# REVOLUTIONIZING INTERACTION: VIRTUAL MOUSE & SPACEBAR CONTROL THROUGH HAND GESTURE DETECTION

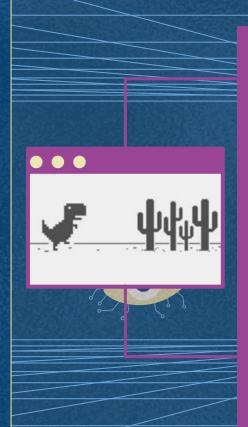
#### **TEAM PASTEL**

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#### INTRODUCTION

Most traditional gaming interfaces may sometimes lack the tactile qualities which toddlers or elderly people desire. And relying solely on gesture-based interfaces can be challenging for precise control.





"Gesture-Dino" introduces an innovative approach to playing the no-internet dinosaur game solely through hand gestures. Through the recognition of the American Sign Language (ASL) system, players can now make the dinosaur jump over rocks and cacti. It eliminates the need for traditional spacebar and mouse interactions, as it seamlessly integrates ASL for both jumping and controlling the dinosaur's vertical movement.

#### **Main Features**

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Recognizes hand gestures and classify them

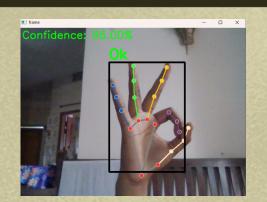
Directs mouse movements

Controls the spacebar enabling jumping

#### DATA COLLECTION



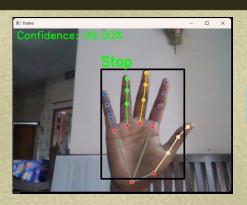
#### Sign Language Classification

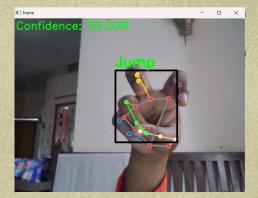






2=Jump

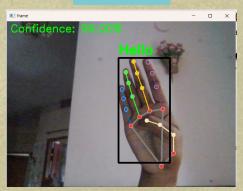




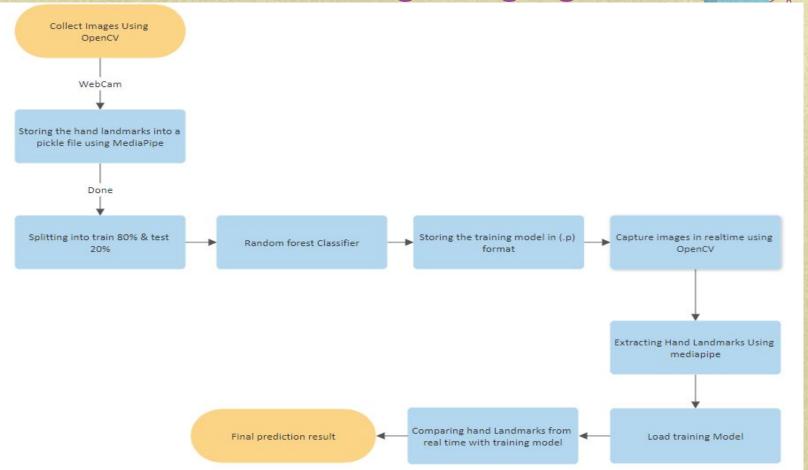
1=Stop







#### FLOWCHART - Sign Language Classification



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Open - stimulates a double-click action

1

Option stimulates a
right-click action

2

Back - stimulates the keyboard press of the spacebar 3

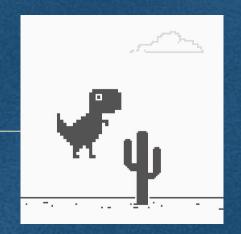
Free - moves the mouse cursor to the position of the hand

#### Spacebar Jump

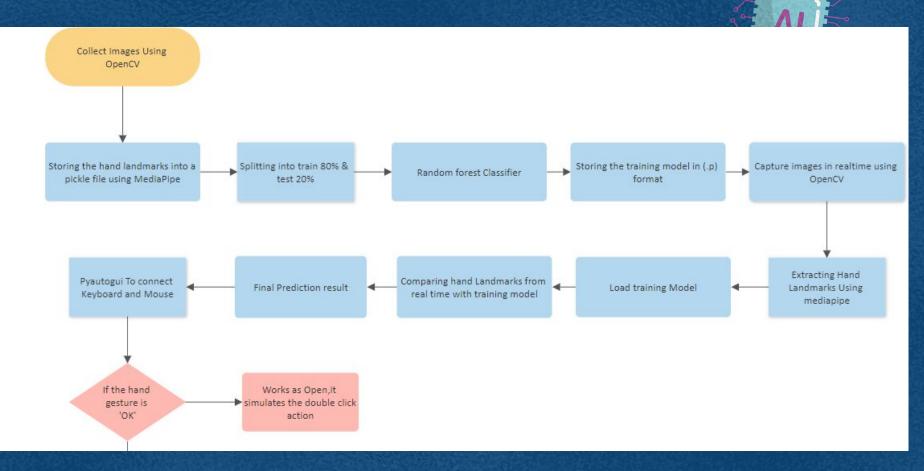


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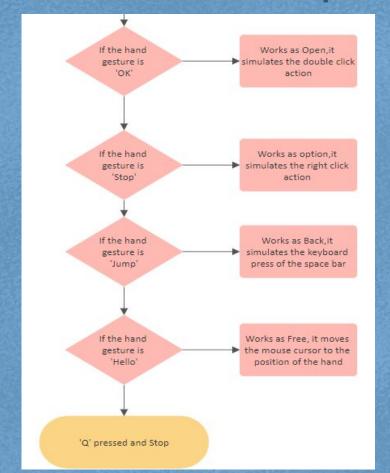
2 = Back - Results the dinosaur to jump!



### FLOWCHART - Mouse & Spacebar Movements

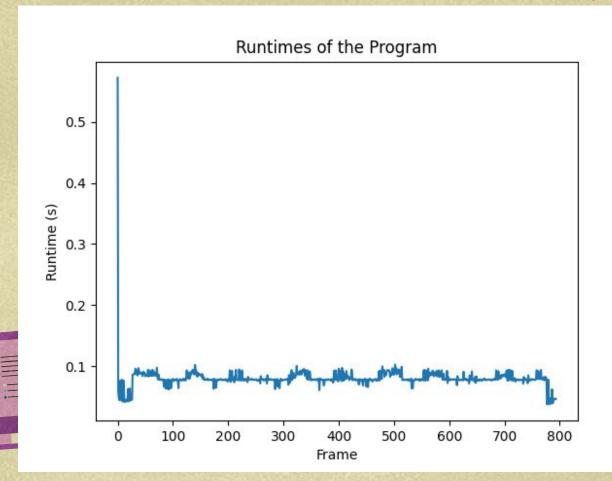


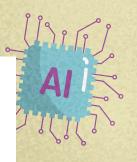
### FLOWCHART - Mouse & Spacebar Movements



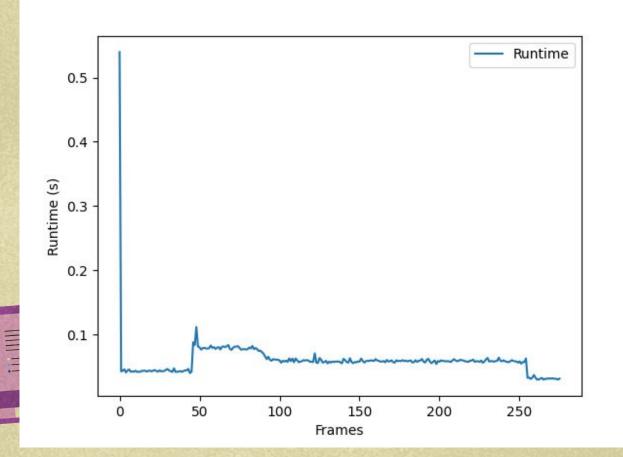


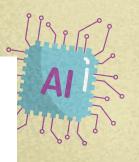
#### RESULTS - Runtime of Gamejump





## RESULTS - Runtime after Torch \_





#### RESULTS

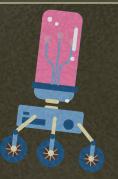
As a result, since our runtime is less, the dinosaur can jump smoothly within intervals. Along with this, our precision is also close to 100% which means our hand gestures are being detected perfectly

#### Unique Contributions

Uses hand gestures to control both the spacebar and mouse direction

. . .

Easy to apply because we've built a complex project using basic techniques









Unlike other projects, this doesn't require a GPU

Multiple hand gestures can be detected at once

#### Limitations

It can sometimes take a while for the virtual mouse to move up or down.



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Memorizing a wide range of hand gestures can be challenging for players

The dinosaur can sometimes jump automatically by detecting the background landmarks

#### TECHNOLOGY STACK

• • •

MediaPipe

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**Neural Network** 

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**PyTorch** 

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Pyautogui

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**OpenCV** 

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Randomforest Classifier

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Numpy

#### ...

#### **GANTT CHART**



Presentation using dataset from research papers and set up Pytorch

Compare research papers and run some projects from GitHub

Data Collection for Sign Language Dectection with Landmark

Training, testing, and debugging

Create GUI for Sign Language Detection and adding virtual mouse

Adding the no-internet Dinosaur game

Debugging and increasing precision and Report Writing



#### CONCLUSION

So overall, our project revolutionizes the implication of the American Sign Language System for playing the no-internet Dinosaur game completely hands-free with 98% accuracy

# THANKS!

• Trello: https://trello.com/b/7PImw3B1/cse299-sign-language-recognition-system Slack: https://app.slack.com/client/T05KJ8YLZS8/C05KFRAMRLJ Github:https://github.com/zayannnn2000/CSE299-VirtualMouseAndSpaceBarControlUsingSignLanguageDetection