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Real Time Face Mask and Temperature Detection with Alert System

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Abstract: Last years of COVID shows that mask-wearing is a important thing in stopping the COVID-19 spreading. By the time of this article, most states have recover from COVID pandemic but mask wearing is needed for personal safety of person. So, real-time face mask and temperature detection becomes an essential application to prevent the spread of the pandemic as well as other viral infection. This study will present a face mask and temperature detection system that can detect and monitor mask-wearing and temperature from camera and gives alert when the person is not wearing mask. Using SVM and CNN algorithm we can detect the person is wearing mask or not. Increasing number of cases all over the world, this system is replace humans to check masks on the faces of people is needed and also detection of temperature is needed. This system fulfil all those need. Our system can be used in public places like airport entry and railway station. This system is very useful in many companies where there are lot of peoples are worked .We have used basic concepts of convolutional neural network algorithm to state the mask wearing position .Results shows that our model performs well on the test data with 100 percent and 99 percent precision and recall, respectively. Our system will be python and machine learning based .Our system is very helpful there because it is worked on real time and gives output in seconds and will very easily find the people who are not wearing the mask or not and gives the temperature of person if he or she is wearing mask .If the person is not wore the mask the system gives alert message. This system saves the precious time of person because it is work on real time bases.

Keywords: Machine Learning, SVM Algorithm, CNN Algorithm ,python ,face mask detection, temperature detection ,alert system

INTRODUCTION

According to recent research on COVID-19, every 10% increase in mask-wearing means the spread of virus is decreased which results the stopping the breakout in a community and other public places. Wearing the face mask is important and essential. At the time of this article, most states in tall over the world have wear the mask before they are going to public places. The face mask detector is an algorithm that finds the mask-wearing status of a person. Using a face mask detector we can easily find out the person is wearing mask or not .If the person is wearing mask then it also detect the temperature of person. If the person is not wore the mask then our system gives alert .Benefit of our system is it does not require humans to detect the person is wearing mask or not. The applications of face mask detection makes it a popular research topic. A popular algorithm for face mask detection is the SVM and CNN. This algorithms are useful for detecting the face mask position .Another benefit of our system is it gives result in seconds.If the person is wearing the mask our system also detect the temperature of that person and if the person is not wore mask then our system gives alert .The CNN algorithm is used for image recognition. It has many features like it require less training parameters .The SVM algorithm is used for face detection .This is one of the most important application of machine learning Nowadays there is a great use of face masks publically due to the increase of the number of Covid19 cases as well as other viral infections which is reported in around the world. From a recent survey, we came to know that people don't wear a face mask to protect their health condition from air pollution but rather they use to hide their emotions from the general public who try to watch their current activities. But now a day it is becoming very mandatory for each and everyone to wear a facemask to protect from spreading the corona virus and other viral infections from one person to another.. This infection is increased day by day across 180 countries. This virus ond other viral infection is mainly spread through close contact of persons who are packed in certain public areas or inside a closed room through the air. Hence the usage of face masks is becoming more and more mandated to prevent the fast-spreading of this virus disease.

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LITERATURE SURVEY

A literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic.Literature reviews use secondary sources, and do not report new or original experimental work.
1.Paper name: “Satellite image classication with deep learning,”
Author: M. Pritt and G. Chern

Satellite imagery is important for many applications including disaster response, law enforcement, and environmental monitoring.These applications require the manual identification of objects andfacilities in the imagery. Because the geographic expanses to be covered are great and the analysts available to conduct the searches are few, automation is required. Yet traditional object detection and classification algorithms are too inaccurate and unreliable to solve the problem. Deep learning is a family of machine learning algorithms that have shown promise for the automation of such tasks.It has achieved success in image understanding by means of convolutional neural networks.

2.paper name: “Human object detection in forest with deep learning based on drone’s vision,”
Author: S.-P. Yong and Y.-C. Yeong

The current advances in drone technology provoked significant changes in enabling drones to perform a wide range of missions with increasing level of complexity. Missions such as search and rescue or forest surveillance require a large camera coverage and thus making drone a suitable tool to perform advanced tasks. Meanwhile, the increasing trend of deep learning applications in computer vision “Brain tumor detection and tissue classification using machine learning algorithm” provides a remarkable insight into the initiative of this project. This paper presents a technique which allows detecting the existence of human in forestry environment with human object detection algorithm using deep learning framework.

3.paper name: THERMAL FACE RECOGNITION USING MACHINE LEARNING

Author: Vivekanand Thakare*1, Yash Lande*2, Pallavi Moundekar

*3,Priya Chamat *4, Shrushti Sangode *5

Any normal face image is a dense pattern consisting of hair, forehead, eyebrow, eyes, nose, ears, cheeks, mouth, lips, teeth, skin, and chin. Human face has more additional features like expression, appearance, adornments, beard, moustache etc.. The face is the quality which best describes a person, and there are ”special” areas of the human brain, such as the identical face area , which when get harmed prevent the recognition of the faces of even close family associates. The categories of certain structures such as the eyes or parts thereof are utilized in biometric recognition to entirely identify people. Artificial neural network is very useful method for face recognition. The face recognition method absolutely separates the face for which the method is already accomplished

4.paper name: Face Mask Detector Using Machine Learning Applications

Author: Anchal Gupta1, Anjali Gupta2, Dr Sarika Saxena3, Dr.
Raji Kaliyaperumal4, Divya Upreti5, Dr. Abbas Kazim6
Facial recognition, as a biometric system, is a crucial tool for the identification procedures. When using facial recognition, an individual’s identity is identified using their unique facial features. Biometric authentication system helps in identifying individuals using their physiological and behavioral features. Physiological biometrics utilize human features such as faces, irises, and fingerprints. In contrast, behavioral biometric rely on features that humans do, such as voice and handwritings. Facial recognition has been widely used for security and other law enforcement purposes. However, since COVID-19 pandemic, many people around the world had to wear face masks.

5.paper name: Progressive Learning for Face Recognition with Mask Bias

Author: Baojin Huang, Zhongyuan Wang, Guangcheng Wang, Kui
D.G.I.E,F.O.E 7 Dept of Computer Engg 2019-20

“Brain tumor detection and tissue classification using machine learning algorithm” Jiang, Zhen Han, Tao Lu, Chao Liang

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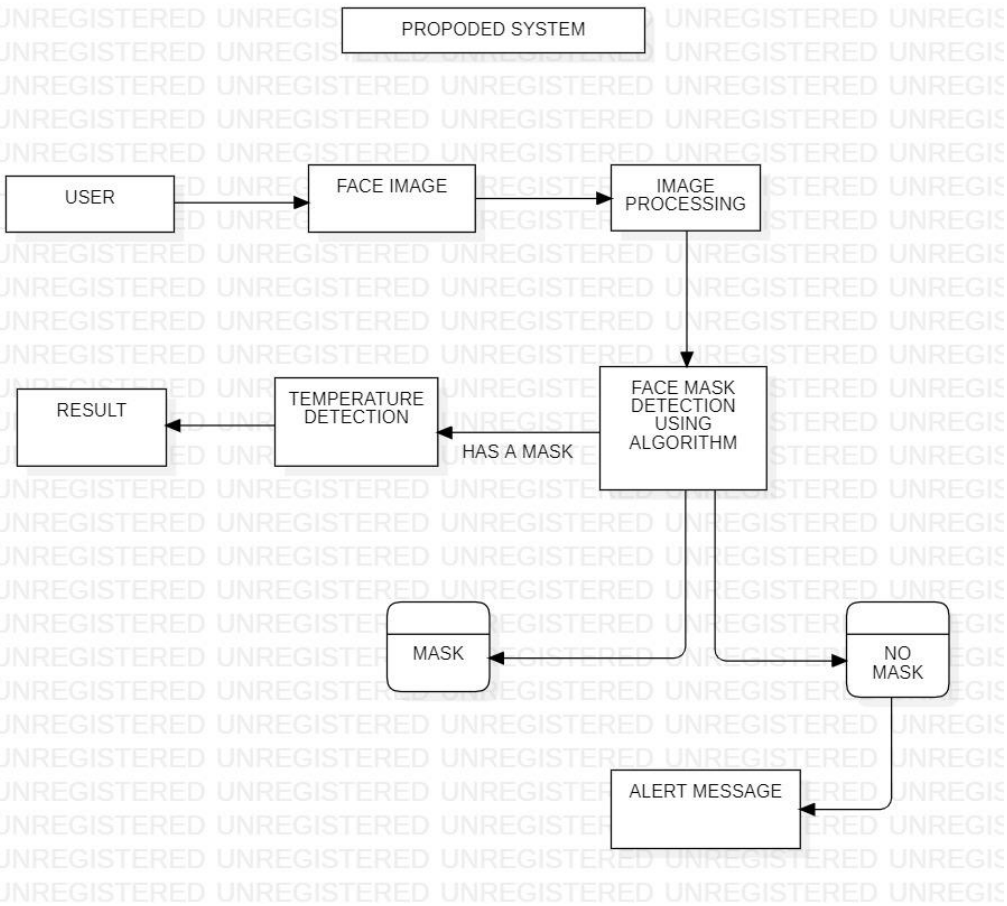
In recent years, Convolutional Neural Networks (CNNs) are widely used in the field of computer vision owing to their powerful feature representation capabilities. Great progress has been made in face recognition system. For face recognition based on deep learning, existing CNNs supervised by margin-based loss functions show the ability to fit large-scale face recognition datasets , but they have been almost carried out on fully exposed faces. This results in great difficulties for masked face recognition (MFR) since people usually wear masks to prevent infection during COVID-19. At present, current popular face recognition training sets, such as WebFace , MS1MV3 , etc., contain tens of millions of normal face images with millions of identities. Whereas, it is challenging to collect large-scale masked images with identity information.

PROPOSED SYSTEM



The face images taken as input and that images performs the preprocessing operation after the preprocessing segmentation using the CNN algorithm and on that segmented area we perform the operation feature extraction using algorithm SVM. Then on that extracted area we perform optimization using genetic algorithm and lastly classify the person is wore the mask or not and detect temperature and give alert message if person is not wore mask using the classification CNN and SVM algorithm.

ALGORITHM

SVM Algorithm:

In machine learning, support-vector machines (SVMs, also support-vector networks) are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. The Support Vector Machine (SVM) algorithm is a popular machine learning tool that offers solutions for both classification and regression problems. Developed at AT&T Bell Laboratories by Vapnik with colleagues (Boser et al., 1992, Guyon et al., 1993, Vapnik et al., 1997), it presents one of the most robust prediction methods, based on the statistical learning framework or VC theory proposed by Vapnik and Chervonekis (1974) and Vapnik (1982, 1995). Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns

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new examples to one category or the other, making it a non-probabilistic binary linear classifier (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting). An SVM model is a representation of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible. New examples are then mapped into that same space and predicted to belong to a category based on the side of the gap on which they fall. In addition to performing linear classification, SVMs can efficiently perform a non-linear classification using what is called the kernel trick, implicitly mapping their inputs into high-dimensional feature spaces. When data are unlabelled, supervised learning is not possible, and an unsupervised learning approach is required, which attempts to find natural clustering of the data to groups, and then map new data to
these formed groups. The support-vector clustering[2] algorithm, created by Hava Siegelmann and Vladimir Vapnik, applies the statistics of support vectors, developed in the support vector machines algorithm, to categorize unlabeled data, and is one of the most widely used clustering algorithms in industrial applications.

CNN Algorithm
Pseudo Code: D.G.I.E,F.O.E 29 Dept of Computer Engineering 2019-20 “Brain tumor detection and tissue classification using machine learning algorithm” (It will help if you think of items as points in an n-dimensional space). The algorithm will categorize the items into k groups of similarity. To calculate that similarity, we will use the Euclidean distance as measurement .The algorithm works as follows: Convolutional Neural Network, also known as CNN, is a well-known method in computer vision applications. It is a class of deep neural networks that are used to analyze visual imagery. This type of architecture is dominant to recognize objects from a picture or video. It is used in applications like image or video recognition, neural language processing, There are three components of a Convolution
1.Non Linearity
2.Pooling or Sub Sampling
3.Classification (Fully Connected Layer) Convolution

The purpose of the convolution is to extract the features of the object on the image locally. It means the network will learn specific patterns within the picture and will be able to recognize it everywhere in the picture. Convolution is an element-wise multiplication. The concept is easy to understand. The computer will scan a part of the image, usually with a dimension of 3×3 and multiplies it to a filter. The output of the element-wise multiplication is called a feature map. This step is repeated until all the image is scanned. Note that, after the convolution, the size of the image is reduced.

CONCLUSION

This paper exhibited a calculation to progressively order the tumor into three areas: entire tumor, center tumor and improving tumor. Intensity , intensity distinction, neighborhood data and wavelet highlights are removed and used on multimodality MRI filters with different classifiers. The utilization of SVM and CNN classifier has expanded the classification precision as clear by quantitative consequences of our proposed technique which are practically identical or higher than the cutting edge.

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