Project Report
on

Rock Paper Scissor Data Logger

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Playing rock, paper and scissor is the most favourite game in the childhood and it is still popular today. However, many people were in isolation during COVID lockdown, and they were bored because no one was allowed to enter the isolation ward. But wait is it not possible that I can play this game alone? Obviously not, because it is a game that requires at least two individuals to participate. So, here's a wonderful concept that pops into my head, why not play with computer with more visualization.

As a result, I created a computer vision programme that recognises the patient's hand gesture. Rock, paper, and scissor are a few of the hand signs used in this game.

Rock   Paper   Scissors

I came across Nicholas Hunter's work on "Computer Vision Gesture Recognition for Rock Paper Scissors" [1] while performing some background study. I found that he is detecting hand signals using single images with the YOLOv3 object detection system.

Other than this, I studied a research paper of Diego F P De Souza et.al. on the topic of "Rock-paper-scissors WiSARD" [2]. Using WiSARD weightless neural networks, the author employed several ways for developing intelligent rock-paper-scissors players.

The methodology behind working of this application is very simple. The Fine-tuned NASNetMobile model is used to recognize patient signals when it's inside the box. As soon as a hand signal is identified, the model predicts the type of signal that was received and keeps track of how many times each of the three signals was displayed. As a result, save it to a database (.csv file) that you can access at any time.

The steps that were taken to create this application are listed below. Begin by installing and importing the relevant libraries. Later, a function to capture photos through a camera was created to collect data. We prepared the model for transfer learning by pre-processing and splitting the dataset into train and test. Now, it was time to train our model. We plot an accuracy and loss graph to see if our model has been correctly trained. Once we're satisfied that it's been adequately trained, we store the model and load it as needed. As our model has been trained and everything is in place, we launch the application and record the number of times each of the three signals has been displayed, saving the information as comma separated value.

This application allows patients to play rock, paper, scissors in the isolation ward, which is a fun game. Furthermore, this programme can be modified since there is a class named "nothing" in which I grabbed blank backdrop photos, but it is not compulsory that background is always blank. So, in the future, we can use background subtraction or add some random images as background when training to make the programme more robust.

References:

[1]   https://openworks.wooster.edu/cgi/viewcontent.cgi?article=11676&context=independentstudy

[2]   https://www.researchgate.net/publication/260422498_Rock-paper-scissors_WiSARD