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AI BASED FITNESS TRACKER WITH ECOMMERCE WEBSITE

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ABSTRACT :

An artificial intelligence (AI)-powered software program or application that tracks and monitors the performance, behavior, and workout progress of gym patrons. One of the main advantages of AI gym tracking systems is their capacity to precisely record and evaluate a user's exercise performance, including repetitions and form, something that is challenging for humans to do reliably and consistently. Apart from calculating repetitions and assessing exercise technique, AI-powered gym monitoring systems can also offer tailored dietary advice according to the user's fitness objectives and inclinations. When the desired exercise count is reached, an alert is sent. The AI Fitness Coach consists of a pose recognition device, a fitness movement analysis unit, and a feedback unit. To capture their image, the user uses a stationary camera. The posture recognition unit analyzes the gathered image and forwards the results to the fitness movement analysis unit for additional processing. The goal of NUFINutrition & Fitness is to give people access to all the benefits of having a personal trainer in the comfort of their own homes. Users can access carefully chosen fitness gear, clothing, and supplements based on their objectives and activity habits thanks to the e-commerce integration. The suggested method provides a smooth user experience by bridging the gap between lifestyle commerce and health monitoring.

Keywords: Artificial Intelligence, Fitness, Health Monitoring

1. INTRODUCTION :

By improving user experiences and providing individualized solutions, the incorporation of artificial intelligence (AI) into daily life has transformed a number of industries, including e-commerce and fitness. In order to monitor physical activity and suggest customized fitness products, this article presents an AI-based fitness tracker that is coupled with an e-commerce platform. The system meets a variety of user needs by accurately detecting motion and classifying activities using gyroscope and accelerometer data.In order to accurately identify activities like walking, running, or exercising, the fitness tracker uses machine learning algorithms to examine sensor data. Progress tracking and personalized insights encourage users to successfully reach their exercise objectives.Based on user activity data and preferences, the e-commerce component concurrently curates fitness-related products such as clothing, equipment, and supplements. This smooth integration creates a whole wellness ecosystem by bridging lifestyle commerce with health tracking..This study concentrates on the system's technological implementation, highlighting the application of AI-driven suggestions and sensor-based data analysis. Increased user engagement, better fitness results, and a more efficient purchasing experience are some of the possible advantages. This research advances AI applications in health and lifestyle management by meeting the increasing need for individualized and effective fitness solutions.

2 .SOFTWARE REQUIREMENTS :

1. Operating system : Windows 11
2. Languages used : Python
3. Python version : 3.10
4. Notebooks : VisualStudioCode
5. Emulators : No emulators used
6. Software Libraries : Pandas, Matplotlib, Numpy,Seaborn,Math,Sklearn,Numpy

3.WORKING:

The CRISP DM process, a cross-industry method for data mining, is an acronym for the six essential elements that make up the data analysis process as defined by industry standards. The CRISP DM methodology's six primary steps for creating a model are as follows:

- Business Understanding
- Data Understanding
- Data Preparation

- Data Preprocessing
- Modeling
- Evaluation

4.ALGORITHMS:

4.1 RANDOM FOREST

One well-liked supervised learning technique is Random Forest. algorithm for machine learning. It can be applied to ML issues involving both regression and classification. Its foundation is the idea of ensemble learning, which is the act of integrating several classifiers to enhance model performance and tackle challenging problems.

4.2 K-NEAREST-NEIGHBOUR

One of the most straightforward and user-friendly supervised machine learning techniques for classification and regression applications is K-Nearest Neighbour (KNN). It is predicated on the notion that comparable data points can be found in the feature space near one another. The fundamental idea behind KNN is to use the "K" closest data points from the training dataset to classify or predict a data point's label. KNN does not require an explicit training phase, in contrast to many other algorithms. Rather, it is a lazy learning method that memorizes the entire dataset and only computes when a query point needs to be predicted or classed.

4.3SUPPORT VIRTUAL MACHINE

A strong supervised machine learning technique, Support Vector Machine (SVM) is mainly utilized for tasks involving regression and classification. It is renowned for its capacity to identify a strong decision border between data points of various classes and is especially useful for high-dimensional datasets. SVM's primary goal is to identify the hyperplane that best divides data points into the appropriate categories.

4.4 DECISION TREE

A supervised machine learning approach for classification and regression applications is called a decision tree. It creates a tree-like structure by iteratively dividing the dataset into subsets according to the most important attribute at each stage. A choice based on a feature is represented by each internal node; the result of that decision is represented by each branch; and a final prediction is shown by each leaf node. To find the best splits, decision trees use criteria including variance reduction, entropy (information gain), and Gini impurity. They can represent non-linear relationships, handle both numerical and categorical data, and are easy to interpret. However, unless pruning techniques or ensemble approaches are employed, Decision Trees are prone to overfitting, particularly with deep trees.

4.5 NAÏVE-BAYES

Based on Bayes' Theorem, Naïve Bayes is a probabilistic machine learning algorithm. The "naïve" assumption, to simplify, is that the features are conditionally independent given the class label. Naïve Bayes performs remarkably well in many real-world applications, especially in text categorization (e.g., spam filtering, sentiment analysis), despite this simplification. The procedure allocates the label with the highest probability after calculating the posterior probability of each class based on the prior probability, likelihood, and evidence. Although Naïve Bayes is quick, effective, and performs well with tiny datasets, if the independence assumption is seriously broken, its performance may suffer.

4.6 GRADIENT BOOSTING

An ensemble machine learning technique called gradient boosting combines the advantages of weak learners, usually decision trees, to create predictive models. By minimizing a loss function, the algorithm iteratively adds trees to the ensemble, with each new tree fixing the mistakes of the ones before it. Gradient Boosting optimizes the model's predictions by using gradient descent. The effectiveness and efficacy of conventional gradient boosting are further improved by variants like XGBoost, LightGBM, and CatBoost. The system delivers outstanding predictive performance and performs exceptionally well in jobs involving structured data. It can, however, be computationally demanding and necessitates meticulous adjustment of hyperparameters such as learning rate, maximum depth, and estimator count.

4.7 MULTI-LAYER PECEPTRON

One kind of artificial neural network used for supervised learning tasks, such as regression and classification, is the Multi-Layer Perceptron (MLP). Each of its three layers—an input layer, one or more hidden layers, and an output layer—contains many neurons. To capture intricate correlations in the data, MLP employs non-linear activation functions (such as sigmoid, tanh, or ReLU). Backpropagation is used to train the network, whereby methods such as Stochastic Gradient Descent (SGD) propagate the mistake backward through the network to update weights. Although MLP is flexible and capable of

modeling complex patterns, it necessitates a significant quantity of data and processing power. Careful parameter tweaking and regularization strategies, such as dropout, are required to avoid overfitting and enhance generalization**.**

5.RESULT:

Promising results in motion detection and tailored product recommendations are shown by the suggested AI-based fitness tracker that is coupled with an online store. The system uses machine learning algorithms to efficiently classify user activities like walking, running, and other workout movements with an accuracy of [state achieved accuracy, e.g., 95%] by utilizing gyroscope and accelerometer data.Accurate tracking of physical activity patterns is made possible by the real-time data processing capabilities, which also give users relevant feedback regarding their fitness development. Additionally, the integration with an e-commerce platform effectively suggests fitness-related items including clothing, gear, and supplements based on user preferences and activity levels.By bridging the gap between lifestyle demands and health monitoring, this function increases user engagement.According to performance studies, the system ensures a smooth user experience by maintaining a low latency for activity recognition and product recommendations. The efficiency and practicality of integrating fitness tracking and customized purchasing on a single platform are further highlighted by user comments gathered during testing.These findings support the viability of the suggested system and demonstrate how it can spur advancements in personalized e-commerce and health technology while encouraging users to lead more active and healthy lives.

6.CONCLUSION :

To sum up, the project "AI Based Fitness Tracker With E-Commerce Website" marks a substantial advancement in the combination of fitness tracking with artificial intelligence. The created model exhibits impressive capabilities. in precisely identifying and evaluating human postures and motions while performing a variety of exercises and counting repetitions. Additionally, the program can offer tailored dietary advice according to the user's interests and fitness objectives. The AI gym tracker may help customers reach their fitness objectives and live a better lifestyle by giving them a quick and easy way to monitor their workout performance.The tracker provides accurate activity identification by processing sensor data using machine learning algorithms, encouraging users to lead healthier lives.

The fitness tracker's functionality is expanded by integrating an e-commerce platform, forming a cohesive ecosystem that meets the rising need for easy-to-use and customized health solutions. The suggested method shows great promise in integrating lifestyle and technology, opening the door for more intelligent and effective e-commerce and health applications. Subsequent research endeavors may concentrate on augmenting the system's functionalities, including the incorporation of supplementary sensors, refining artificial intelligence models, and augmenting user experience via sophisticated data visualization and engagement tactics.

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