

Human Activity Recognition

Abstract:

HAR is one of the bases of ubiquitous computing in smart environments and a topic undergoing intense research in the field of ambient assisted living. The increasingly large amount of data sets calls for machine learning methods. In this case study, we introduce a deep learning model that learns to classify human activities without using any prior knowledge. For this purpose, a Long Short-Term Memory (LSTM) Recurrent Neural Network was applied to one real world dataset. The results of these experiments show that the proposed approach outperforms the existing ones in terms of accuracy and performance.

Problem Description:

The aim of this project is to create a model that can identify the basic human actions like running, jogging, walking, clapping, hand-waving and boxing. The model will be given a set of images & video where in video, a person will be performing an action. The label of a video will be the action that is being performed in that particular video. The model will have to learn this relationship, and then it should be able to predict the label of an input (video) that it has never seen. Technically, the model would have to learn to differentiate between various human actions, given some examples of these actions.

Scope:

A lot of scope exists to model and understand the behavioral pattern of human agents along with predictions for security and surveillance purposes. Further study is aimed towards recognizing activity like talking, eating, drinking, etc. by

understanding the head and body pose of humans in the video. Though a hard problem, this will be open up many prospects towards understanding and modeling human actions for various real-life applications.

NoteBook Used:

Google Collaboratory:

Colab notebooks allow you to combine **executable code** and **rich text** in a single document, along with **images**, **HTML**, **LaTeX** and more. When you create your own Colab notebooks, they are stored in your Google Drive account. You can easily share your Colab notebooks with co-workers or friends, allowing them to comment on your notebooks or even edit them. To learn more, see [Overview of Colab](#). To create a new Colab notebook you can use the File menu above, or use the following link: [create a new Colab notebook](#).

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Technology:

Tools & Library	Usage
Keras	Keras is the high-level API of TensorFlow 2: an approachable, highly-productive interface for solving deep learning problems, with a focus on modern deep learning. It provides essential abstractions and building blocks for developing and shipping deep learning solutions with high iteration velocity.

Pafy	This is the documentation for pafy - a Python library to download YouTube content and retrieve metadata.
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Other Details:

Model: Sequential

Area: CNN

Dataset Name: UCF50

Dataset link:

<https://drive.google.com/drive/folders/1EqIQCDStESkJ95U7wAzaemOuLiB1X7v?usp=sharing>

Github Project link:

https://github.com/VasoyaViral321/Human-Activity-Recognition/blob/master/Human_Action_Recognition.ipynb

Github Project report link:

https://github.com/VasoyaViral321/Human-Activity-Recognition/blob/master/Human_Action_Recognition.pdf