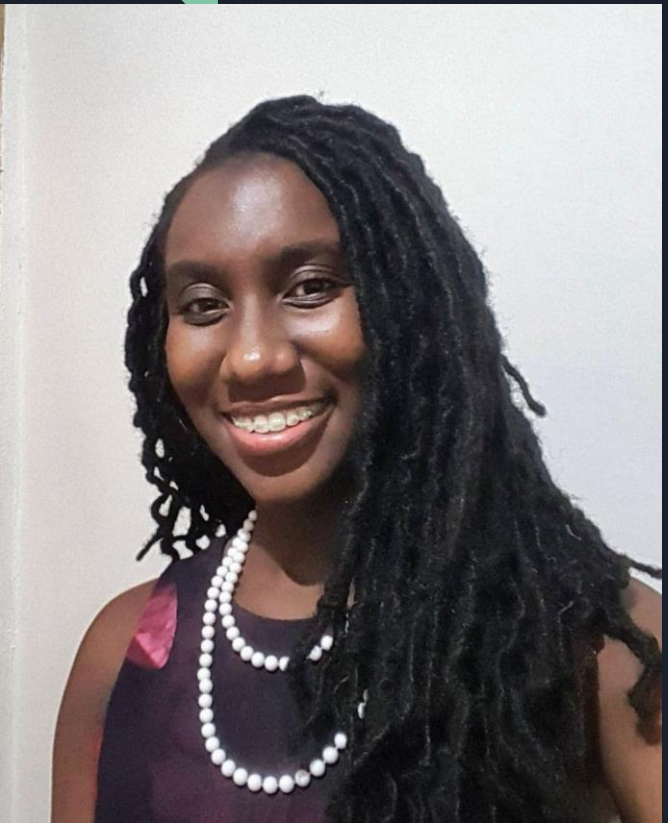
- I'm Michael Koranteng, a University of Ghana student. Web development, Machine Learning, and Data Science are three areas in which I am interested.
- My contribution to the project was to help develop a model workflow
- edit the model
- and debug any errors that occurred

GERALD – TEAMM MEBER



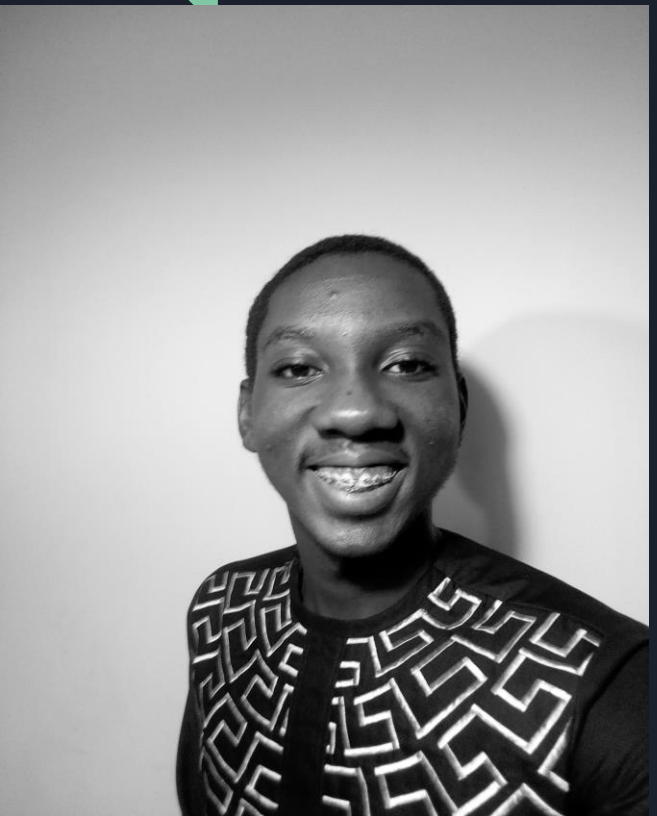
- First year student at IUBH University, Germany. My interests are not yet clear enough for me but still exploring my options in computer science that's why I joined the hackathon program. So far I can say I a little skill in web development and a little skills in the python programming language.

JASMINE AMPOFO – TEAM MEMBER



- I am a student of IU University of Applied Sciences. I am in my first year. My main interests are technology, music and photography.
- I always try to learn something new everyday regardless of whether it is tech related or not.
- I have basic web development skills using HTML and CSS and also have knowledge in Python.

JASON AMPOFO – TEAM MEMBER



- I'm 19.
- I'm a first year Computer Science student at IU International University of Applied Sciences
- I like to read, code and watch football.
- I have basic knowledge in HTML, CSS and Python.