

## DETECTING THE HUMAN'S EMOTIONS BY ANALYZING THEIR FACIAL EXPRESSIONS

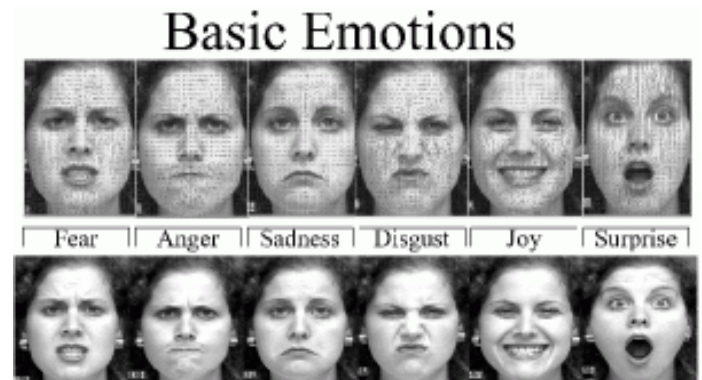
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### ABSTRACT

Human emotions are supposed to be expressed through behaviors, actions, stances, expressions on the face, and voice. In-depth analysis has been used to investigate the connections between these channels and emotions. This project suggests a working prototype of a system that can recognize an ace's emotion automatically. As a result, the classification of the six universal emotions—happiness, sadness, anger, disgust, surprise, and concern—is done using a neural network-based resolution along with an image processing technique.

The modules for recognizing emotions are keras, TensorFlow, tflearn, and OpenCV.

**KEY WORDS:** Emotions, Neural Networks, Keras, TensorFlow, TFLearn, OpenCV, NumPy, Expressions, Facial Expressions.



### 1 INTRODUCTION

Over 90% of human communication, according to research, can be nonverbal, but established codes have always had trouble deciphering our intonations and intents. However, emotion recognition, sometimes referred to as emotional More types of developers are being able to access computing.

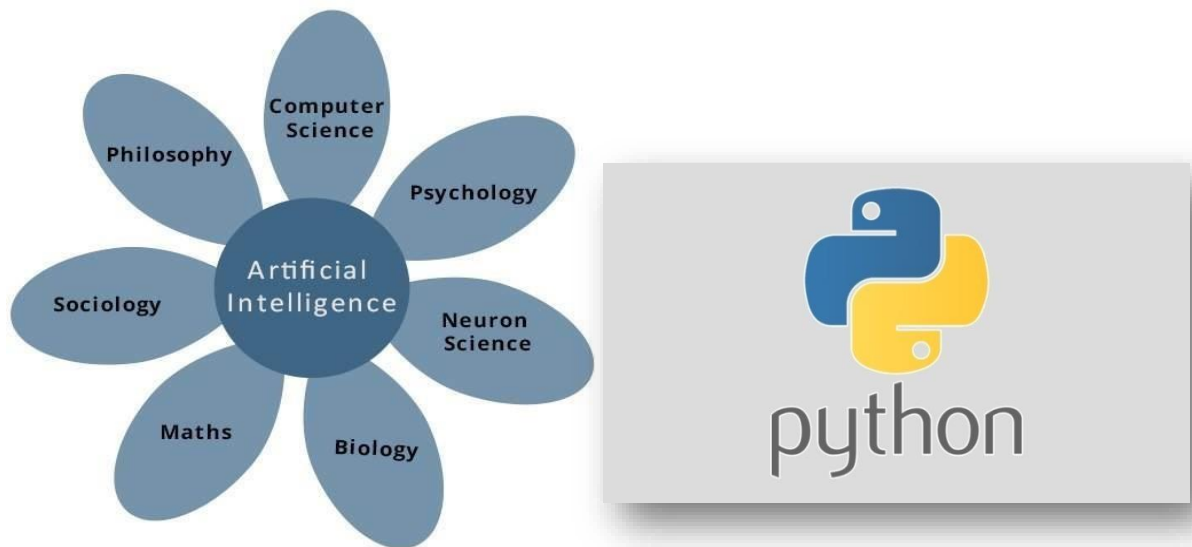
There are significant ramifications for society and business from understanding contextual emotion. [Fig 1] Governmental bodies could benefit from being able to recognize feelings like guilt, anxiety, and doubt in the public domain. It's not difficult to picture the TSA doing automatic passenger screenings for indications of terrorism and so making the world a safer place. Fig: 1 Businesses have also started using emotion recognition to influence business outcomes. Apple even introduced a new function on

#### 1.1 ARTIFICIAL INTELLIGENCE

Artificial intelligence is a science and technology supported disciplines like technology, Biology, Psychology, Linguistics, arithmetic, and Engineering. A major thrust of AI is within the development of pc functions related to human intelligence [Fig 2] like reasoning, learning, and drawback finding

Fig : 2

1.1.2 PYTHON: Fig:3



.1.1 DEEP LEARNING

ep learning is a set of AI and machine learning that uses multi-layered artificial neural networks to deliver progressive accuracy in tasks like object detection, speech recognition, language translation and others.

Deep learning differs from traditional machine learning techniques in that they can automatically learn representations from data such as images, video or text, without introducing hand-coded rules or human domain knowledge[Fig 3].

Their extremely versatile architectures can learn directly from knowledge{data|information} and may increase their prophetic accuracy once supplied with a lot of data.

Deep learning is accountable for several of the recent breakthroughs in AI like Google DeepMind's AlphaGo, self-driving cars, intelligent voice assistants and plenty of a lot of.

We are using python because it has a few deep learning libraries we need Python options a dynamic kind system and automatic memory management.

It supports multiple programming paradigms, together with object-oriented, imperative, purposeful and procedural.

It also has a comprehensive standard library[Fig 4]. It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting

Fig : 4

We are using few libraries:

Keras, OpenCV, TFLearn, TensorFlow, NumPy.ERAS:

Keras is a high-level neural networks API, written in Python and capable of running on high of TensorFlow, CNTK, or Theano.

It was developed

with attention on enabling quick experimentation. Being able to travel from plan to result with the smallest amount attainable delay is essential to doing sensible analysis OpenCV (Open supply pc Vision) may be a library of

### 1.1.2.2 OpenCV:

Keras is a deep learning library that:

- Allows for easy and fast prototyping (through user friendliness, modularity, and extensibility).
- Supports both convolutional networks and recurrent networks, as well as combinations of the two.

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NumPy is a library for the Python programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays[Fig 7].□

NumPy is that the basic package for scientific computing with Python.

It contains among other things:

- a powerful N-dimensional array object
- sophisticated (broadcasting) functions
- tools for integrating C/C++ and Fortran code
- useful linear algebra, Fourier transform, and random number capabilities

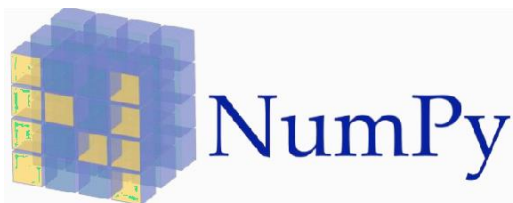


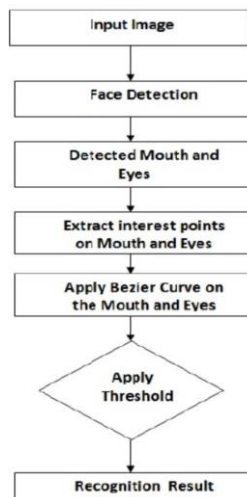
Fig : 7

## 1.2 THE TRAINING AND LABELING PROBLEM

As with any Machine Learning downside, your results square measure solely nearly as good as your information – garbage in means that garbage out. Affective computing has a data problem, but it runs deeper than just lacking labeled training data – it's that we're not quite sure how to label it in the first place.

Creating AN algorithmic program means that we'd like to grasp our inputs and outputs – thus what specifically square measure the human emotions?

There square measure 2 core approaches that inform however solutions may be designed.



**Fig : 8**

- **Categorical** – argues that emotions fall into set classes. The pioneer of this approach was a Swedish expert named Carl-Herman Hjortsjö, and therefore the plan is simple: there area unit a finite set of human emotions.

A group of scientists led by Paul Ekman later developed the system, called FACS (Facial Action Coding System), and have continually been updating it since then.

The emotions area unit happiness, sadness, surprise, fear, anger, disgust, and contempt.

- **Dimensional** – assumes that emotions exist on a spectrum, and can't be defined concretely. The Circumplex model of affect defines two dimensions, pleasure and arousal, while the PAD emotional state model uses three.

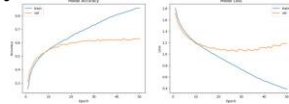
Which model of human emotions we have a tendency to settle for and work with has necessary consequences for modeling them with Machine Learning.

A categorical model of human feeling would seemingly cause making a classifier, where text or an image would be labeled as happy, sad, angry, or something else.

But a dimensional model of emotions is slightly additional

complex, and our output would need to be on a sliding scale (perhaps a regression problem).3.

## CONCLUSION



We are implementing this Emotion Recognition to understand human emotions in a better way. This can help

to analyze the customer's emotions and thereby accordingly alter the marketing approach. It can also be helpful in detecting suspicious people in a crowd. The objective of this research paper is to give brief introduction towards techniques, applications and challenges of automated emotion recognition system.

## REFERENCES

### Existing model :Fig : 9

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There is no existing model for Emotion Recognition. But there is only face recognition. Facial Recognition system is a technology capable of identifying or verifying a person from a digital image or a video frame from a video source.

## PROPOSED MODEL:

Now the proposed model is Emotion Recognition. This analysis the facial expressions of a human and detects emotions like happiness, sadness, anger, disgust, surprise and fear.



Fig : 10

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