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Design and Implementation of Facial Emotion Recognition System using Image Processing

[1]Ms.S.Rajalakshmi, [2]S.Abirami, [3]M.Aneesh, [4]OM.Mohan Singh,

Assistant Professor,Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu.
Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu.
Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu.
Sri Ramakrishna Institute of Technology, Coimbatore, Tamil Nadu.

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ABSTRACT: Patient Emotions monitoring is a pivotal part of the healthcare system nowadays, either at hospitals or at home.Critical patients must be monitored continuously with minimal human intervention, 24 hours a day, to ensure that they receive medical help when they need it Smart healthcare framework is promising due to the increase in accuracy of the systems involved in the framework we propose a user satisfaction detection system using two multimedia contents, namely, speech and image. The three classes of satisfaction are happy, not happy, and indifferent. The user's speech and face picture are collected, transferred to the cloud, and then processed in the suggested system.The proper parties are then informed of the satisfaction decision. Smart Cradle System using Web applications which will help the Patient to monitor their emotions even if they are away from reactions & detect every activity of the Patient from any distant corner of the world. It's an ingenious, smart, and safe cradle system for efficiently nurturing a newborn.This system takes into account all of the minute details required for the patient's care and protection in the cradle. The usage of technologies/methodologies that involve face emotions is used in the design of smartness and innovation.Because people are unable to ask for help in an emergency while asleep or unconscious, the patient monitoring system is disabled.

KEYWORDS: Monitoring,Emotions,FaceImages,Patient

I. INTRODUCTION

Critical patients require to be monitored consistently, 24 hours a day to enable them to get medical assistance in the moment of need. However, the significant imbalance in staff to patient ratio has made it difficult for patients to attain a specialized and efficient medical attention constantlymost public hospitals in Malaysia treat patients on a first-come, first-served basis, with the highest-priority patients receiving treatment first. This pattern is also used in wards, where patients in the Intensive Care Unit (ICU) receive more attention than those in a regular ward.This causes the situation where patients in public hospitals only get proper attention if their condition is at the worst.

Face-to-face human observation and mining of the electronic health record (EHR) for documentation of mobility events are two well-known methods for monitoring patient mobility.These methods are time and labour intensive and almost impossible for the medical staff to give specific attention to a huge number of patients concurrently. To address this healthcare security issue, hospitals should adopt an effective and convenient patient monitoring system (PMS).

As a starting point, an integrated microcontroller consists of current devices such as Web applications and applications is implemented in a single.Linear regression is a sort of machine learning in which we use a set of variables to train a model to predict the behaviour of your data.

Let's imagine you're having a sales campaign and you expect a specific number of clients to grow. You can do one of two things:When you run it, you may look at previous promotions and plot them on the chart, then see whether there is an increase in the number.When you rate promotions, you try to figure it out or guess what will happen

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based on previous historical data.be what is the count or what is expected to be the count for my current promotion3 many numbers of stalls maybe you need or how many increase number of employees you need to serve the customer.

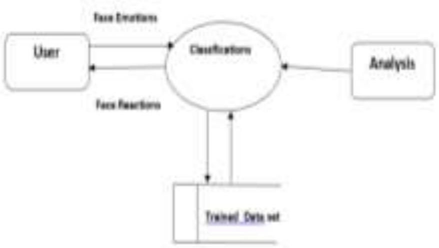
The objective here is to forecast future value based on historical data by learning history data's behaviour or patterns. In other circumstances, the value will be linearly upward, meaning that as X increases, Y increases as well, or vice versa, indicating that they have a correlation or a linear downward relationship. For example, if the police department is launching a campaign to minimise the number of robberies, the graph will slope linearly downward in this situation.

II. EXISTINGSYSTEM

In existing system, A patient monitoring system that manually detects a patient's emotional state through face recognition, heartbeat levels, and body temperature is designed and implemented. The emotion module predicts the patient's feeling in real time, while the vital module keeps track of the patient's vital indicators.The Doctor repressed model is able to accurately predict the patient's emotions from the facial expressions given and the vital data helps the medical staff in monitoring the patient's vitals continuously. The visualisation of this data allows for the detection of abnormal vital signs and can assist medical personnel in predicting if the patient is experiencing any trouble or discomfort and taking quick action.

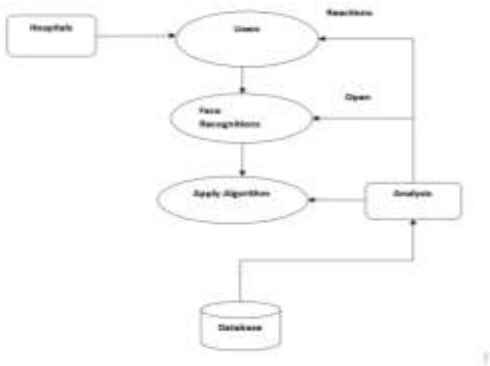
III. PROPOSEDSYSTEM

A system for detecting user satisfaction in a smart healthcare framework. Multimodal input inputs, such as speech and image signals, are processed in the proposed system.A microphone records the speech from the user while a video camera captures the facial expressions. Facial recognition is steadily gaining traction in healthcare, thanks in part to advancements in artificial intelligence, which have allowed the technology to be used in a variety of ways.



Data Flow Diagram – Level 0

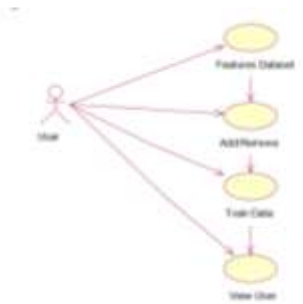
Face recognition systems powered by AI are already available on the market, allowing healthcare practitioners to consider employing the technology for a variety of objectives other than security. The following is a list of some of the technology's potential applications.



Data Flow Diagram – Level 3

IV. METHODOLOGY

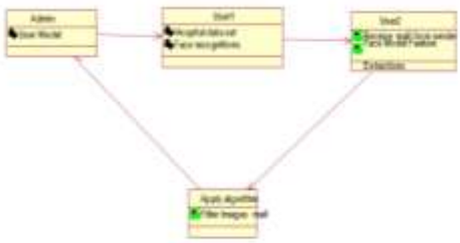
Any facial detection and recognition system or software relies on a face recognition algorithm as its foundation. These algorithms are divided into two categories by experts. The geometric method emphasises distinguishing characteristics. To extract values from an image, photometric statistical approaches are utilised. To remove discrepancies, these values are compared to templates. The algorithms can also be broken down into two types: feature-based and holistic models.



Use Case Diagram

The former examines the spatial characteristics of facial landmarks and their relationship to other features, whereas holistic techniques consider the human face as a whole unit. In image recognition, artificial neural networks are the most popular and successful method. Algorithms for facial recognition are dependent on mathematical computations, and neural networks conduct a huge number of these calculations.

Face detection in an image, video, or real-time stream; calculation of a mathematical model of a face; and comparison of models to training sets or databases to identify or verify a person are the three major tasks performed by the algorithms. The most well-known facial recognition algorithms and significant features are covered in this article. Researchers are continually experimenting with combining approaches and inventing new technologies because each method has its own task-specific advantages. Each image sequence is captioned and begins with a neutral face and ends with an image of the facial expression. As can be seen, the first photographs aren't very useful for the training process because they don't show any facial emotions. The first three photos of each series were deleted to reduce the impact of these photographs.Because not all sequences contain the same amount of photos or the same emotion display distribution for each image, these numbers were defined as an 11 heuristic.The size of the dataset altered as a result of the various decisions that were made.



Class Diagram

The process of data augmentation entails applying transformations to the corpus. Transformations were done to CK+ photos in this scenario. Modifying picture attributes aids in the network's learning of invariant characteristics. TF has a collection of functions that can be used to convert images: Adjusting the brightness and contrast while flipping the image from left to right. All of the settings were set up according to the TF tutorial's convolutional neural network configuration. Finally, the whitening procedure is applied to the image. The whitening procedure calculates the average pixel value before subtracting it from the image. As a result, the mean value of the pixel is centred at zero.

The code snippet below demonstrates how these operations are carried out in TF. The next step is to produce image batches to feed the network after the image processing is completed. Another important factor to consider is the batch size. Because stochastic gradient descent (SGD) with momentum is used to optimise the network, selecting the right batch size is crucial. The data set size and hardware availability are two factors to consider when determining batch size. It would be ideal to optimise towards the gradient by taking into consideration the entire data set in each step; however, this strategy would be computationally expensive and time consuming. The batch size is commonly stated in the literature to be a power of two.

V. RESULTSANDDISCUSSION

This work proposes a system to detect multiple medical responses that is used to reduce the reaction time to attend to a needed patient during emergencies. The medical responses used in these projects are based on body temperature sensors, heart rate sensors and computer vision which provides uniqueness to this project. These sensors provide physical flexibility to the patient as they are wearable sensors which would be strapped to a patient’s body to increase the quality of the patient monitoring system.

Surprised Face

Each of the sensors, hardware and software components used in this project aims to provide a wireless technology that could feed real-time patient monitoring medical parameters to the physician’s main counter or desktop to monitor the patient’s remotely.This does not only ease the monitoring process of a patient’s parameters, but it is also used to alert the physicians of any irregular readings of the medical parameters of the patient, as well as the patient's location. This is made possible by the advancement of wireless technology in today’s world. This project utilizes inbuilt wireless technologies that are found in microcontrollers and sends the data to an IoT platform for processing and

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data collection before it can be sent to the physician's remote desktop for digital monitoring.

Happy Face

This system comprises three main modules: Emotion Module, Vital Module and IoT Module. The integration of the modules can be seen from Figure 5. The emotion module is used to capture a stream of the patient's face images through a Raspberry Pi equipped with a Pi Camera. The images are to the Image Server through MQTT protocol. The images are captured and sent to the image server with an interval of 5 seconds. The images sent to the server are then processed by an emotion recognition AI model to identify the patient's emotional state from the images.

VI. CONCLUSION

Two types of results are taken to test the functionalities of the system. Each result tests the evaluation and execution of both vital and emotion modules. Emotion module presents the emotional data of the patient whereas the vital module presents the vital data (heart rate, temperature) of the patient. Both the data is sent periodically to the Things board server for data visualization. The data is read from the module attached to the patient's hand and sent to the Things board Server. These vital signs data are taken from resting phase. Resting phase describes the optimal condition of the patient when resting. From the results, the patient's heart rate and temperature reading are measured using this module a patient monitoring system that automatically detects patient's emotional state through face recognition algorithms, heartbeat levels and body temperature is presented. The emotion module is used to predict the emotion of the patient in real time whereas the vital module is used to monitor the vital sign of the patient.

VII. FUTURE SCOPE

To develop the data visualization of both these data enables the medical staff to take immediate action upon the patient in case of a difficulty or discomfort. Summarizing from the emotion data, it can be seen that the AI model is able to predict the patient's emotion from the facial expressions given. The prediction is also largely accurate. The vital data helps the medical staff in monitoring the patient's vitals continuously.

REFERENCES

[1] S. Yeung et al., "A computer vision system for deep learning-based detection of patient mobilization activities in the ICU," Npj Digit. Med., vol. 2, no. 1, p. 11, Dec. 2019, doi: 10.1038/s41746-019-0087- z.

[2] B. C. Ervural and B. Ervural, "Overview of Cyber Security in the Industry 4.0 Era," in Industry 4.0: Managing The Digital Transformation, Cham: Springer International Publishing, 2018, pp. 267–284.

[3] M. Ali, A. A. Ali, A.-E. Taha, I. B. Dhaou, and T. N. Gia, "Intelligent Autonomous Elderly Patient Home Monitoring System," in ICC 2019 - 2019 IEEE International Conference on Communications (ICC), Shanghai, China, 2019, pp. 1–6, doi: 10.1109/ICC.2019.8761204.

[4] Nayyar, V. Puri, and N. G. Nguyen, "BioSenHealth 1.0: A Novel Internet of Medical Things (IoMT)-Based Patient Health Monitoring System," in International Conference on Innovative Computing and Communications, vol. 55, S. Bhattacharyya, A. E. Hassanien, D. Gupta, A. Khanna, and I. Pan, Eds. Singapore: Springer Singapore, 2019, pp. 155–164.

[5] M. S. Uddin, J. B. Alam, and S. Banu, "Real time patient monitoring system based on Internet of Things," in 2017 4th International Conference on Advances in Electrical Engineering (ICAEE), Dhaka, 2017, pp. 516–521, doi: 10.1109/ICAEE.2017.8255410.

[6] G. Guo and N. Zhang, "A survey on deep learning based face recognition," Comput. Vis. Image Underst., vol. 189, p. 102805, Dec. 2019, doi: 10.1016/j.cviu.2019.102805.