Department of Computer Science and Engineering
St. Thomas College of Engineering and Technology
Mattannur

VIRTUAL GYM-TRAINER USING AI

Author:

AKSHAY K (STM21CS014)
AYUSH SUNIL KUMAR E K (STM21CS024)
SANJAY KRISHNA NELLIADAN (STM21CS050)
SANJAY M (STM21CS051)

Project Guide:

Ms.VAISHAKHI V K

Academic Year
2023-24
March 6, 2024

OUTLINE

INTRODUCTION

- AI in fitness revolutionizes exercise approaches, providing personalized and interactive experiences beyond traditional training methods.
- An AI Gym-trainer, fueled by Python, OpenCV, and MediaPipe, offers real-time feedback and guidance through computer vision and form improvement.
- MediaPipe efficiently analyzes video data, supporting the program's real-time feedback capabilities.
- Machine learning suggests fitness recommendations based on individual abilities and objectives, ensuring a customized fitness journey
- This technology combination offers a unique, engaging experience for people of all fitness levels, enhancing well-being and marking a significant advancement in fitness training.

PROBLEM DEFINITION

- The existing system does not incorporate personalized workout plans tailored to the user's strength level. This could be an area for further enhancement and refinement, ensuring an even more comprehensive and customized fitness experience for users of varying abilities.
- The existing system of the AI fitness trainer does not incorporate a proper exercise repetition counter, which is a significant aspect that requires enhancement. By addressing this issue, users can expect a more accurate and streamlined experience as they follow their workout routines.

LITERATURE SURVEY

Human Pose Estimation using Artificial Intelligence with Virtual Gym Tracker

- Human pose estimation is gaining popularity, using AI or Machine Learning techniques.These techniques analyze data from images or videos to locate and position human body joints.
- The obtained information can be used for various purposes, like studying an athlete's methods to achieve success.A gym trainer tracker is a potential application, helping gymnasts achieve their goals.
- Machine learning can track exercise repetitions during weightlifting or CrossFit events.Pose estimation helps identify key points and measure angles between them, like elbow and shoulder.
- The research paper focuses on estimating key points in a Gym tracker and predicting 33 position points based on angle thresholds.

LITERATURE SURVEY

AI-Based Workout Assistant and Fitness Guide

- A system has been designed to monitor body movements and provide feedback on the number of repetitions executed accurately.
- When users perform exercises incorrectly, the system offers audio guidance to help them improve their form.
- This system takes into account users' physical dimensions, dietary habits, and calorie intake to suggest an appropriate calorie intake for maintaining a healthy Body Mass Index (BMI) and overall fitness.
- The proposed system utilizes the Mediapipe Pose Estimation Model to track and analyze users' body movements during exercise sessions, ensuring proper execution and progress.

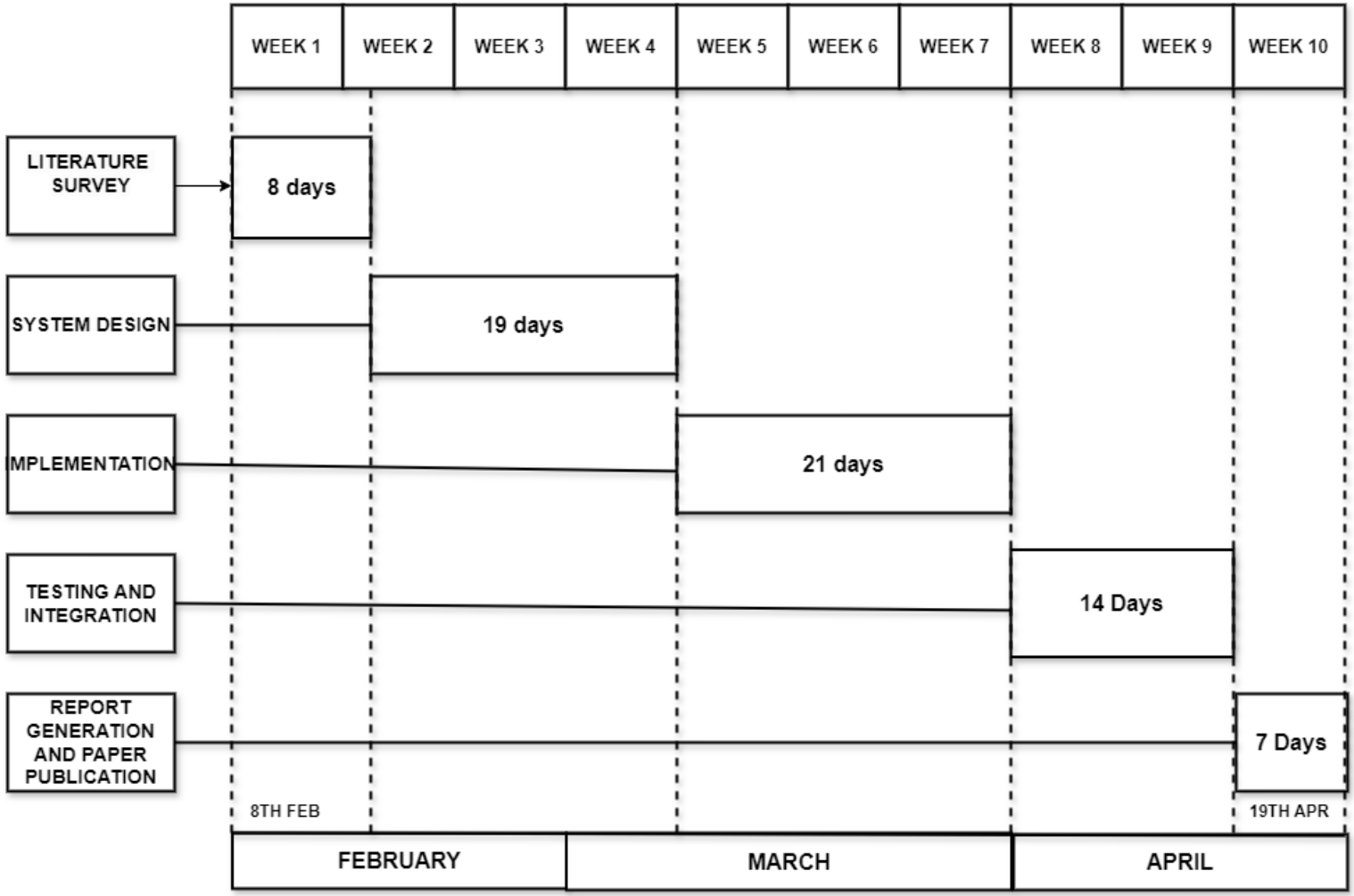
EXISTING SYSTEM

- The MediaPipe pose estimation tool, with a webcam, extracts body sequences from fitness videos.
- Combining Python and MediaPipe allows human posture analysis through image-based skeleton joint identification and assessing pose accuracy, enhancing exercise performance.
- MediaPipe's Pose estimation library identifies 33 human keypoints from images, offering 3-D coordinates and visibility data in a feature array.
- MediaPipe helps track limb and arm movements from real-time videos during workouts, assessing if specific sub-posture steps for various exercises are executed correctly and safely.

PROPOSED SYSTEM

- An AI Gym trainer is a program that utilizes the capabilities of Python, OpenCV, and MediaPipe to guide users through physical fitness routines.
- The program uses computer vision techniques provided by OpenCV to track the user's movements and provide feedback on form and technique. MediaPipe is used to process the video data and provide real time analysis.
- The program also utilizes machine learning algorithms to provide personalized fitness recommendations and progress tracking. The combination of these technologies provides a highly interactive and effective way for users to improve their physical fitness.

GANTT CHART


WEEK 1
WEEK 2
WEEK 3
WEEK 4
WEEK 5
WEEK 6
WEEK 7
WEEK 8
WEEK 9
WEEK 10
LITERATURE SURVEY
8 days
SYSTEM DESIGN
19 days
MPLEMENTATION
21 days
TESTING AND INTEGRATION
14 Days
REPORT GENERATION AND PAPER PUBLICATION
7 Days
8TH FEB
19TH APR
FEBRUARY
MARCH
APRIL

CONCLUSION

- In conclusion, The Virutal Gym-trainer using Python and MediaPipe can provide a personalized and interactive workout experience for users. With the combination of Python's machine learning and data analysis capabilities and MediaPipe's computer vision technology,
- The Virtual Gym-trainer can track and analyze user movements and provide real-time feedback and adjustments. The use of AI technology in fitness training can help improve efficiency, accuracy, and motivation, leading to better results and a more enjoyable workout experience.

REFERENCES


Grandel Dsouza,Deepak Maurya,Anoop Patel
Smart gym trainer using Human pose estimation.


Gourangi Taware,Dr Reena Kharat,Pratik Dhende,Prathamesh Jondhalekar
AI-Based Workout Assistant and Fitness Guide


Neetu Faujdar,Shipra Saraswat,Sachin Sharma
Human Pose Estimation using Artificial Intelligence with Virtual Gym Tracker


Tiago Oliveira,Diogo Leite,Goreti Marreiros
PersonalFit – Fitness App with intelligent plan generator

THANK YOU