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Food Taste Analysis Based on Facial Expression Detection

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Abstract

Taste tasting is a critical metrics for a variety of purposes, including predicting long-term market acceptance of a variety of food and beverage products. The main purpose is to use speech, power such as speed and speed of speech to express the secret patterns of tasteful responses. To that end, we've compiled a huge database of tasting food. The database contains a collection of video samples of flavoured discourses collected from various topics. This extensive test on websites including OpenCV image processing, deep learning algorithm-CNN editing and GUI Tkinter, this helps to separate between different levels of taste preferences. This project aims to independently estimate your preferred taste using idiomatic illustrations, based on visual, informal, and varied sources.

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Keywords: *Taste detection, CNN*

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1. Introduction

Nutrition is one in every of the fundamental supplies of life. Currently, dietary consistency (for example, low in sugar) is vital in preventing obesity and promoting health. The test is to calculate the

gratitude of food in an analytical, random, and fast thanks to achieve a range of food songs (e.g. low, sugar, and salty) with a taste for equal taste. Often, a person's face is often used as a reference because it provides rich and random details by definition, determining whether anyone enjoys a specific taste. Previous research has found that after you eat and drink, somebody's face reflects different levels of taste, including acceptance or rejection. During this project, an outsized tasting database containing random expressions has been collected to verify and compare the proposed system. A web site like this is often an enormous step in automatically understanding the actions that happen within the planet. This important experimentations on this database that has use of technologies like OpenCV for image pre-processing, Deep learning algorithm-CNN for classification and Tinter for providing a graphical computer programme, helps in distinctive between various stages of various topics. This project aims to spontaneously identify taste-induced facials terms for taste love but the inner emotional states aren't specifically reflected in facial expressions, but relatively during natural motors reply to taste hence nearby the looks of taste-induced facials terminologies, subtle vibrant evidence hidden in such expressions is vital. Considering of these underlying factors we use emerging technologies like Deep Learning to analyse taste liking of food.

This paper follows this format. It starts with Introduction as part 1, Literature survey as part 2, System overview as part 3, Methodology as part 4, working as part 5. Results as part 6, The Conclusion and future enhancements, Acknowledgement and References are in part 7, 8 and 9.

Literature Survey

We have reviewed several papers and found that the different techniques available for identification of customer's facial expression till date have many highlights and limitations.

[1] Hamdi D, Theo Gevers "Automatic Estimation of Taste Liking through Facial Expression Dynamics ", Google Scholar, 2020. This paper was published in 2020 by Hamdi Dibeklioglu and Theo Gevers. [1] This paper suggested the first method for analyzing the taste preferences of video samples. Instead of using outdated features, the proposed method uses in depth regional reading capabilities for each framework and processes them in the Fisher carrier in each region to specify details about the video. Disadvantages: The accuracy rate is only 70.37%.

[2] Junya Ueda "Face morphing using average face for subtle expression recognition", IEEE conference,2019.

This paper was published in 2019 by Junya Ueda. He proposed a process for further facial expression to sharpen the ability to distinguish on the basis of machine learning algorithms. By using a control test face, it removes the distinction of a person-centered face and amplifies the speech signal. Also, he created a hidden display image database using control and face-to-face formations for use in both his algorithm and its validation. Disadvantages: The level of accuracy is low.

[3] Maliha Khane et "Face Detection and Recognition Using OpenCv.", IEEE conference,2019.

"This paper was published in 2019 by Maliha Khane et. Al. He proposed a face recognition and recognition software program using OpenCv. A wide range of 1-D pixels made with a 2-D facial image on the main objects of space work is designed for PCA recognition.The right space is determined by identifying covariance matrix vectors, focusing on the collection of fingerprints Disadvantages: Hard, each easy to solve. Disadvantages: The level of accuracy is low.

[4] Mangala and Prajwala "Facial Expression Recognition by Calculating Euclidian Distance for Eigen Faces Using PCA", IEEE conference, 2018.

This paper was published in 2018 by Marala B.S Divya and N.B. Prajwala. They raised the face view paper by manipulative the Euclidian distance of Eigen Faces by means of PCA. In this paper the proposed process is to identify soul expressions through Eigen Faces. In recognition of the expression of the person, in this way they look at the following steps: face recognition, feature removal and face editing. The planned system relies on the Euclidian distance of Eigen Faces. In this means will consider all seven basic emotions that are separated such as happiness, anger, sadness, fear, and disgust, surprise, and neutrality. Here about 50 facial pictures are used and accomplished by Eigen Faces. Disadvantages: The level of accuracy is low.

[5] Chayanut P and Suthep Madarasmi "A pose and expression face recognition method using transformation based on single face neutral reference", 2017.

This paper was published in 2017 by Chayanut Petpairote and Suthep Madarasmi. In this they see the image of the front face in shape and magnification is one of the most challenging research problems, often failing during comparisons with a neutral facial database. In this paper, we propose a face-to-face approach by converting a given face-to-face image into a single face-to-face reference to create a more realistic front-end image. Therefore, we transform the pose face into the front face and the index face into the open eyes and the closed lip face using a triangular rotation. Disadvantages: The level of accuracy is low.

System Overview

To develop this Project, we have made use of Open-cv and CNN algorithm.

The software and Hardware requirement.

Hardware:

- PROCESSOR – Intel i3 or above
- RAM – 4GB
- Web cam

Software:

- Python 3.6 or above.

2. Materials And Methods

To develop this Project, we have made use of OpenCv and CNN algorithm.

OpenCV: OpenCV can be a cutting-edge library where we will progress present computer viewing programs. Its emphases primarily on image handling, video detention and analysis including features

such as face discovery and entity detection. In this lecture, can clarify how you will be able to use OpenCV in your applications.

CNN: CNN can be a Deep Learning algorithm that can immerse image input, provide value (readable materials and selection) to various features / objects within the image and be able to differentiate between different.

MAJOR MODULES:

1. Formulating Dataset
2. Feature Extraction
3. Model Training
4. Model Testing

1 Formulating Dataset: Collection of Images/videos from camera. Read Image Using the role cv2.imread () to read the image. The image must be inside a occupied directory or the full image path must be inclined. The second argument would be a flag that describes how the image should be recite.

2 Feature Extraction: CNN is used for image acknowledgement and image organization. In CNN images organization it receipts an image to insert, procedure it and categorize it under certain categories. CNN is alternative style of neural grid that will routinely enable machines to picture items and perform tasks such as image detection, image acknowledgement and object discovery. The image moves periodically in a very sequentiall layer.
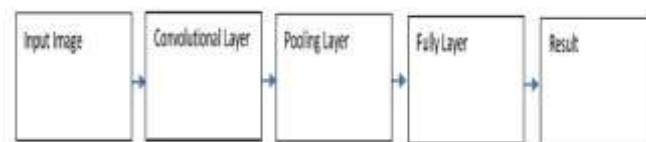
3 Model Training: the proposed model are going to be trained using two datasets namely COHN-KANADE, JAFFE and CNN algorithm. The COHN-KANADE datasets ccontains 500 picture sequences from 100 topics whereas the JAFFE datasets contain 213 images.

4 **Model Testing:** The designed model will be tested using real time images and videos.
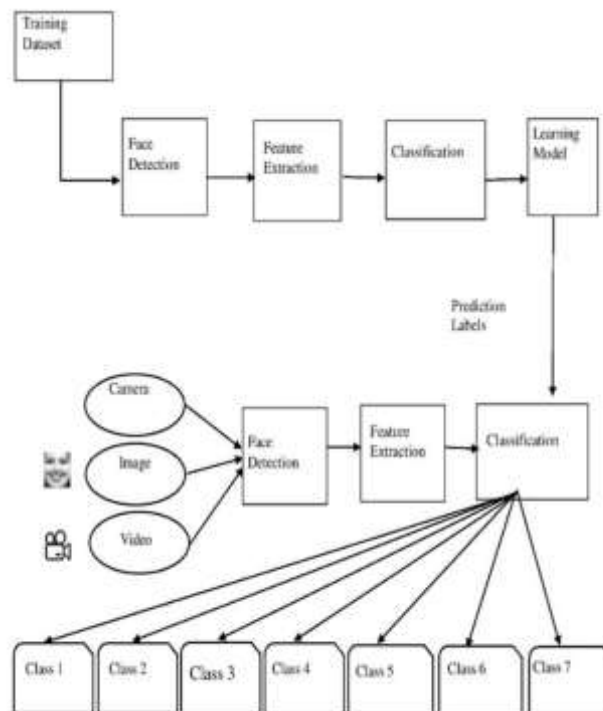
Fig.1 System Design.

Implementations

Let us look at the major steps associated with implementation.

1. Input Photo

Using a webcam, the image is captured ad shown in the image below

Fig2. Input Image

2. Contrast Widening of the Image:

The system works with image enlargement and adjusts min and max, then converts pixels from source to destination ((pixel-min) / (max-min)) * 255.

Fig3. Contrast Stretching

3. Skin Colour Conversion of the Image:

In the skin colour category, a person's skin colour is visible and converted into a black pixel and the remaining parts are converted into a white pixel.

Fig4. Skin Colour Conversion.

4. Detecting Connected Region:

Labelling associated parts is then integrated into a computer view and detects associated regions in ordinal pictures, although colour images and high-resolution data are also processed. When used in a photo or computer monitoring system.

Fig5. Detecting Connected region

5. To Detect Taste of The Person:

CNN algorithm classifies the images to its respected class after the images has gone through several layers of CNN
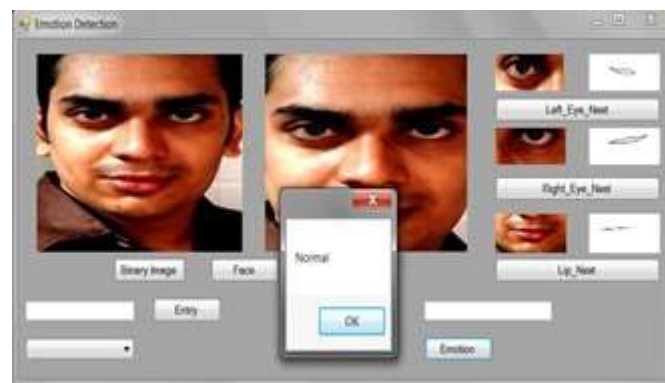
Fig6. Detect taste

3. Results and Discussion

Hence this proposed work gives an easy way of recognizing customer's satisfaction and taste of the food. It also provides safety and security. We have provided user-friendly interface to help the user to operate the system. This model decreases the user work by making it simple.

4. Conclusion

The proposed project gives an easy way to identify the taste of food and customer's satisfaction by extracting facial expressions using OpenCv and CNN algorithm. As per Users needs new module can be integrated without any modification to the existing system and in future we can improve the accuracy of detecting taste, the proposed work is only for web use we can implement the same idea for phones and tablets

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