

# Human Action Recognition

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**Abstract:** Human Action Recognition is one of the important research areas in computer vision and image processing field. A machine can be interacted and controlled by gestures and facial expression using the visual modality. Human action recognition can be seen as a bridge for machines to understand human body language, an intelligent interacting system between machines and humans which limits majority of input devices such as keyboard and mouse. Thus, producing accurate and meaningful information on human activities and behaviors is one of the important tasks in pervasive computing.

**Key Words:-** Human Action Recognition, gestures, facial expression, pervasive computing.

## I. INTRODUCTION

Recognizing human activities from video sequences or still images is a challenging task due to problems, such as background clutter, partial occlusion, changes in scale, viewpoint, lighting, and appearance. Many applications, including video surveillance systems, human-computer interaction, and robotics for human behavior characterization, require a multiple activity recognition system. In particular, we divide human activity classification methods into two large categories according to whether they use data from different modalities or not. Then, each of these categories is further analyzed into sub-categories, which reflect how they model human activities and what type of activities they are interested in. Moreover, we provide a comprehensive analysis of the existing, publicly available human activity classification datasets and examine the requirements for an ideal human activity recognition Human Action Recognition system plays a vital role in video surveillance systems, human-computer interaction, and robotics for human behavior characterization, require a multiple activity recognition system. In this project, we propose a system in which, the various actions performed by the humans will be recognized.

This project proposes an intelligent human action recognition system which can automatically recognize the human daily activities. Activities can be recognized by using image parsing techniques on the video image. Moreover, due to low computational cost and high accuracy outcomes, an approach using image parsing techniques has proven very promising. Therefore, this project discusses the development of an

effective video image based HAR which can be used as an embedded system.

## II. LITERATURE SURVEY

Many methodologies have been proposed to detect actions of a human in an image or video. In this, the classification of action is studied on the basis of spatial and temporal structure of body movements. In hierarchal approach is reviewed to differentiate the human action recognition problems. In the review, human action is classified into two ways i.e., single layered approach and hierarchal approach. Based on the different approaches, there are further classification to recognize human actions which are based on different representation and learning methodologies.

## III. EXISTING SYSTEM

### A. Using Wearable Sensors:

Human activity recognition based on wearable sensor data has been an attractive research topic due to its application in areas such as healthcare and smart environments. In this context, many works have presented remarkable results using accelerometer, gyroscope and magnetometer data to represent the activities categories.

However, current studies do not consider important issues that lead to skewed results, making it hard to assess the quality of sensor-based human activity recognition and preventing a direct comparison of previous works. These issues include the samples generation processes and the validation protocols used. We emphasize that in other research areas, such as

image classification and object detection, these issues are already well-defined, which brings more efforts towards the application. Inspired by this, we conduct an extensive set of experiments that analyze different sample generation processes and validation protocols to indicate the vulnerable points in human activity recognition based on wearable sensor data. For this purpose, we implement and evaluate several top-performance methods, ranging from handcrafted-based approaches to convolutional neural networks. According to our study, most of the experimental evaluations that are currently employed are not adequate to perform the activity recognition in the context of wearable sensor data, in which the recognition accuracy drops considerably when compared to an appropriate evaluation approach. To the best of our knowledge, this is the first study that tackles essential issues that compromise the understanding of the performance in human activity recognition based on wearable sensor data.

Drawbacks of Existing System:

- Recognition accuracy is low by using wearable devices.
- Wearable devices place unnecessary physical and mental discomfort on people.
- Processing speed is low.



Fig.1. Existing System

#### IV. PROPOSED SYSTEM

In this project A new technique in action recognition is proposed, which is action recognition using image processing and artificial neural networks:

Human action recognition is an important technique and has drawn the attention of many researchers due to its varying applications such as security systems, medical systems, entertainment. Action recognition is an interesting and a challenging topic of computer vision research due to its prospective use in proactive computing. The developed algorithm for the human action recognition system, which uses the two-dimensional discrete cosine transform (2D-DCT) for image compression and the KNN neural network for recognition purpose, is simulated in MATLAB. By using 2D-DCT we extract image vectors and these vectors become the input to neural network classifier, which uses K-Nearest Neighbors algorithm to recognize elementary actions from the images (trained). In this paper we have developed and illustrated a recognition system for human actions using a novel K-Nearest Neighbors based retrieval system. KNN has good feature extracting property due to its topological ordering.

Advantages of Proposed System:

- Accuracy rate is more.
- No physical and mental discomfort.
- Processing speed is high.

#### V. SYSTEM IMPLEMENTATION

*Tools:* In this project the implementation is done by using

##### A. MATLAB

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. MATLAB stands for matrix laboratory, and was written originally to provide easy access to matrix software developed by LINPACK (linear system package) and EISPACK (Eigen system package) projects. MATLAB is therefore built on a foundation of sophisticated matrix software in which the basic element is array that does not require pre dimensioning which to solve many technical computing problems, especially those with matrix and vector formulations, in a fraction of time.

MATLAB features a family of applications specific solutions called toolboxes. Very important to most users of MATLAB, toolboxes allow learning and applying specialized technology. These are comprehensive collections of MATLAB functions (M-files) that extend the MATLAB environment to solve particular classes of problems. Areas in which toolboxes are available include signal processing, control system, neural networks, fuzzy logic, wavelets, simulation and many others.

Typical uses of MATLAB include: Math and computation, Algorithm development, Data acquisition, Modeling, simulation, prototyping, Data analysis, Exploration, visualization, Scientific and engineering graphics, Application development, including graphical user interface building.

### B. Using the MATLAB Editor to create M-Files:

The MATLAB editor is both a text editor specialized for creating M-files and a graphical MATLAB debugger. The editor can appear in a window by itself, or it can be a sub window in the desktop. M-files are denoted by the extension .m, as in pixelup.m.

The MATLAB editor window has numerous pull-down menus for tasks such as saving, viewing, and debugging files. Because it performs some simple checks and also uses color to differentiate between various elements of code, this text editor is recommended as the tool of choice for writing and editing M-functions.

To open the editor, type edit at the prompt opens the M-file filename in an editor window, ready for editing. As noted earlier, the file must be in the current directory, or in a director-y in the search path.

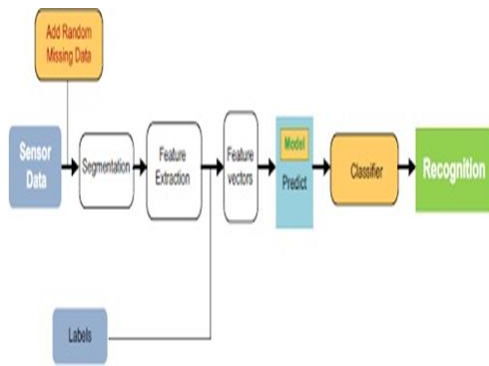


Fig.2. Proposed System Architecture

### C. Reading Images:

Images are read into the MATLAB environment using function imread whose syntax is imread('filename')

Here filename is a string containing the complete of the image file (including any applicable extension). For example, the command line

```
>> f = imread('8.jpg');
```

Reads the JPEG (above table) image chest ray into image array f. Note the use of single quotes (') to delimit the string filename. The semicolon at the end of a command line is used by MATLAB for suppressing output if a semicolon is not included. MATLAB displays the results of the operation(s)

specified in that line. The prompt symbol (>>) designates the beginning of a command line, as it appears in the MATLAB command window.

When as in the preceding command line no path is included in filename, imread reads the file from the current directory and if that fails it tries to find the file in the MATLAB search path. The simplest way to read an image from a specified directory is to include a full or relative path to that directory in filename.

For example,

```
>> f = imread('D:\myimages\chestxray.jpg');
```

Reads the image from a folder called my images on the D: drive, whereas

```
>> f = imread('.\my images\chest ray.jpg');
```

Reads the image from the subdirectory called 'my images' of current working directory. The current directory window on the MATLAB

desktop toolbar displays MATLAB's current working directory and provides a simple, manual way to change it. Above table lists some of the most of the popular image/graphics formats supported by imread and imwrite.

## VI. EXPERIMENTAL RESULTS



Fig.3. Action form

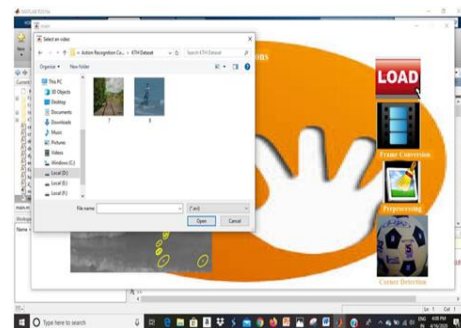


Fig.4. Loading the video

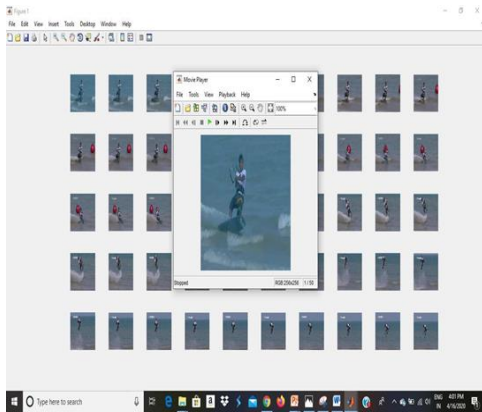


Fig.5. frame conversion

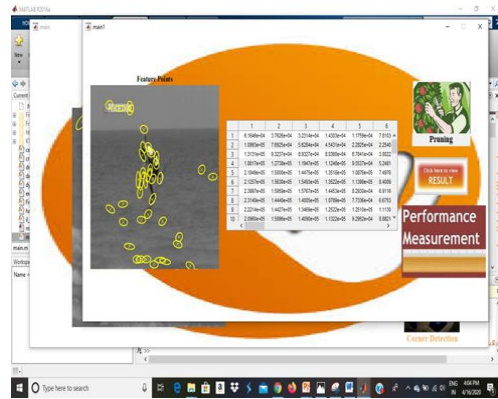


Fig.8. Pruning



Fig.6. Pre-processing

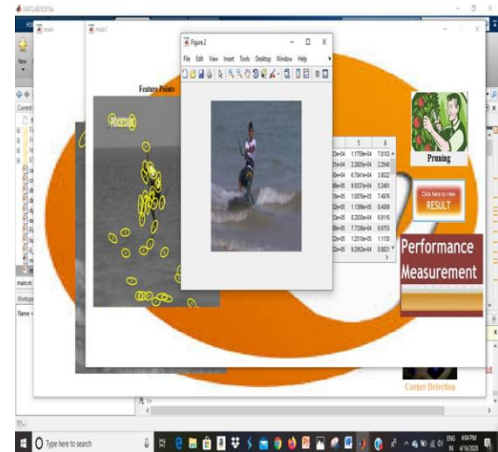


Fig.9. Result

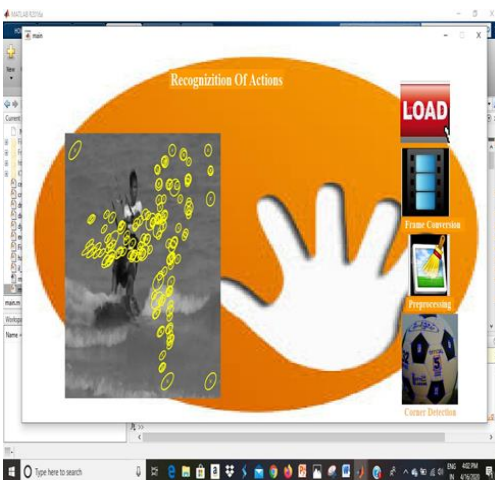


Fig.7. Corner detection

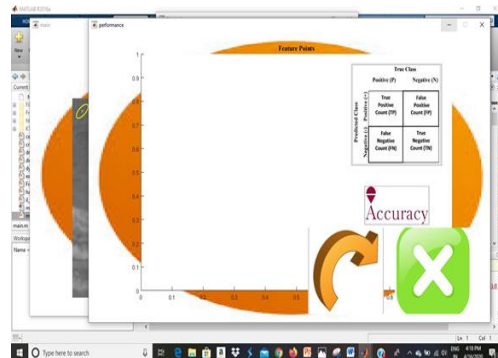


Fig.10. Performance Measurements

## VII. CONCLUSION

As we see that existing system has many defects such as less accuracy, time taking, putting physical and mental stress but

now we can say that our approach is more helpful and highly accurate compared to the existing system. The research reported in this paper demonstrates optimal human action recognition in terms of recognition rate accuracy by combining two different kinds of features. The first feature concerns the boundary coordinates (contour-based type) and is called DCDS. The second is the regional appearance (silhouette-based type) and is called HOG. Combining these features leads to the formation of a strong complementary feature vector that captures effective discriminant details of human action videos. The KNN experimental results achieved a correct recognition rate of 100%. This result demonstrates that our algorithm promises excellent results in terms of accuracy for human action recognition.

#### REFERENCES

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