

AI Asteroids

Submitted in partial fulfilment of the requirements

of the degree of

Bachelor of Engineering in

Artificial Intelligence and Data Science

by

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under the guidance of

Supervisor (s):

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Department of Artificial Intelligence and Data Science

Vivekanand Education Society's Institute of Technology

2021-2022



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Department of Artificial Intelligence and Data Science

CERTIFICATE

This is to certify that *Shubham Hadavle, Prasad Jawale, Saket Shaurya, Avanish Shrivastava* of Second Year of Artificial Intelligence and Data Science studying under the University of Mumbai have satisfactorily presented the Mini Project entitled AI Asteroids as a part of the MINI-PROJECT for Semester-III under the guidance of Dr.(Mrs.) Anjali Shrikant Yeole in the year 2021-2022.

Date: 18 December 2021

(Name and sign)
Head of Department

(Name and sign)
Supervisor/Guide



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DECLARATION

We, Shubham Hadavle, Prasad Jawale, Saket Shaurya, Avanish Shrivastava from *D6AD*, declare that this project represents our ideas in our own words without plagiarism and wherever others' ideas or words have been included, we have adequately cited and referenced the original sources.

We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our project work.

We declare that we have maintained a minimum 75% attendance, as per the University of Mumbai norms.

We understand that any violation of the above will be cause for disciplinary action by the Institute.

Yours Faithfully

1. Prasad Jawale
2. Shubham Hadawle
3. Shaurya Saket
4. Avanish Shrivastava

Date - 18/12/2021



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Abstract -

AI has made several breakthroughs when it comes to implementation into games. The functionalities of AI in video games include various domains such as real-time facial emotion recognition, automated difficulty adaptation, sentiment analysis, non-verbal bodily motion, lip-synchronised speech and more.

This technique has been used in games to enhance graphical realism, to generate levels, sceneries and storylines, to establish player profiles, balance complexity or to add intelligent behaviours to non-playing characters.

Here, we have used an Image Recognition technique to develop a gesture controlled game that helps kids learn spelling and new words.

List of Figures -

Sr. No	Title
1.	<i>Algorithm to determine starting difficulty</i>
2.	<i>Algorithm for game levels</i>
3.	<i>Design of game</i>



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1. Introduction

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1.1. Introduction

In today's digital age, AI is on the rise and it can be used in a wide variety of applications. One such application is to help younger students learn words easily. Artificial Intelligence is an approach to make a computer, a robot, or a product to think how smart humans think.

AI is a study of how the human brain thinks, learns, decides and works, when it tries to solve problems. And finally this study outputs intelligent software systems. The aim of AI is to improve computer functions which are related to human knowledge, for example, reasoning, learning, and problem-solving.

1.2. Problem Statement

Making a game based on hand/facial tracking and implementing AI for generating levels as per user's skill.

1.3. Objectives

To make a game which can recognize gestures and use concepts of AI to adjust the difficulties of the game that helps children improve their vocabulary.

- *Create a application that can help learn vocabulary*
- *Implement ML modules like OpenCV, Mediapipe in a game*
- *Accomplish Image recognition techniques*
- *Apply reinforcement learning algorithm*

1.4. Scope

Intended towards younger generation children to help them learn English words easily. Our approach will make sure that the students are learning words effectively and they retain the words in memory as well. The game can be ported on Android and later on desktop systems as well.



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2. Literature Survey

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2.1 Literature/Techniques studied

- *Machine learning based Flappy bird game*
- *OpenCV facial recognition library*
- *Reinforcement learning algorithm*

2.2 Papers/Findings

1. *Gesture Recognition Library for Android* : <https://github.com/quickbirdstudios/opencv-android>

Easy way to integrate OpenCV into your Android project via Gradle.

2. *Semantris Project by Google AI*: <https://experiments.withgoogle.com/semantris>

Semantris is a set of word association games powered by machine-learned, natural language understanding technology. Each time you enter a clue, the AI looks at all the words in play and chooses the ones it thinks are most related.

3. Analysis and Design

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3.1 Analysis of the system

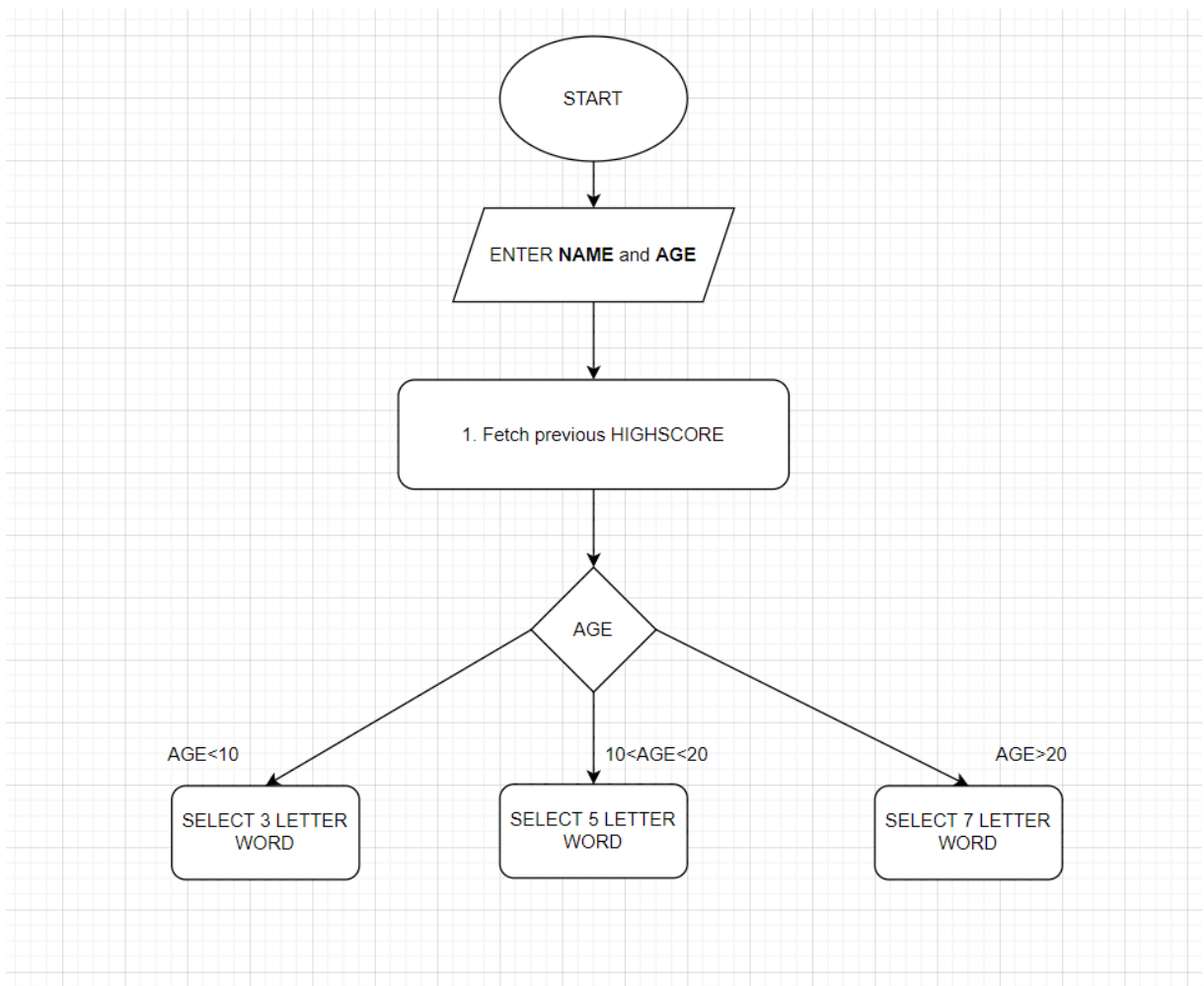


Figure 1: Algorithm to determine starting difficulty

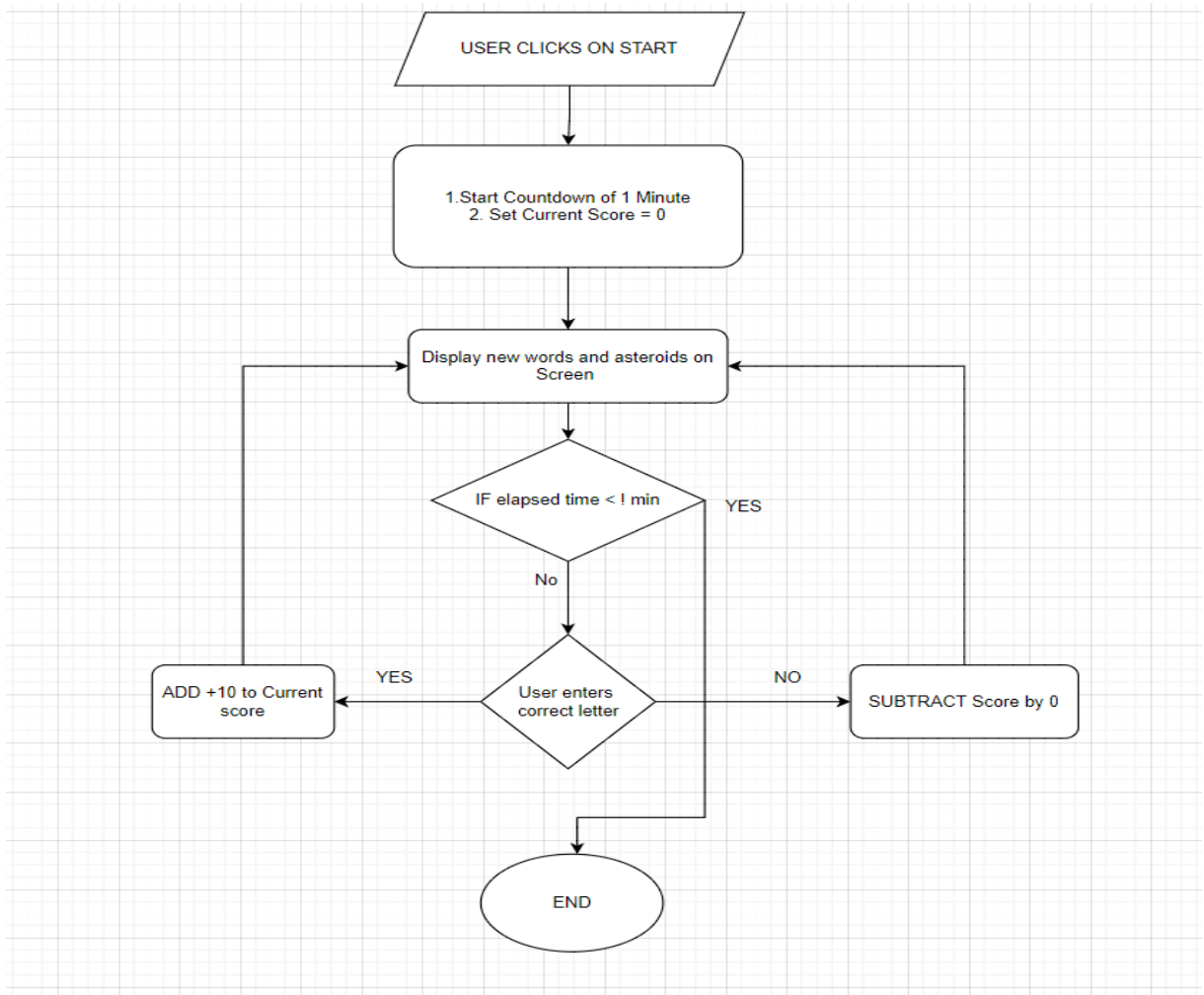


Figure 2: Algorithm for game levels



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RULES

- A Player has 3 lives.
- For every Letter Dashed – Points Gained = 10.
- Hitting the wrong letter causes the player to lose 1 life.
- Hitting an asteroid causes the player to lose 1 life.
- A player gets 15 – 60 secs to complete the word depending on the difficulty.
- Difficulty is defined by the age entered along with the previous high score.

ALGORITHM

→ Increase in Difficulty :

1. After every 3 correct words, an extra letter is added to the upcoming word.
2. After every 5 correct words, the speed of the incoming asteroids increases by 0.25x.

- NOTE –

The words will appear to be floating at their position

The asteroid might move across the screen, acting as obstacles.

3.2 Proposed Solutions

AI will keep track of time taken to solve a word and the word difficulty level.

2. *If User is finding it easy to complete words quickly, AI will **increase** the difficulty of words*

3. *If User having trouble, AI will **decrease** the difficulty level of words.*

Hence, AI will recommend words as per user.

3.3 Design of the proposed system

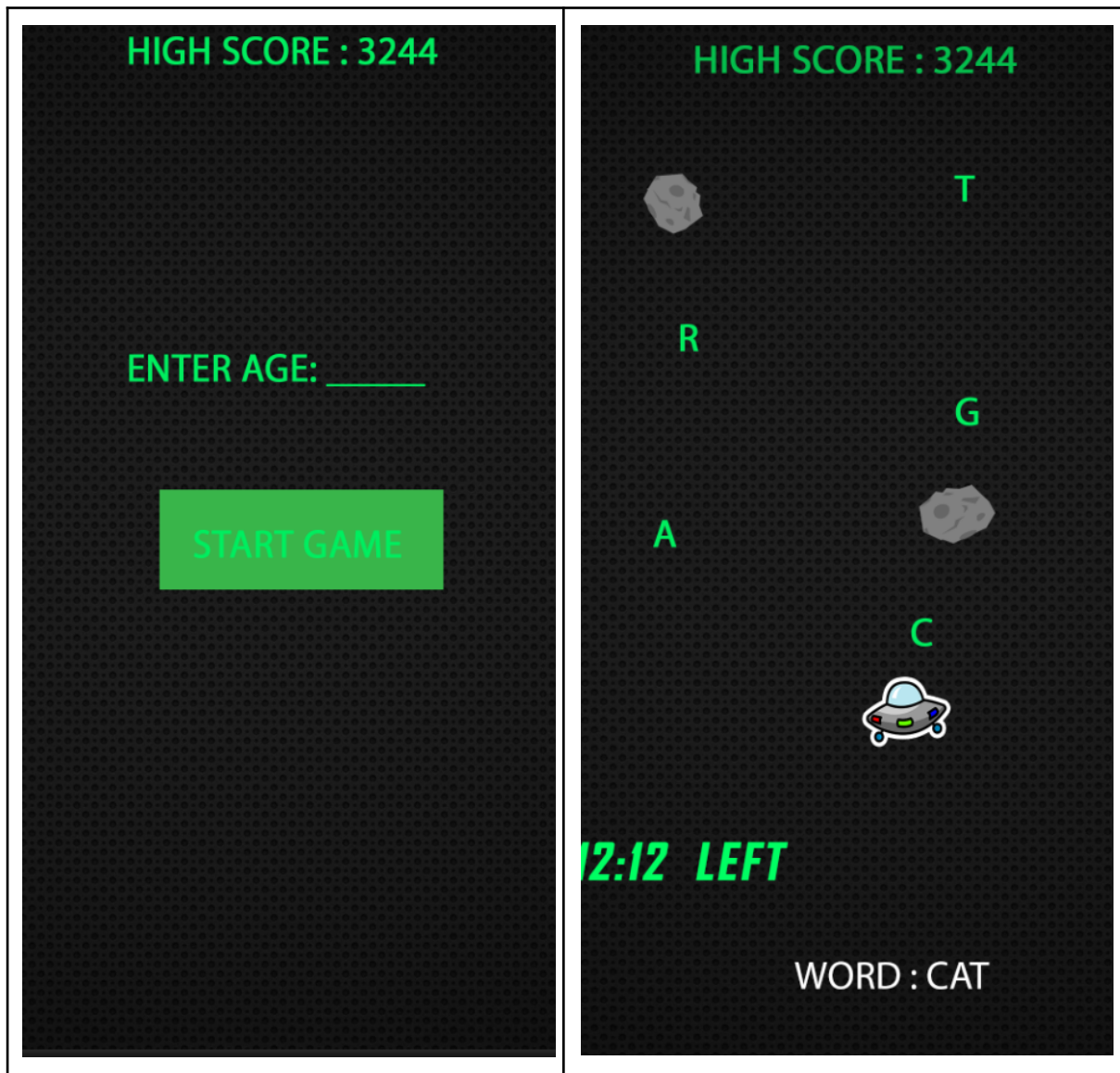


Figure 3: Design of game



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4. Results and Discussion

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For finding a similar game like the game design proposed above, Flappy bird game based on Machine Learning was studied. This project is intended for young children and more difficult words can be recommended for more advanced users. Research in Android Development and OpenCV motion tracking technology was done. Artificial intelligence in this game will be using Reinforcement learning to better select words to give to the user.

5. Conclusion and Future Work

We will be extending this project and work on even better graphic design and improving the gameplay. The gameplay can be improved by adding more graphical features, selecting words as per a certain theme and introducing rewards to the user in the game like normal video games. The game project can be ported to an independent Windows OS based application

References

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