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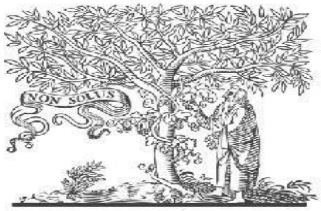

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Dial Intense Acknowledgement

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Abstract:
Artificial intelligence's quick development has made significant contributions to the field of technology. Machine learning and deep learning algorithms have had considerable success in various applications because older algorithms were unable to match human needs in real time.
Systems for classification, recommendation, pattern recognition, etc. The influence of emotion on a person's thoughts, actions, and feelings is crucial. By exploiting the advantages of deep learning, an emotion detection system can be created, and many applications, including feedback analysis and face unlocking, may be executed with high accuracy. The primary goal of this research is to develop a Deep Convolutional Neural Network (DCNN) model that can categorise five distinct face expressions of human emotion. Using, the model is trained, examined and verified.

Introduction:
The creation and application of computer networks, software, and systems are expanding rapidly. These systems play a significant part in daily living and greatly simplify the lives of people. Given that it can record human behaviour, sentiments, intentions, etc., facial expression detection systems are becoming increasingly important. While deep learning-based face expression recognition systems have shown to be superior, conventional methods are slower and less accurate. This system seeks to create a deep Convolutional neural network model that can identify five distinct facial expressions of human emotion. This model can be applied to applications like face unlocking and customer feedback analysis.

In the modern era, facial expression detection systems are very important since they can record human behaviour, sentiments, intentions, etc.

the traditional approaches have restricted speed and have low accuracy while facial expression recognition system employing deep learning has demonstrated to be the better one. This system aims to create a deep convolutional neural network model that can identify five distinct facial expressions of human emotion. This model can be applied to applications like face unlocking and customer feedback analysis.

Feedback analysis: Finding out what customers want and are frustrated about helps firms increase customer happiness and lower churn. As it's frequently done automatically, businesses are able to quickly and accurately sort vast amounts of data from numerous channels.

Face unlocking: face unlocking, it makes use of a face recognition algorithm. It looks for several facial traits like the space between the eyes, the colour of the retina, the size of the iris, the shape of the face, the density of the facial hair, etc., and converts each one into a bitmap specification. When you try to unlock a locked phone with your face, this algorithm compares the saved bitmap specification with the one created at runtime and decides whether to grant access or not.

2. Literature Survey
G. Cao et al [1] used a Convolutional Neural Network model to recognize In human emotion from the ECG dataset, which can in turn be used to classify

brain. signals as well. The system gives an accuray around 83% on testing. G. Yang al[2] proposed a DNN model which uses vectorized facial features as input. The model can predict different emotions with an accuracy of 84.37%. Liu et al [3] uses the fer2013 dataset and two layer CNN to classify different facial emotions They have also compared it with 4 different existing models and the proposed model yields a test accuracy of 29.8% 5 Suresh er af [4] proposed a sign language recognitions system that classifies i different sign languages using a Deep Neural Network (DNN) Two made with different optimizers (Adam and SGD) and compared and the model with Adam optimizer is found to have more accuracy. K Houw of [5] ha denestrated an analytics workflow that integrates the tools and techniques of image recognition. The purposed model classifies different handwriting with CNN architecture. FZhou et al [6] used a deep convolutional neural network model to detect ship in motion for PalSAR images. The model uses fter region based CNN (Faster-RCNN) method to recognize ships with differ sizes. The model is validated using NASA/JPL AIRSAR datasets.

Proposed System

In the field of computer science, machine learning is one of the emerging technologies that is considered to have an impact of 90% in the next 4 years. Deep learning, a subset of machine learning uses artificial neural network, which is an algorithm inspired from the human brain. Convolutional Neural Network (CNN) is a class of deep neural network that uses convolution as the mathematical operation. As the dataset consists of images, the system uses a 2D CNN for the recognition task. The proposed deep convolutional neural network is trained not only to classify 5 different human facial emotions, but also to yield a good accuracy. The model is trained using the dataset which is collected manually using a mobile phone camera.

Existing System:

Deep Learning (DL) approaches have been providing state-of-the-art performance in different modalities in the field of medical imagining including Digital Pathology Image Analysis (DPIA). Out of many different DL approaches, Deep Convolutional Neural Network (DCNN) technique provides superior performance for classification, segmentation, and detection tasks. Most of the task in DPIA problems are somehow possible to solve with classification, segmentation, and detection approaches. In addition, sometimes pre and post-processing methods are applied for solving some specific type of problems. Recently, different DCNN models including Inception residual recurrent CNN (IRRCNN), Densely Connected Recurrent Convolution Network (DCRCN), Recurrent Residual U-Net (R2U-Net), and R2U-Net based regression model (UD-Net) have proposed and provide state-of-the-art performance for different computer vision and medical image analysis tasks. However, these advanced DCNN models have not been explored for solving different problems related to DPIA. In this study, we have applied these DCNN techniques for solving different DPIA problems and evaluated on different publicly available benchmark datasets for seven different tasks in digital pathology including lymphoma classification, Invasive Ductal Carcinoma (IDC) detection, nuclei segmentation, epithelium segmentation, tubule segmentation, lymphocyte detection, and mitosis detection.

Proposed System

In the field of computer science, machine learning is one of the emerging technologies that is considered to have an impact of 90% in the next 4 years. Deep learning, a subset of machine learning uses artificial neural network, which is an algorithm inspired from the human brain. Convolutional Neural Network (CNN) is a class of deep neural network that uses convolution as the mathematical operation. As the dataset consists of images, the system uses a 2D CNN for the recognition task. The proposed deep convolutional neural network is trained not only to classify 5 different human facial emotions, but also to yield a good accuracy. The model is trained using the

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dataset which is collected manually using a mobile phone camera.

3.Methodolgy

A. Convolutional Neural Network

Neural network is a set of algorithms that mimic the human brain and it finds a relationship between the data to get solutions using these algorithms. CNN is a type of Neural Network where the mathematical operation used to find the relationship between the data is Convolution [7]-[9]. Traditional neural network fails when coming to complex problems such as image classification, video classification, pattern recognition, etc. but CNN has achieved great success in these applications, yielding good accuracy. CNN consists of mainly 4 Layers, viz. convolutional, pooling, dropout and fully connected layers. These layers together extract the features from the inpuzt data. The algorithm learns from the feature, where the features of interest are represented by each convolution filter.

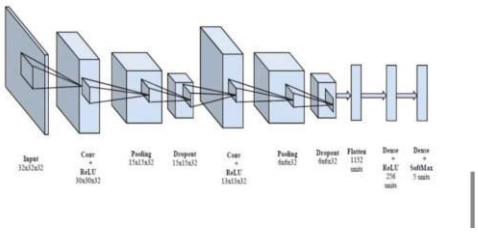

Figure 1. Architecture of the proposed facial emotion recognition model using DCNN The convolutional layer consists of small patches, which transforms the entire image based on the filter values. Equation (1) is the formula to create feature maps, i.e. the output from the convolutional layer

$$G[m,n] = (f * h)[m,n] = \sum_j \sum_k h[j,k] f[m-j, n-k] \quad (1)$$

where f is the input image, h is the filter, (m,n) is the size of the resulting matrix generated. The output from the convolution layer is passed on to a pooling layer where its size gets reduced without any loss of information. These 2-dimensional arrays are converted to a single dimensional vector using the flatten layer so that it can be fed to the neural network for classification. The neural network uses the back-propagation algorithm where the errors are back propagated to adjust the weights, thereby reducing the error (loss) function. The weight updation is done using (2).

$$W_i = W_i + \Delta W_i \quad (2)$$

where Wi is the weight and Wi is given by the delta rule as in (3)

$$\Delta W_i = \mathrm{n} \frac{dE}{dW_i} x_i \quad (3)$$

where n is the learning rate, E is the error function and xi is the input.

B. Proposed CNN Model

The architecture for the proposed facial emotion recognition model is depicted in Figure 1. The model uses two convolution layers with dropouts after each convolution layer. The input image is resized to 32 x 32 and is given to the first convolution layer. The output from the convolution layer, called feature map, is passed through an activation function. The activation function used here is ReLU (Rectified Linear Unit) that makes the negative values zero while the positive values remain the same

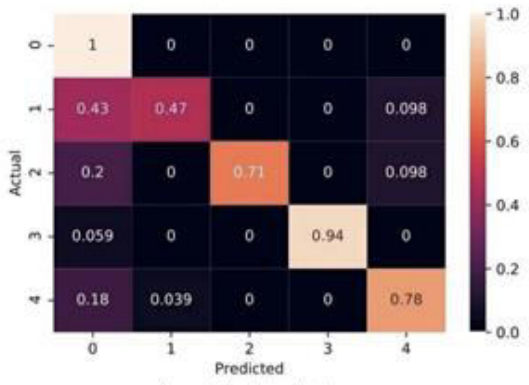

Figure 3. Confusion Matrix

User Interface

1.The interface can be viewed as Facial emotion recognition user interface is an essential aspect of any system designed to detect and recognize emotions in human faces. The user interface should be intuitive and user-friendly to ensure that the user can easily interact with the system. The design of the interface

should be unique and not plagiarized from other sources.

The interface should incorporate responsive design to ensure that it adjusts to the size of the screen it is being viewed on. Visual cues such as animations and progress bars can be used to provide feedback to the user on how the system is analyzing their facial expressions. The interface should provide clear and concise results of the facial emotion recognition analysis, including feedback on the accuracy of the analysis.
Overall, the facial emotion recognition user interface should be designed with the user's experience in mind, providing clear and concise feedback on the results of the analysis. By following these guidelines, the user interface can help to ensure the effective and accurate analysis of emotions in human faces.

4.Conclusion

Facial emotion recognition is an exciting technology that has numerous applications in fields such as psychology, marketing, and human-computer interaction. The success of facial emotion recognition systems relies on the design of an effective user interface that allows users to interact with the technology and obtain accurate results.
When designing a facial emotion recognition user interface, it is essential to focus on the user experience, incorporating responsive design and appropriate visual cues to provide an intuitive and user-friendly interface. Providing clear and concise results and feedback on the accuracy of the analysis can help to build trust with users and ensure that the technology is effective.
The design of the user interface should be unique and stand out from existing interfaces. By following these guidelines, developers can create a facial emotion recognition user interface that is effective, accurate, and user-friendly. Ultimately, the success of facial emotion recognition technology relies on the design of a robust user interface that enables users to effectively interact with the technology and obtain accurate results.

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