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INTRODUCTION

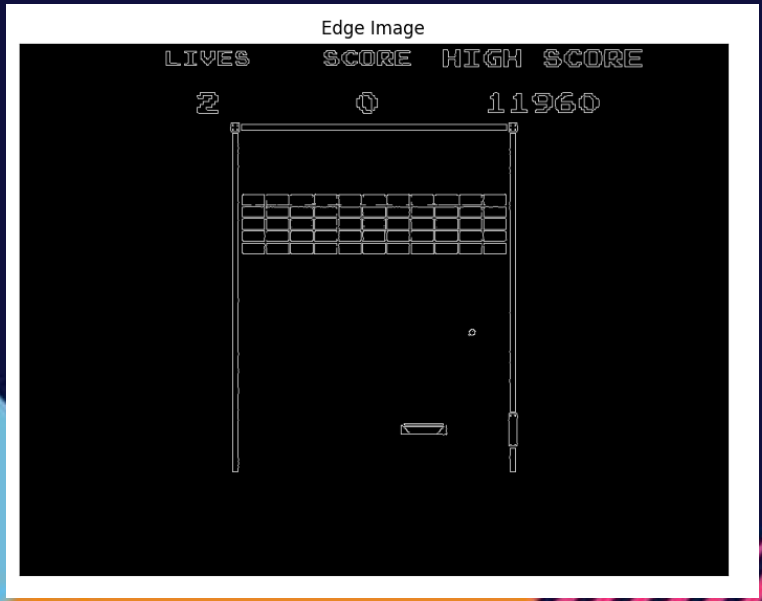
The game ‘Breakout’ is a simple game that has a goal of removing all the small bricks without previously loosing all lives.The goal of the project is to count how many times the ball (or multiple balls) hit the edges of left and right wall.

DATASET

Dataset contains 10 videos in .mp4 format, all of different length and content. The file res.txt contains the final answers to help us solve the problem.

CANNY EDGE DETECTION

The first process when looking at the solution is method called Canny(). Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. When the video is loaded and ready, we take frame by frame from it and pass it to this detector. The output result is this :



When all the edges are now extracted, the next thing to do is seperate them. I do this by searching every white pixel on the image and add it to a map, where the coordinates are the key and I assign it a value of 0. If the pixel has continuity i.e. there are multiple pixels with same X coordinate and gradualy increasing Y, it surely is a vertial line. Vice-versa goes for searching the horisontal line. When the longest 4 vertical lines are found, I collect their coordinates and assign their lengths with the longest one. The smaller X is the right edge of the left wall and vice versa.

After we have found the walls, we convert the farme to gray. So on, we find the ball (or multiple balls) using threshold. It is a process that binarises the given image based on given properties. Then we use findContours() to extract ball contours from output image. The iteration goes for every contour found in the current frame and we are trying to find and gives us x,y pair of coordinates and a radius. If the radius is not in the given criteria (between 4 and 5) we assume it’s not the ball. The collision detection is next in line, we compare ball coordinates in every frame and if the left or right edge of the ball are in range of 5 pixels to a wall, we count it as a collision and set next 2 frames not to count.