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Human Activity Recognition Using Computer Vision In Machine Learning

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Abstract: Human activity recognition plays a significant role in human-to- human interaction and interpersonal relations. The human ability to recognize another person's activities is one of the main subjects of study of the scientific areas of computer vision and machine learning. With the advent of miniaturized sensing technology, which can be body-worn, it is now possible to collect and store data on different aspects of human movement under the conditions of free living. This technology has the potential to be used in automated activity profiling systems which produce a continuous record of activity pat-terns over extended periods of time. Such activity profiling systems are dependent on classification algorithms which can effectively interpret body-worn sensor data and identify different activities. This article reviews the different techniques which have been used to classify normal activities and/or identify falls from body-worn sensor data. The review is structured according to the different analytical techniques and illustrates the variety of approaches which have previously been applied in this field. Although significant progress has been made in this important area, there is still significant scope for further work, particularly in the application of advanced classification techniques to problems involving many different activities.

Index Terms **- Deep Learning, Logistic Regression, Activity Recogniton, Neural Network**

I. INTRODUCTION.

Human activity recognition has a wide range of uses because of its impact on wellbeing. Human activities have an inherent hierarchical structure that indicates the different levels of it, which can be considered as a three-level categorization. Movements are often typical activities performed indoors, such as walking, talking, standing, and sitting. They may also be more focused activities such as those types of activities performed in a kitchen or on a factory floor. Human activity recognition plays a significant role in human-to-human interaction and interpersonal relations. The human ability to recognize another person's activities is one of the main subjects of study of the scientific areas of computer vision and machine learning. This technology has the potential to be used in automated activity profiling systems which produce a continuous record of activity patterns over extended periods of time. To develop a Human Activity Recognition System Using Machine Learning. There has been an ever rising need for improving the methods involved in Human and Computer Interaction and how computer understands human actions and activities. Human Activity Recognition is the problem of predicting what a person is doing based on a trace of their movement using sensors. It is a challenging problem because there is no clear analytical way to relate the sensor data to specific actions in a general way. Human activity recognition is a field of study that deals with identifying, interpreting, and analyzing the actions specific to the movement of human beings.

Human activity recognition basis for many applications such as video surveillance, health care, and human-computer interaction. To Analyze the activity of a person from the information collected by different devices. Discover which are the variables that determine which activity is doing a person. To Calculate a predictive model that can recognize a person's activity from the signals received by the sensors.

II.LITERATURE REVIEW.

Human action recognition has been thoroughly investigated for a long time. The majority of action recognition techniques call for manually annotating the crucial section of the action that is of interest in the video. Recent studies have shown that it is possible to automatically identify and determine the action's relevant element. We can examine the techniques for action recognition.

A. A Comparison of Machine Learning Classifiers for Human ActivityRecognition using Magnetic Induction based Motion signals.

Author: Negar Golestani , Mahta Moghaddam

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Abstract : Human activity recognition (HAR) is a growing research field with a wide range of applications. Magnetic induction-based human activity recognition system (MI-HAR) is a wearable-based HAR system proposed for capturing human motions and detecting activities based on the collected data. In this work, we focused on the performance analysis of different machine learning classifiers using synthetic magnetic induction based motion (MI-motion) signals. In this paper, we evaluate the correction filter for human activity identification using Multiple-Input Multiple Output (MIMO) radar. The human activity is estimated by the trajectory ofthe estimated height and Radar Cross Section (RCS). We confirm that the filtering technique is effective in increasing the identification rate of the human activity, andthe highest recognition rate is over 90.

B. Deep Learning and SVM-Based Method for Human Activity Recognition with Skeleton Data

Author: Plamen Hristov, Agata Manolova, Ognian Boumbarov

Abstract : In recent years, research related to the analysis of human activity has been the subject of increased attention by engineers dealing with computer vision, and particularly that which utilizes deep learning. In this paper, we propose a methodfor classification of human activities, composed of 3D skeleton data. This data is normalized beforehand and represented in two forms, which are fed to a neural networkwith parallel convolutional and dense layers. Human Activity Recognition system isone of the emerging fields with the rapid advancement of sensing technologies for facilitating sophistical analytical operations on human behaviour as well as acting as leveraging computer human interaction. After reviewing existing literatures, it hasbeen explored that existing system doesn't emphasize much on computational performance rather they are more application specific by identifying specific problems.However, it is evident that for an accurate as well as cost effective analysis of humanactivity recognition system, not all the features are required to be studied.

C. A Comparative Research on Human Activity Recognition Using Deep Learning

Author: Nilay Tüfek,Özen Özkaya

Abstract : Human activity recognition technology has been widely used in many fields such as public safety and intelligent medical care. In smart home systems, hu-man activities have uncertain characteristics. This paper combines Ontology and Dempster-Shafer theory to reason simple abnormal activities based on inference rules. First of all, sensors get the data information, next it will uses the Dempster- Shafer theory to filter the collected information, through the ontology verification module, and outputs the corresponding activity information, so as to obtain the rea-soning result, at last, the reasoning ends. The combination of ontology and DempsterShafer theory not only effectively solves the problem of heterogeneous data betweensensors, but also solves the problem of uncertainty in activity inference.

D. An Individual model for Human Activity Recognition Using Trans-fer Deep Learning

Author: Sujittra Sarakon,Kreangsak Tamee

Abstract Deep transfer learning. In this work, we present an individual model that efficiently recognizes the characteristics of each of 6 activities of each user. Westarted using the network structure from our previous work, 1D-CNN, which has al-ready shown resistance to abnormal data. This experiment was started by pre-train network from 30 users. After that, after receiving the main model from the main data source, each test data was examined, the main model prediction performance. In this study, we designed and constructed a system to identify human actions using integrated sensors in smartphones. There are six actions that are selected for recognition include: walking, standing, sitting, lying down, up the stairs, down the stairs. In this system, Support Vector Machine (SVM) is used to classify and identify action. Collected data from sensors are analyzed for the classification model - the model file. The classification models are optimized to bring the best results for the identified human activity. The accuracy of the system depends on selected features and the quality of the training model. On the Android system running on smartphonewith 248 features achieve 89.59.248 features achieve 89.59.

III PROPOSED METHOD.

- Admin

In this module, the Admin has to log in by using valid user name and password.After login successful he can do some operations such as View All Users andAuthorize, View All E-Commerce Website and Authorize, View All Productsand Reviews, View All Products Early Reviews, View All Keyword Search Details, View All Products Search Ratio, View All Keyword Search Results, View All Product Review Rank Results.

- View and Authorize Users

In this module, the admin can view the list of users who all registered. In this,the admin can view the user's details such as, user name, email, address and admin authorizes the users.

- View Charts Results

- View All Products Search Ratio,View All Keyword Search Results,View AllProduct Review Rank Results.

- Ecommerce User
  In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password Once Login is successful user will do some operations like Add Products, View All Products with reviews, View All EarlyProduct's reviews, View All Purchased Transactions.

- End User
  In this module, there are n numbers of users are present. User should register before doing any operations. Once user registers, their details will best or to the database. After registration successful, he has to login by using authorizeduser name and password. Once Login is successful user will do some operations like Manage Account, Search Products by keyword and Purchase, ViewYour Search Transactions, View.

IV Algorithm.

Logistic Regression:

A summary of Python packages for logistic regression (NumPy, scikit-learn, StatsModels, and Matplotlib, Mediapipe)

1. Step 1: Import Python Libraries
2. Step 2: Explore and Clean the Data
3. Step 3: Transform the Categorical Variables: Creating Dummy Variables
4. Step 4: Split Training and Test Datasets
5. Step 5: Transform the Numerical Variables: Scaling
6. Step 6: Fit the Logistic Regression Model
7. Step 7: Evaluate the Model
8. Step 8: Interpret the Results

For Linear Regression, we had the hypothesis y_hat = w.X +b , whose output range was the set of all Real Numbers. Now, for Logistic Regression our hypothesis is — y_hat = sigmoid(w.X + b) , whose output range is between 0 and 1 because by applying a sigmoid function, we always output a number between 0 and 1.
Logistic regression aims to solve classification problems. It does this by predicting categorical outcomes, unlike linear regression that predicts a continuous outcome.

It consists of 3 stages – (1) Analyzing the correlation and directionality of the data, (2) estimating the model, i.e., fitting the line, and (3) evaluating the validity and usefulness of the model.

Logistic regression is used to obtain odds ratio in the presence of more than one explanatory variable. The procedure is quite similar to multiple linear regression, with the exception that the response variable is binomial. The result is the impact of each variable on the odds ratio of the observed event of interest.

Below are the steps:

1. Data Pre-processing step.
2. Fitting Logistic Regression to the Training set.
3. Predicting the test result.
4. Test accuracy of the result(Creation of Confusion matrix)
5. Visualizing the test set result.

V. System Architecture.

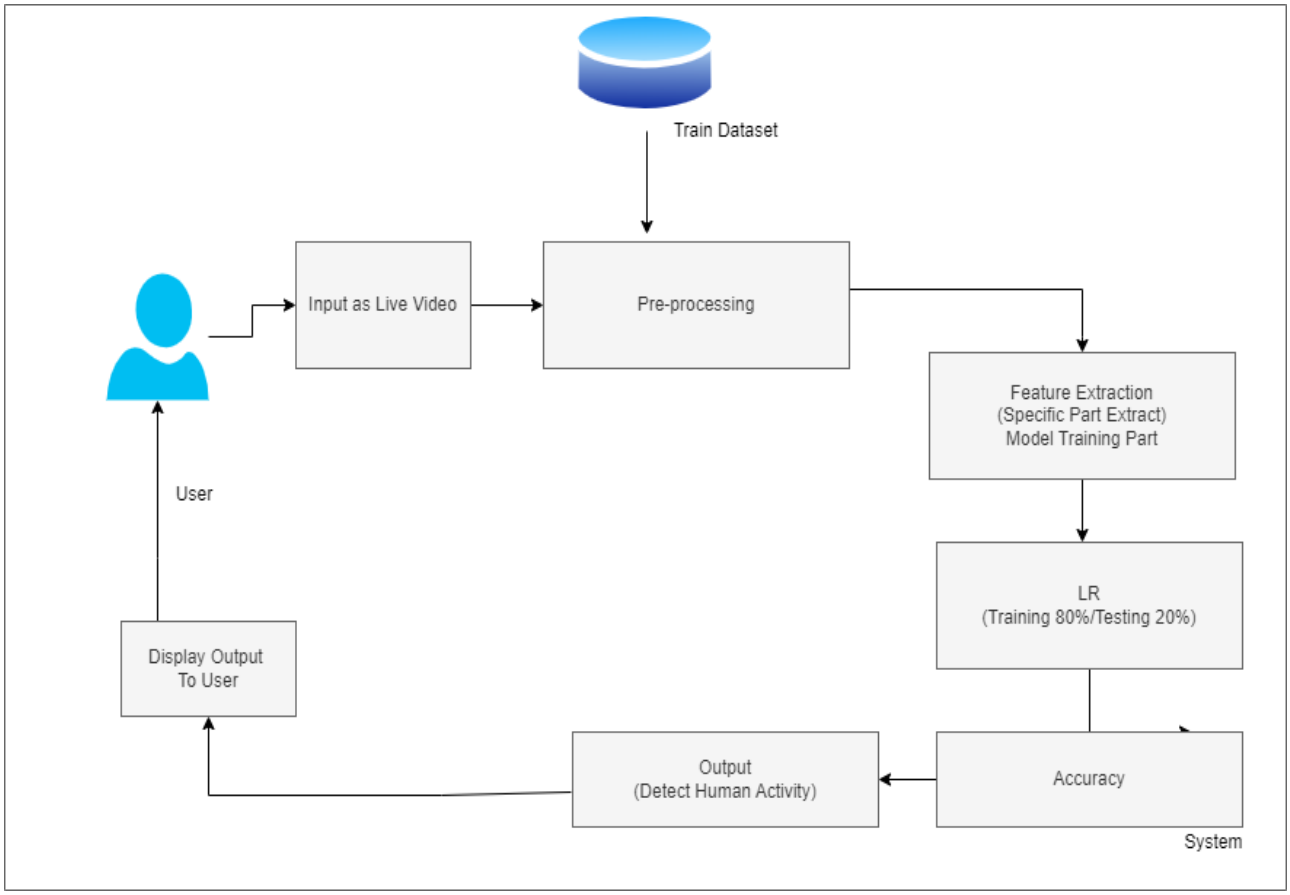

Fig1.System Architecture

VI. Result.

Fig2. Login Page

Fig3. Register Page

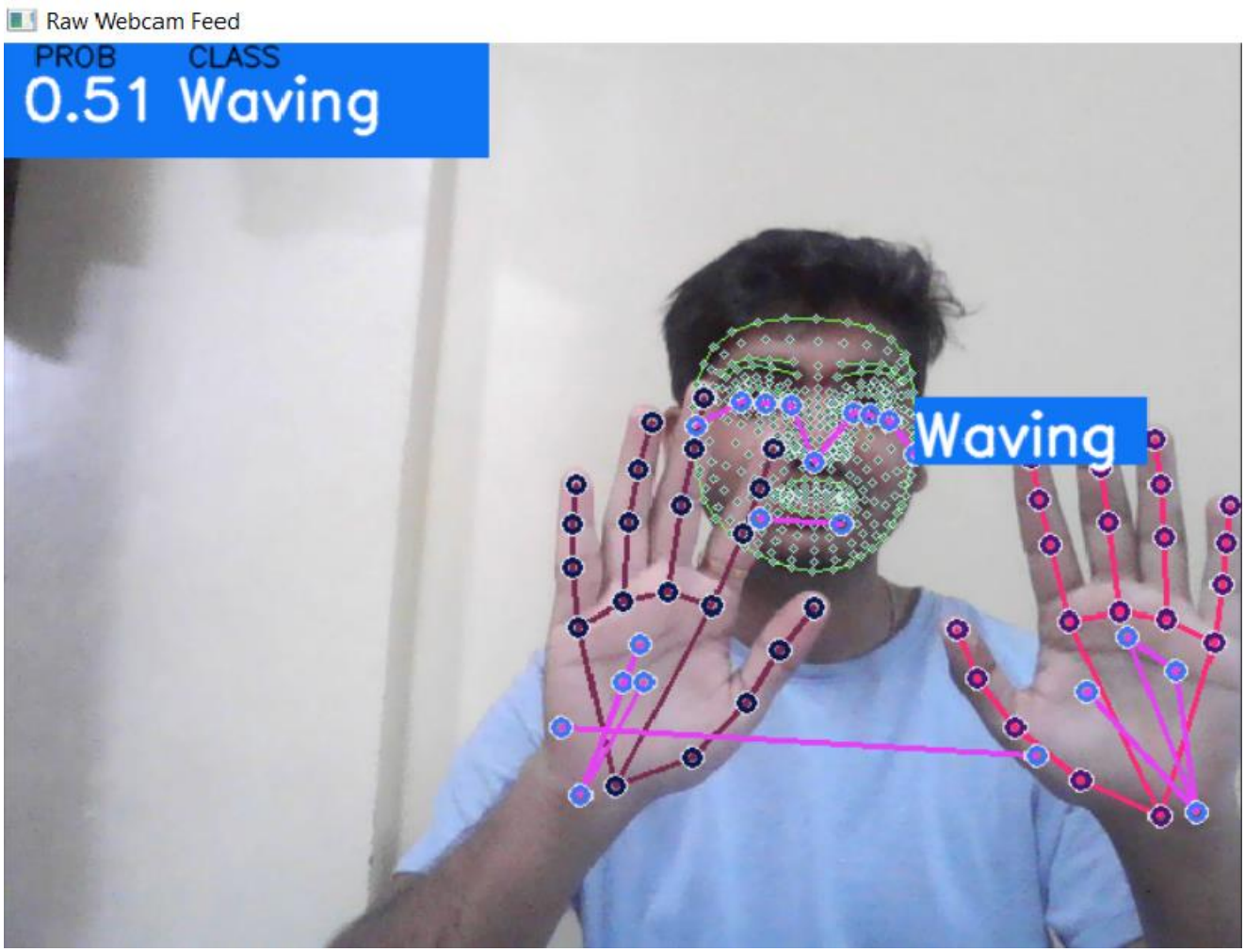

Fig4.Action Recognition

To recognize, detect and classify the activity of the human many applications have been developed with human centered monitoring and researchers have proposed different solutions. The result behind our work is to implement machine learning algorithms in real world datasets so that their accuracy can be studied and effective conclusions can be drawn. In them, Logistic Regression gave good results whereas Naive Bayes result was not good. In this paper Human Activity Recognition System, we proposed a model trained using LR with spatiotemporal three-dimensional kernels on live data set to recognize almost seven human activities with satisfactory accuracy level. The designed system can be used to automatically categorizing a dataset of videos on disk, training and monitoring a new employee to correctly perform a task.

VII. Conclusion.

We have proposed a Human Activity Recognition system based on pose estimation and convolutional neural network. This system will combine the results of the 3D pose estimation model with the Logistic Regression for better and more accurate detailed result generation. The proposed system would be then developed and tested for it's ability to improve the quality of human activity recognition.

VIII. Reference.

1) Dang, L.M.; Min, K.; Wang, H.; Piran, J.; Lee, C.H.; Moon, H. Sensorbased and vision-based human activity recognition: A comprehensive survey. Pattern Recognit. 2020.

2) Chen, K.; Zhang, D.; Yao, L.; Guo, B.; Yu, Z.; Liu, Y. Deep learning for sensor-based human activity recognition: Overview, challenges, and opportunities. ACM Comput. Surv. 2021.

3) Amin Ullah; Khan Muhammad; Javier Del Ser; Sung Wook Baik; Victor Hugo C. de Albuquerque.Recognition Using Temporal Optical Flow Convolutional Features and Multilayer LSTM..IEEE Transactions on Industrial Electronics,December 2019.

4) Hassan, M.M.; Uddin, M.Z.; Mohamed, A.; Almogren, A. A robust human activity recognition system using smartphone sensors and deep learning. Futur. Gener. Comput. Syst. 2018.

5) Wenjun Jiang and Chenglin Miao. Towards Environment Independent Device Free Human Activity Recognition. 24th Annual International Conference on Mobile Computing and Networking,October 2018.

6) Khan, Z.N.; Ahmad, J. Attention induced multi-head convolutional neural network for human activity recognition. Appl. Soft Comput.IEEE 2021.