

Parkinsons Diseases Detection Using Machine Learning

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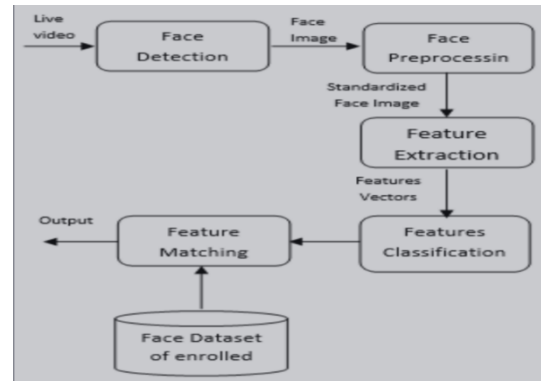
I. INTRODUCTION

1. The population overall is currently aging. While an aging population represents the triumph of medical and social advances over disease, it also presents daunting challenges.
2. Research in biometrics has grown significantly in recent years with an increasing number of applications. One of the most important application is healthcare.
3. Parkinson's is a chronic and progressive disease. More than million people worldwide are living with this disorder. It is also called the 'Movement Disorder'.
4. Parkinson's is caused due to malfunctioning of some vital neurons located in the region called the substantia nigra of the midbrain.

Parkinson's Disease-Current Scenario

1. Patients with serious illness may be plagued by balance disorders, frozen gait, falls, and speech disorders, resulting in an inability to take care of themselves and a decrease in quality of life.
2. Medical decision support tools are very interesting for increasing objectivity and for helping in an early diagnosis.
3. An important research goal for neurodegenerative diseases is to identify accurate biomarkers.
4. It has been brought to light that Parkinson's can be detected by observing the changes in the retina which occur before the changes in brain occur. Another testing method is through medication.

Face recognition



The pipeline of the face recognition is as follows:

1. First, look as a picture and find all the faces in it.
2. Second, focus on each face and be able to understand that even if a face is turned in a weird direction or in bad lighting, it is still the same person.
3. Third, be able to pick out unique features of the face that you can use to tell it apart from other people-like how big the eyes are, how long the face is, etc.
4. Finally, compare the unique features of that face to all the people you already know to determine the person's name.

So, to encode faces in images we first need to detect them either by HOG or CNN, between these two, HOG is faster than CNN but less accurate than CNN.

Openface's project structure

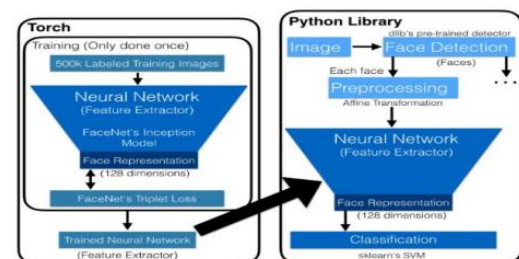


Figure 4: OpenFace's project structure.

About LFW:

Labeled faces in the wild , a database of face photographs designed for studying the problem of unconstrained face recognition.

The data set contains more than 13,000 images of faces collected from the web. Each face has been labeled with the name of the person pictured.

In 1680 , the people pictured have two or more distinct photos in the dataset.

For making our own face recognition system for the employees of our company, we collected 5 to 6 images of everyone in different poses.

After testing when we trained by 4 encodings or more i.e., 4 images of an employee and tested on other images, it gave 100% correct results (tested on 132 employees).

Software architecture

The project also works with video or live stream and implement object tracking to get better results and to reduce the computation cost when dealing with high frame rate.

A program doesn't run any faster when it is read from a .pyc file than when it is read from a .py file; the only thing that's faster about .pyc files is the speed with which they are loaded.

- The module compileall can create .pyc files for all modules in a directory.

The namespace containing the built-in names is created when the Python interpreter starts up, and is never deleted.

Parkinson's Disease Using Python 3.7:

1. Compared with other programming languages, Python's class mechanism adds classes with a minimum of new syntax and semantics.
2. Creating a new class creates a new type of object, allowing new instances of that type to be made.
3. Python classes provide all the standard features of Object Oriented Programming, the class inheritance mechanism allows multiple base classes, a derived class can override any methods of its base class or classes, and a method can call the method of a base class with the same name.
4. Python does not check the cache in two circumstances.

First, it always recompiles and does not store the result for the module that's loaded directly from the command line.

Second, it does not check the cache if there is no source module.

GEANY IDE

Geany is a small and lightweight Integrated Development Environment. It was developed to provide a small and fast IDE, which has only a few dependencies from other packages.

Geany detects an already running instance of itself and opens files from the command-line in the already running instance.

By default the Compile and Build commands invoke the compiler and linker with only the basic arguments needed by all programs.

So, Geany can be used to view and edit files by opening them from other programs such as a file manager.
Face Description With Local Binary Patterns

Application to face recording

1. This paper presents a novel and efficient facial image representation based on local binary pattern (LBP) texture features.
2. The face image is divided into several regions from which the LBP feature distributions are extracted and concatenated into an enhanced feature vector to be used as a face descriptor.
3. The performance of the proposed method is assessed in the face recognition problem under different challenges.

Other applications and several extensions are also discussed.

Comparative Study Of Texture Measures With Classification Based On Feature Distributions:

1. This paper evaluates the performance both of some texture measures which have been successfully used in various applications and of some new promising approaches proposed recently.
2. For classification a method based on Kullback discrimination of sample and prototype distributions is used.
3. The classification results for single features with one-dimensional feature value distributions and for pairs of

complementary features with two-dimensional distributions are presented.

1. The proposed approach is very robust in terms of gray-scale variations since the operator is, by definition, invariant against any monotonic transformation of the gray scale.
2. Another advantage is computational simplicity as the operator can be realized with a few operations in a small neighborhood and a lookup table.
3. Excellent experimental results obtained in true problems of rotation invariance, where the classifier is trained at one particular rotation angle.
4. And tested with samples from other rotation angles, demonstrate that good discrimination can be achieved with the occurrence statistics of simple rotation invariant local binary patterns.

II. CONCLUSION

1. Alteration in the kinematics of drawing is one of the initial signs of PD and evaluating drawing movements is easy to perform because it does not require any invasive procedures.
2. The main contribution has been the proposal of the spectrum as inputs to a CNN for PD detection from spiral drawing movements.
3. The CNN includes convolution layers (features learning) and fully connected layers (for PD detection).
4. Also, readings obtained from all the three axes for both the hands are almost same, thus for implementation of such system any one axis can be considered.
5. Sufficient data needs to be collected for confirmed diagnosis of Parkinson's disease based on tremor analysis.