

# Inside the Mind of the Machine: An Exploratory Study of Street Fighter Players Using Voice Recognition System

Ashima Arya<sup>1</sup>, Sapna Juneja<sup>2</sup>, Meenakshi Aggarwal<sup>3</sup> and Abhinav Juneja<sup>4</sup>

<sup>1,2,3&4</sup>Department of Computer Science, B. M. Institute of Engineering and Technology, Sonipat, Haryana, India

E-mail: [ashiarya@gmail.com](mailto:ashiarya@gmail.com), [sapnajuneja1983@gmail.com](mailto:sapnajuneja1983@gmail.com), [meenu12283@gmail.com](mailto:meenu12283@gmail.com), [abhinavjuneja1979@gmail.com](mailto:abhinavjuneja1979@gmail.com)

(Received 19 May 2020; Revised 1 June 2020; Accepted 2 July 2020; Available online 12 July 2020)

**Abstract** - Computer games are part of our modern way of life. However, sure classes of human beings are excluded from this shape of leisure and social interaction because they're not able to use the interface of video games. The cause for this may be deficits in motor manage, vision or listening to. By the use of automated speech popularity structures (ASR), voice pushed instructions may be used to control the game, which may for that reason open up the opportunity for people with motor system trouble to be blanketed in- game communities. The aim of this paper is to discover a preferred way of using voice instructions in games which makes use of a speech popularity gadget within the backend and that can be universally applied for designing inclusive games.

**Keywords:** Pygame, Python, Voice Recognition System, Multithreading, Event Handling, Sprites, Sprite sheets

## I. INTRODUCTION

Like track and films, video games are hastily becoming a quintessential part of our lives. Over the years, you've yearned for every new gaming console, mastered every blockbuster within weeks after its launch, and have even gained a neighborhood gaming competition. But currently, you've been spending plenty of time considering a recreation idea of your own, or are exploring the opportunity of making a profession of this colorful and developing industry. But where have you begun? Beginning Game Development with Python and Pygame is written with the budding recreation developer in thoughts, introducing video games improvement via the Python programming language and popular Pygame games development library.

Street Fighter is a 2-dimensional stopping video game franchise evolved and published by using Capcom. Learn the manner to create superior video games by taking advantage of the well-known open supply Python programming language and Pygame video games improvement library. With the improvement of Pattern Recognition, the generation of Speech Recognition has played an increasingly huge role, especially while it is carried out into use. Therefore the concept of the application of the Speech Recognition in video games is raised, geared toward making it more on hand for the players to engage with the computer systems without using the keyboard or mouse. Moreover, compared with other techniques it has extra blessings in each efficiency and portability [6].

## II. METHODOLOGY

Street Fighter game is the most popular fighting games in terms of sales, content created by fans, and competitive play (Street Fighter tournaments have long been a staple of gaming events like E3). Furthermore, while some other types of games have received a fair amount of scholarly investigation (fore-most among them MMOs like World of Warcraft), there is a relative lack of research on fighting games. According to Hutchinson (2007: 283), such games are "most often seen in terms of simple entertainment, lacking narrative power and encouraging an apathetic and passive attitude to violence." The case was studied through non-participatory observation of Street Fighter online communities to discover how players themselves relate the game [1].

## III. MASTERS AND APPRENTICES

At first glance the gameplay of Street Fighter seems rather simplistic: characters can move left and right, kick and a superkick, perform three types of kicks and three types of punches, varying in speed and amount of damage, blocks, throws and special moves. Each player starts the match with a limited amount of "life", which is reduced each time they receive a hit from the opponent. When it reaches zero, the match is over. But appearances are certainly deceiving in this case, since my analysis has revealed a staggering complexity behind these simple mechanics. Players analyze the exact duration of every possible move to determine possible combinations and develop strategies, they delve into the algorithm of the game to take advantage of shortcuts and ambiguities, and they develop and discuss a terminology, covering both technical and strategic aspects of the game [7].

### A. Sprite and Sprite Sheets

A sprite is a bitmap image this is designed to be part of a larger scene. It can both be a static photo or an animated photo. Sprites are utilized in video games to together create a scene. Each sprite is used to symbolize each object. Examples of sprites include items in 2D video games, icons that are part of a software consumer interface, and small images posted on web sites.

A sprite sheet is a bitmap picture document that consists of numerous smaller snapshots (sprites) in a tiled grid arrangement. By compiling several photos into an unmarried file (one big photograph), you enable Animate and different packages to use the photographs whilst handiest needing to load a single report. A "Sprite Sheet" is a group of still images that develop [11].

### ***B. Sprite Sheet Animation***

Sprite sheet animation is nothing greater than taking a sprite sheet and changing which sprite is rendered in short succession to offer the phantasm of movement, much like a film projector showing a movie.

Coding Sprite sheet Animations

There are three parts to coding a sprite sheet animation:

1. Creating the image
2. Updating the image to each frame of the animation
3. Drawing the frame to the screen

### ***C. Collision Detection***

Collision detection entails identifying when two things on the screen have touched (collided with) each other. Collision detection is surely useful for games [4]. The pygame Collision Detection program imports modules.

1. Import pygame, sys, random
2. From pygame.locals import \*

Pygame provides its own collision detection method named `collidect()` for `pygame.Rect` objects.

### ***D. Event Handling***

The preferred manner of handling input is Event Handling. Pygame will put them in containers which might be called Events. Event handling is normally utilized in graphical interface packages. The gadget keeps a listing of things that have passed off, and your program can procedure this, commonly once consistent with frame.

This list of activities is called the Event Queue, and it lets in you to recognize the order of the whole thing that passed off because of your closing time checking the queue.

Pygame has several methods for dealing with the queue, all within the `pygame`. Occasion module. To permit occasion dealing with in our video games we will create one elegance, that has python capabilities for each form of events, and one to call them depending on the form of event.

## **IV. TECHNOLOGIES USED**

### ***A. Python***

Python is an interpreter, object-oriented, excessive-level programming language with dynamic semantics. Its excessive-level built-in fact systems, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect current components collectively. Python's easy, smooth to study syntax emphasizes clarity and consequently reduces the price of program preservation. Python supports modules and packages, which encourages software modularity and code reuse. The Python interpreter and the sizeable trendy library are to be had in supply or binary form without charge for all most important structures and may be freely distributed. Python provides lots of features that are listed below [8].

1. Easy to learn and use
2. Expressive Language
3. Interpreted Language
4. Cross-platform Language
5. Free and Open Source

### ***B. Pygame***

Pygame is a cross-platform set of Python modules designed for writing video games. It consists of computer photos and sound libraries designed for use with the Python programming language. Pygame makes use of the Simple Direct Media Layer (SDL) library, to permit real-time pc game development without the low-stage mechanics of the C programming language and its derivatives. This is based totally on the belief that the maximum expensive features internal video games may be abstracted from the game logic, making it feasible to use a high-stage programming language, including Python, to shape the game.

Other capabilities that SDL does not have encompass vector math, collision detection, 2d sprite scene graph management, MIDI assist, camera, pixel-array manipulation, ameliorations, filtering, advanced FreeType font help, and drawing [2].

### ***C. Multithreading***

Multiple threads can exist inside one process where:

Each thread incorporates its personal register set and nearby variables (saved in stack).

All thread of a manner proportion international variables (saved in heap) and the program code.

Consider the diagram below to understand how multiple threads exist in memory:

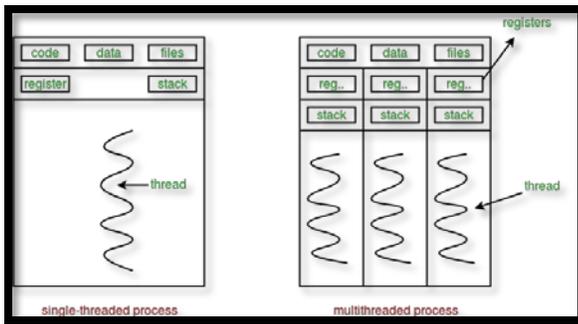


Fig.1 Single thread vs Multi thread

Multithreading is defined because the capacity of a processor to execute a couple of threads simultaneously. In an easy, unmarried-middle CPU, its miles accomplished the usage of frequent switching among threads. This is called context switching. In context switching, the state of a thread is saved and a nation of another thread is loaded whenever any interrupt (due to I/O or manually set) takes place. Context switching takes region so often that everyone the threads look like going for walks parallel (that is termed as multitasking) [9,10,11].

Consider the diagram underneath in which a procedure incorporates active threads:

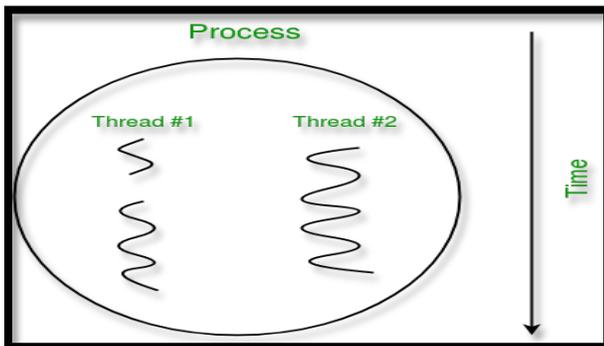


Fig.2 Active Threads

#### D. Voice Recognition

Voice recognition is the ability of computer software to identify words and phrases in spoken language and convert them to human-readable text. The street fighter game performs moves the usage of occasion dealing with keys as well as voice. The various movements include line when participant offers command as pass left, flow right, kick or super kick. Then the participant responds within an equal manner in keeping with the event executed using keyboard or speech.

It may all be achieved with the help of a speech recognition package that desires to be installed in pygame. The textual content is converted to speech as according to the users want as proven in the underneath diagram however it can need high data connectivity which can be known as the predominant drawback of this recreation [3,5].

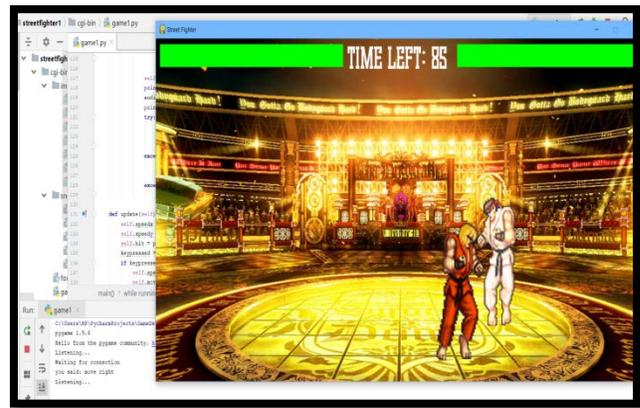


Fig.3 Voice Recognition

#### V. CONCLUSION

1. Concluding the Python Programming Language we would say Python is an incredible language to pick out up. Its recognition speaks for itself.
2. Python gives the greatest compromise of teachability and applicability.
3. While making this avenue fighter, a 2-dimensional game, coding skills are advanced so that we can continue for further game improvement in keeping with our hobby.
4. In conclusion to this Python Speech Recognition, we have created Speech Recognition API to read an Audio in Python and transformed into textual content.

#### REFERENCES

- [1] Available: <https://www.slideshare.net/Axphey/the-complete-srs-documentation-of-our-developed-game>.
- [2] Available: <https://www.pygame.org/project-Street+pyghter-1860-3264.html>.
- [3] Available: <https://www.gamedev.net/forums/topic/663142-some-help-with-creating-a-street-fighter-style-beat-em-up-game/>.
- [4] Available: <https://realpython.com/python-speech-recognition/>.
- [5] Available: <https://www.geeksforgeeks.org/speech-recognition-in-python-using-google-speech-api/>.
- [6] Shikha Gupta, personal email, 2019.
- [7] Available: Slovakia eva.meszárosova@fmph.uniba.sk.
- [8] Available: [https://www.w3schools.com/python/python\\_intro.asp](https://www.w3schools.com/python/python_intro.asp).
- [9] Available: <https://www.geeksforgeeks.org/multithreading-python-set-1/>.
- [10] Available: <https://code-projects.org/simple-fight-game-in-python-with-source-code/>.
- [11] Available: <https://medium.com/@sundarstyles89/create-your-own-google-assistant-vassistanoice-based--using-python-94b577d724f9>.