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Squid Game and Music Synchronization

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Abstract - *According to a recent info trends study, in 2021, mobile and camera device users will have taken more than 1.5 trillion images, a sharp increase from the data from 2016. These image data will be used in a variety of real-time applications, including visual video surveillance, object identification, object detection, and classification. Advanced computer vision algorithms that were an upgrade over traditional computer vision techniques were created to manage these enormous volumes of data automatically.*

One of the most crucial tasks is object detection, which can greatly enhance the functionality of a variety of computer vision-based applications, including object tracking, license plate detection, mask and social distance detection, etc. To create a comprehensive

***Key Words*: Detection, Computer vision, Image**

1.INTRODUCTION

Saliency and scalable object detection are two recent examples of object detection methods based on computer vision systems. The conventional object detection procedure can be divided into region detection, feature extraction, and classification. These systems have a number of problems with variations in pose, changing lighting settings, and increased complexity of localization of an object within the given image.

In the world of computer vision, the world is displayed in 3D, but the input to humans and computers is two-dimensional. In addition, computer systems can only process binary bits of data, but some useful programs only work in two dimensions. To take full advantage of computer vision, you need 3D information, not just a collection of 2D views. , These limited opportunities, 3D information is portrayed directly and is clearly not as good as people use. However, designing a robust, feature-rich extract for all types of objects is considered a tedious task due to the different number of lighting variations. To perform visual recognition, you need a classification model and library to further distinguish the categories of objects. Of the object.

The application of these advanced computer vision techniques along with various machine learning algorithms like NumPy, TensorFlow which provide support for advanced mathematical calculations along with vast repositories of libraries and packages available in python like Tkinter for front- end design and development can solve various real-world problems, these coupled with deep learning algorithms and accurate object detection using Yolo and various iterations for neural networks prove to be a boon in improving the accuracy of object detection and tracking and application of these into the real world.In context to the current issue concerning expensive games with augmented reality and virtual reality because of their costly sensors and high-end processing power required for their application also not convenient for small-scale manufacturers to develop without sufficient research and development, that's when the application of advanced computer vision comes into picture which has proven to be useful in various application like yoga pose estimation and various complex exercises like posture management thus success in this field provides a view to approaching other aspects of applicability.

1.1 Overview

An approach to gaming implementation of a television series which proved to be a motivation for this implementation of a game based solely just on the camera sensor and advanced computer vision technologies like tensor flow for artificial intelligence and NumPy for calculations and Tkinter for front-end development, we intend to replicate the real world game played in the movie scene into a gaming scenario using the cheapest of resources as possible and proving that immersive games can also be cheap and not needing any complex consoles

1.2 Problem Statement

Current Augmented Reality and Virtual Reality games are too expensive as the need of costly sensors to recognize movements is very high. Training of players, athletes and dancers' posture and response time currently needs an experienced human supervision. Motion detection using cameras is not much used in game development due to its accuracy Issues also as it hinders profit margin of console developers. Understanding community, and provide mental health guidance.

2. EXISTING SYSTEM

Many types of immersive games, many with respect to virtual reality and recently augmented reality applications has increased in the basic format, but they are quite expensive as they're need arises for expensive

sensors and customized hardware(consoles) and software are needed.

Previous use cases of computer vision had very complex process of object detecting and tracking which proved to be slower and more process intensive with so many processes needed for detection and its application and unable to compete with their console's counterpart.

3. PROPOSED SYSTEM

Recent advancements in advanced computer vision and popularity of python as the go to programming language for artificial intelligence and machine learning applications led to many developers getting involved in making custom libraries and packages, also improvement in tensor flow allowed faster insight discovery from data. Due to this aspect, and the lack of intelligence in current generation gaming consoles meant that we could try to develop immersive games with just basic sensors and cameras. Furthermore, as success and acceptability were seen in AR in the use cases of posture and yoga training as well as trying on of glasses and visualizing a piece of furniture in the living environment. Thus, as a first approach we intend to replicate implementation of a real-world game (squid game- red light green light) with just the camera backed by artificial intelligence

4. SYSTEM DESIGN

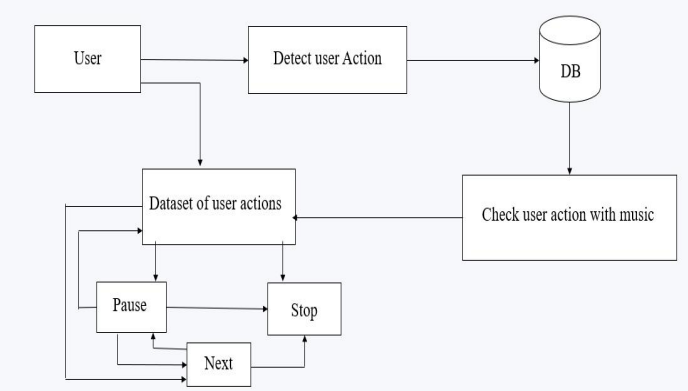

Fig -1: Low-Level System Design

The proposed design of application of computer vision and artificial intelligence and machine learning algorithm and libraries.

5.MODULE DESCRIPTION

Open CV: This research focuses on development of an Immersive gaming application with bare minimum hardware requirements possible, that's where application of advanced computer vision comes into picture which is used to understand the characteristics of the image frames obtained from the video or a live stream, as it is a open-source open source library for computer vision containing machine learning and it plays a major.

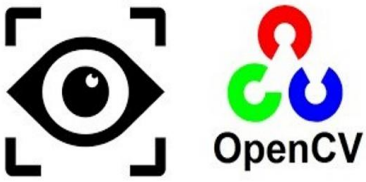

Fig -2: Open Computer-Vision for Squid Game

Media-Pipe: Media Pipe is a python package built by google for building machine learning pipeline models for processing time-series of data like videos, audio, etc. its cross-platform Framework works in Desktops, Servers and android as well as ios use case . Like Raspberry Pi Media Pipe is powered by revolutionary product and services that we use daily . Unlike power-hungry machine learning Frameworks, Media Pipe requires minimal resources, Media Pipe opened up a whole new world of opportunity for researchers and developers following public release . Media Pipe Toolkit comprises the Framework and the Solutions, the diagram shows how media pipe is organized with its features .

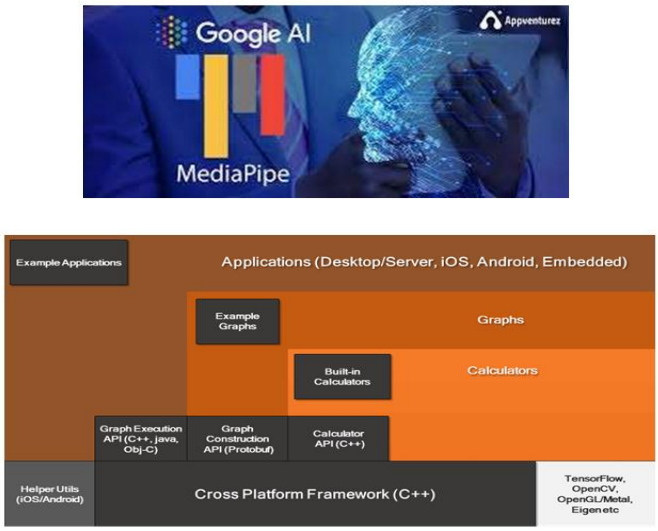

Fig -3: Media-Pipe Architecture

Tkinter: The tkinter package is standard Python user interface graphical user interface toolkit , Both Tk and tkinter are available on many platforms and are cross platform compatible .Running python tkinter was done as a standard installation procedure from the command line of scripts using the pip command and later import and used as an object during implementation .In this project

we use tkinter to represent an image of how the gameplay is going to be along with button operations and playing of instructions along with linking of threading modules .

Fig -4: Tkinter

Multi-Threading: Multi-threading is a way of multitasking using threads, as the modern processors have the capability to run multiple threads at a time, its highly beneficial to run different tasks on different threads of a processor to reduce the delay and improve performance.

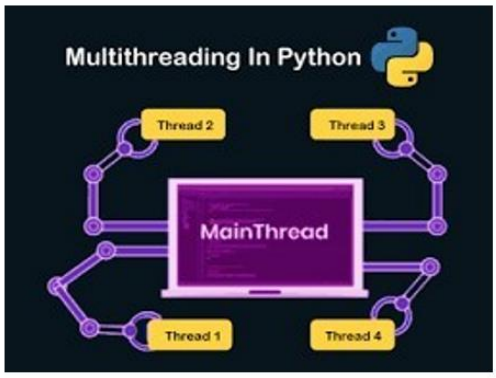

Fig -5: Multi-Threading

6.FLOWCHART

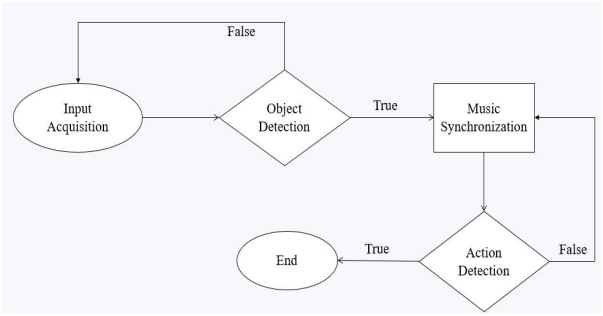

Fig -6: Methodology Flowchart

1.In level 0 the user interacts with the graphical interface developed with Tkinter.
2.A recording of the instructions of the game is played via the play-sound module.
3.The start button is connected to the back-end code via an os module (latency is reduced and performance is increased by implementing multi-threading).
4.When The start button is pressed the open computer vision kicks into action and connects to the camera thereby displaying a visual as well as analyzing the frames.
5.Human isolation, detection and segmentation is done by media pipe which is an ml based google developed module.
6.The action of the user is captured via the landmarks drawn according to the necessity by the media pipe module.
7.The Landmarks are generated as a set of matrices or co-ordinate equations which are then fed into NumPy library and tensor flow for gathering insights from the data.
8.Later insights are analyzed and a threshold is given to identify whether the subject is completely visible or not.
9.When the subject(player) is completely visible the gameplay begins along with music synchronization.

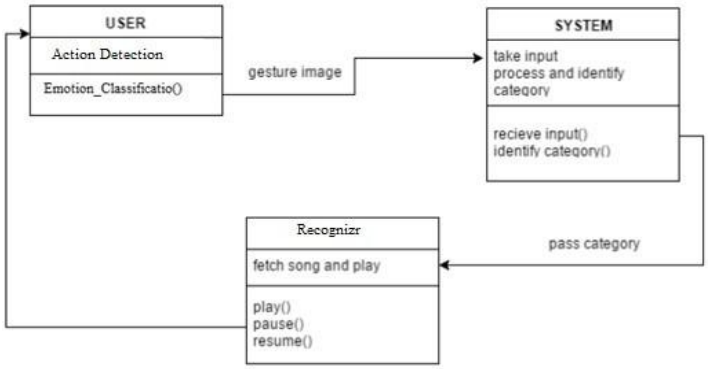

Fig -7: Class Diagram

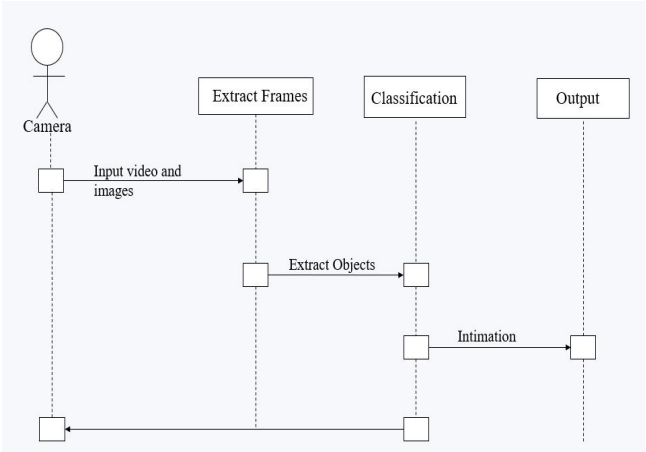

Fig -8: Sequence Diagram

7.EXPERIMENTAL RESULTS

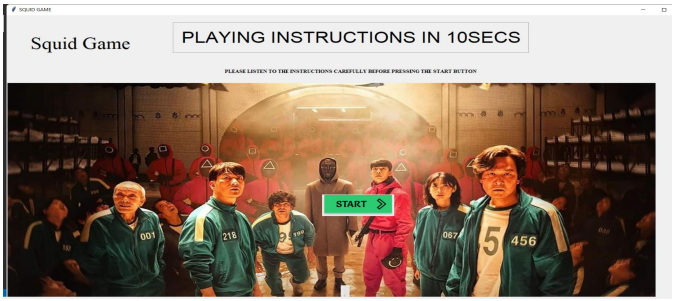

Fig -9: Front End of Squid Game

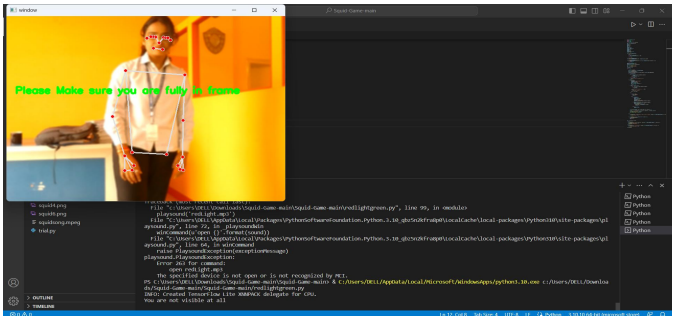

Fig -10: Criteria not meeting Visibility

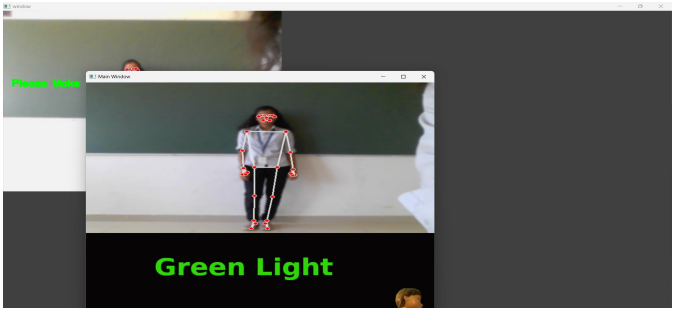

Fig -11: Green Light Signaled and Game begins

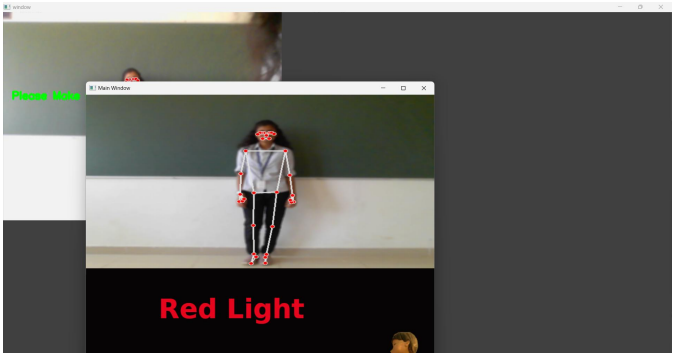

Fig -12: Red Light Signaled and movement detection begins

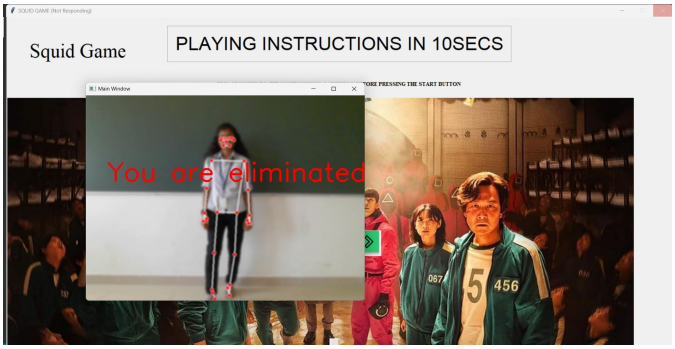

Fig -13: When movement is detection either eliminated or declared as winner

8. CONCLUSIONS

When compared to the conventional immersive gaming technologies and the hardware and processing capabilities needed for its effective functioning, we have proposed implementation of artificial intelligence and machine learning into the immersive gaming technology, which was possible due to the previous success observed in implementation of media pipe in exercise posture as well as yoga pose detection which facilitated its application in the field of immersive gaming, With the help of media pipe and ai and ml implementation using tensor flow the capabilities of the system needed for an immersive gaming experience is considerably reduced.

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