Escape from Hawkins

Problem statements

Statement 1

In Kali's introductory scene in S2, the only valid identifier the police could've had for the white van she was in was the number plate. **Write a CV algorithm to detect a number plate with the resources given.**

Resources

You will be given three test pictures as well as a trained .xml file to initialize a Haar Classifier. You will be expected to store your resultant cropped images containing only the number plates in a separate output directory.

Statement 2

While Demogorgons are certainly impeccable at detecting blood across dimensions, when they finally find their target, their brain-equivalent organs must discern the contours of their target to recognize them. **Implement an algorithm to detect the contours on the provided image and classify it's shape.**

Resources

You will be given an image of multiple shapes in .jpg format which will be required for contour detection & counting in your algorithm.

Statement 3

The tendrils found throughout the upside down were seemingly very primary creatures with little sentience of their own. Common sense points to the possibility that they navigate using a very single dimensional viewpoint. Simulate the movement of a tendril assuming the presence of eye-like sensory input **by constantly finding the midpoint of a path**.

Resources

You will be given a video file in .mp4 format containing a test video from a prototype of the Virtual Lab made for the Project Oasis event in 2021. The video is made from the perspective of an autonomous mobile robot. You will be required to detect the centre of the path in your CV algorithm.

Statement 4

Let's say you ran into a Flayed. Now, unless the Mind Flayer explicitly gives an instruction to said Flayed to behave in a hostile manner to you, it's just going to stand there giving you a menacing stare. **Simulate this system by writing a face tracking algorithm with an accompanying arduino script to control two motors mounted to the camera (one per dimension of movement). The camera must move in such a way that that it tracks the face as it moves). Create a tinkercad project to simulate the physical build.**

Resources

You will be given a trained .xml file for a Haar Classifier to detect the front of a human face as well as a test video of people walking through a corridor. You will have to write a script to detect this, print movement instructions onto a serial monitor as well as the console. Write the receiving .ino script as well.

Final Cumulative Statement

Imagine an exceedingly deadly scenario where the Mind Flayer actually uses the Flayed as normally functioning spies to reconnoitre the surroundings in a human dominated area before attacking. Being unfamiliar with the way we've constructed out surroundings and having a total lack of empathy, the Mind Flayer needs to teach its drones to react appropriately to avoid accidental deaths of other humans rather than coldly murdering them in broad daylight and moving on as if nothing happened.

Write an algorithm to help a Flayed human see and detect when a pedestrian is crossing a lane and when he's on the edge.

Resources

You will be given a video file in .mp4 format of a man walking across a grid-like pathway. Your CV algorithm will be required to figure out whether or not he is located between two adjacent vertical lines (on the path) or if he is on top of a vertical line (not on the path). The challenge here will be to filter out the horizontal.

Optional Hint

Feel free to browse the net for any .xml files or do away with them altogether using a colour detection approach. There's many ways to complete this challenge