V.S.B. ENGINEERING COLLEGE,KARUR

Department of Information Technology

IBM NALAIYA THIRAN LITERATURE SURVEY

TITLE:AI-Powered Nutrition Analyzer for Fitness Enthusiasts

TECHNOLOGY:Artifical Intelligence

DOMAIN NAME:Nutrition Analyzer

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TITLE : Mobile fitness safety and improvement application

AUTHOR : Asia Flores

DESCRIPTION :

At home fitness has rapidly risen recently due to the COVID-19 pandemic and stay-at-home-orders. This also produced a large set of first time users of gym equipment and structured exercise routines. Access to professional fitness trainers to assist beginners in proper exercise form has become increasingly difficult. According to the National Safety Council (NSC), approximately 468,000 injuries occurred due to exercise in 2019 before the pandemic. Without proper guidance, this statistic is bound to increase. Therefore, there is a need for systems to monitor exercise performance for both short term and long term injury prevention. We present a novel mobile app called Verum Fitness which will use the camera from a smart phone to record a user performing an exercise. Then, the app will skeletonize the user, extract angles from specific joints, and feed this data into a Fuzzy Inference System (FIS), an inherently explainable model, to classify exercise performance. With the FIS, we can provide a description of each repetition performed to determine if it could cause injury and how to improve. From our synthetically generated data, we show a training and test Accuracy of 80.42% and 71.67%, respectively, as well as high Sensitivity and Specificity for the goblet squat.

PUBLISHED IN : 2020

TITLE : Toolbox for fitness activity recognition based on deep CNN

AUTHOR : Ali Bidaran

DESCRIPTION :

Online applications for virtual meetings have be-come handy for many fitness instructors these days. However, currently used applications have limitations in tracking clients' performance simultaneously, particularly for many participants. In this paper, we proposed a fitness AI-assisted toolbox to detect the fitness activities of athletes from steamed frames. The innovative Magnitude flow method is introduced to compute the dense optical flow of each frame and provides details of human body poses during exercising. The two-stream convolutional neural network is proposed to only detect fitness actions from RGB frames and improved magnitude flows. The two-stream CNN is designed with a MobileNetVl backbone and a Multi-layer perceptron (MLP) network as the classification head. Moreover, we introduced an Observer network as a score fusion approach to improve the final detection accuracy and reduce the uncertainties between the two networks. Our proposed method is tested over selected fitness activities of the UCF dataset. The plenary results were acquired by testing selected activities and considering their ability in detecting major fitness actions. The efficient accuracies and confusion matrices describe that our proposed model is an effective solution to assist fitness instructors in tracking, analyzing, and conveniently supervising many participants.

PUBLISHED IN : 2021

TITLE: Fitness biasing for evolving an xpilot combat agent

AUTHOR : Gary Parker

DESCRIPTION :

In this paper we present an application of Fitness Biasing, a type of Punctuated Anytime Learning, for learning autonomous agents in the space combat game Xpilot. Fitness Biasing was originally developed as a means of linking the model to the actual robot in evolutionary robotics. We use fitness biasing with a standard genetic algorithm to learn control programs for a video game agent in real-time. Xpilot-AI, an Xpilot add-on designed for testing learning systems, is used to evolve the controller in the background while periodic checks in normal game play are used to compensate for errors produced by running the system at a high frame rate. The resultant learned controllers are comparable to our best hand-coded Xpilot-AI bots, display complex behavior that resemble human strategies, and are capable of adapting to a changing enemy in real-time.

PUBLISHED IN : 2021

TITLE : Efficient fitness action analysis

AUTHOR : Hainan Cui

DESCRIPTION :

Human action analysis has been an active research area in computer vision.
Most of existing approaches are data-driven and focus on general actions. In this paper, we aim to recognize fitness actions from image sequences and propose an action evaluation method, which can be applied in artificial intelligence (AI) fitness system. Firstly, we extract human skeleton information
from the captured fitness video with a simplified skeleton model. Secondly, the extracted skeleton images of an action sequence are transformed to an uniform two-dimensional plane with the proposed spatial-temporal skeleton encoding method, which describes a global action feature. Finally, an action
classifier and a geometrical registration metric are constructed respectively to analyze the fitness actions. In addition, we build a dataset for fitness actions recognition and evaluation. Experimental results demonstrate thatour method has a good performance both on the fitness action dataset and small-scale dataset.

PUBLISHED IN : 2020

TITLE: Banknote fitness classification

AUTHOR : Weizhong Sun

DESCRIPTION :

The degree of defilement of the banknotes to some extent determines whether the banknotes can continue to circulate. How to accurately identify the dirtiness of banknotes is a major issue facing financial instruments. To solve this problem, we use a contact image sensor to collect double-sided reflection images of banknotes under red light, green light, blue light, and infrared light, and at the same time, collect images of banknotes under transmission of green light and infrared light. By using an image processing method to extract the banknote images, and then analysing the images formed by the various stain levels of the banknotes irradiated by various light sources, it is finally decided which kind of light source banknote images are input to the convolutional neural network. We process the classified training samples and test samples in the above manner, and we will get the training samples and test samples of the banknote images. Using the training sample to train our convolutional neural network, we will get the banknote dirt recognition classifier we need. Then use the test sample to test on this classifier, we will get the recognition effect of our trained classifier. The test results show that our designed convolutional neural network classifier is very accurate for identifying the dirtiness of banknotes.

PUBLISHED IN : 2018