OPEN PIANO USING OBJECT DETECTION

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Abstract: Music is a limitless form of art. Accessibility is an essential part of its emergence. Traditional musical instruments like piano, drum, etc., are expensive and arduous which reduces its accessibility and portability. To make it universally available and efficient, this is an attempt to demonstrate the use of an alternate medium for creating music using gestures. use of colored gloves/fingertip covers/nail paints/drumsticks, etc., making it more user-friendly and autonomous.This makes it available to a large number of music enthusiasts. Devices, nowadays, use touch-based and key-array-based controls, limiting the interface to two dimensions. For this purpose, object detection has been used to demonstrate a gesture-controlled piano, giving it another dimension. Existing image processing systems use shadow detection methods, IR detection methods, etc., whereas here, object detection method for gesture recognition has been used to identify the gesture and simulate the playing of piano notes. The object detection method eliminates the use of colored gloves/fingertip cover/nail paints/drum sticks, etc, making it more user friendly and autonomous.

Keywords: CNN, API, OpenCV, GPU, CPU

I. INTRODUCTION

With the development of machine learning and deep learning, there have been many achievements in various fields. The computer vision field has been deeply affected by technology like CNN and there have been achievements, for example, in image recognition, classification and so on. Furthermore, there have been analyses of more than static images. Video recognition, which is an important part of this research, has been done by many researchers. Unlike analyzing static images, analyzing video is much more complex by nature since it contains temporal information more than a spatial one. A TensorFlow object detection API based analysis shows it can be useful to analyze videos. And for the motion detection problem, it is well known that optical flow-based analysis can be utilized for better precision.

That is probably why people like to enjoy music with a live performance or music videos. More than that, the visual factor of music contains lots of information about the music itself. For example, one can notice which note or how strong a music performer plays the music by watching the player's hand movement and slight changes in the instrument itself. With this fact, there have been types of research that tried to analyse visual factors in music performance too. For example, there were researches that analysed guitar performance tuning oscillation of guitar strings or researches that analysed piano performance using pianist's hands and key Movements. However, previous research on piano analysis has limitations that it can only detect which keys are on or off and how long the keys persist. Considering that music performance expresses their emotion using various intensity of notes, it is important to know how strong the performer plays the music more than which notes or how long the notes are played.

II. PROPOSED SYSTEM

The growing popularity of music generation between the music world has led to the development of large and sophisticated instruments for various musical events. Understanding their difficulties and music generation various instruments are used and which makes a crucial challenge for music generation. Traditional music generation involves use of large and heavy instruments in the process is very costly. So technology like object detection helps in this problem and makes the process easier for the musician.this project sought to create an intuitive piano playing experience through object detection that allow users a cheaper and mobile alternative to that real pianos.we used gesture controls for accurate finger tracking for creating the piano playing scene.we were able to successfully implement finger tracking to play the keys of the piano.user feedback depended on how advanced their piano skills.novice users actions were easily recreated whereas advanced users could not get the feedback they wanted.the demo currently works better as a prop as opposed to a real piano,though future improvements could lead to a more authentic playing experience. Even an already purchased piano requires tuning that costs hundreds of dollars. Mobility is also a significant problem; pianos are large and extremely cumber some.instruments like these are difficult to transport without other machinery. Most people can't make space for something like piano,Especially on the move.a open piano using object detection would allow users to avoid these cost,mobility,and space issues.with the widespread use of OPIOID,we hope to create a simple VR experience in which a growing user base can play a piano almost anywhere.our work would allow an entire new population access to pay the

piano without the need to leave their homes,pay for lessons or rent rooms.further work could include incorporating a virtual assistant that dicatetes the user to continue improving,removing the necessity of a piano teacher. We hope to create a stimulating experience that captures the same realities if sitting in front of a piano and playing.The piano will respond to the user's object gesturing accurately hitting the keys by using finger motion.

III. IMPLEMENTATION AND DISCUSSION

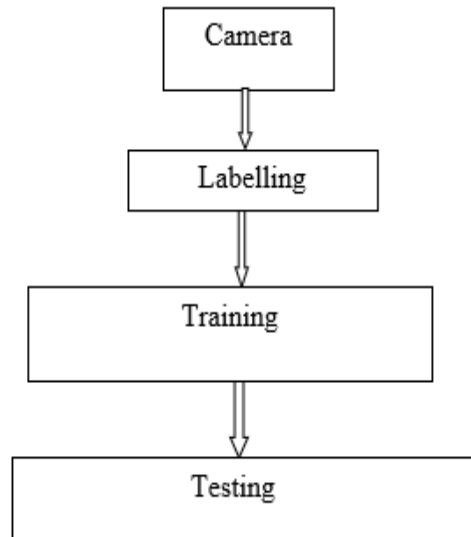 The proposed system will be implemented according to the given system flow:

Fig. 1 System Flow

IV. CONCLUSION

The growing popularity of music generation between the music world has led to the development of large and sophisticated instruments for various musical events. Understanding their difficulties and music generation various instruments are used and which poses crucial challenges for music generation. Traditional music generation involves use of large and heavy instruments in the process is very costly. So technology like object detection helps in this problem and makes the process easier for the musician.

REFERENCES

[1]   Shir Goldstein and Yael Moses."Guitar music transcription from silent video.In BMVC",pp 309,2018
[2]   Adam Goodwin and Green.Key "Detection For A Virtual Piano Teacher" .In 2013 28ih International conference on Image and vision computing New Zeland(IVCZ 2013),pp 282-287.IEEE,2013.
[3]   Boga Vishal and K Deepak Lawrence. "Paper piano—shadow analysis, based touch interaction". In 2017 2nd International Conference on Man and Machine Interfacing (MAMI), pp 1–6. IEEE, 2017.
[4]   Mohammad Akbari and Howard Cheng. "Real-time piano music transcription based on computer vision ." IEEE Transactions on Multimedia,17(12):2113-2121