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A Smart Machine Learning Model for Detection of Brain Hemorrhage Using IoT

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Abstract: ***For the most part, the development of Web of Things empowered applications propelled the world during the most recent couple of years, giving cutting edge and novel-based answers for various issues. This developmental field is fundamentally lead by remote sensor organization, radio recurrence ID, and brilliant versatile advances. The Internet of Things, or IoT, plays a crucial role in smart medical devices and wearables that can collect a wide range of longitudinal patient-generated health data while also providing options for preliminary diagnosis. As far as endeavors made for aiding the patients utilizing IoT-based arrangements, specialists exploit capacities of the AI calculations to give proficient arrangements in drain conclusion. To decrease the demise rates and propose precise treatment, this paper presents a savvy IoT-based application utilizing AI calculations for the human cerebrum drain finding. In view of the modernized tomography check pictures for intracranial dataset, the help vector machine and feedforward brain network have been applied for the grouping purposes. Generally, characterization consequences of 80.67% and 86.7% are determined for the help vector machine and feedforward brain organization, separately. It is finished up from the resultant examination that the feedforward brain network beats in ordering intracranial pictures. The classification tool's output provides information about the kind of brain hemorrhage that, in the end, helps validate the expert's diagnosis. It is used as a learning tool for trainee radiologists to reduce system errors.***
Keywords: A smart machine learning model for detection of brain hemorrhage using iot

I. INTRODUCTION

Universally, the vast majority of the nations are confronting an emotional expansion in the quantity of clinical patients. This skyscraper in number limits the patients in getting to the guardians or essential specialists for quality treatment. In this cutting edge mechanical age, working on the effectiveness of biomedical and medical services frameworks is the most difficult errand. As featured by Redondi et al. [1], as a matter of fact, the ongoing accessible methods for patient consideration, oversight, checking, and the executives are executed by nursing staff physically. Certainly, the most pressing issues are addressing the nursing staffing shortage and providing patients with high-quality care at a reasonable cost in a short amount of time. Through the use of remote patient monitoring, the development of Internet of Things (IoT) devices and wearable devices has improved treatment quality over the past few years.

These days, IoT gadgets assume a fundamental part in medical care applications particularly in recognizing and diagnosing a few sorts of illnesses in brilliant urban communities, route framework execution [2], proficient traffic prioritization component in the IoT gadgets [3], reinforcing the Web asset content, and dealing with countless Web associations utilizing data driven network (ICN) [4, 5]. Ahmad and co. 6] proposed the enhanced grouping system for vehicular specially appointed networks utilizing hereditary calculations and bumble bees model.

Mind drain is a sort of stroke that is typically brought about by a corridor in the cerebrum. The stroke explodes and drains in the encompassing tissues. The constant draining from the worry tissues kills synapses. In the event of not precisely diagnosing and treated in time-touchy method, then it will cause passing or lifetime handicap. Regular alcohol consumption, high blood pressure, smoking, and other factors are the primary causes of brain hemorrhage. while heredity is likewise thought to be as a central point with regards to cerebrum drain.

Electronic tomography (CT) checks are inspected by the radiologists to anticipate intracranial drain (ICH) and find impacted locales. Also, drain is separated into five classifications in light of the draining tissues that are intraventricular discharge, intraparenchymal discharge, subarachnoid discharge, epidural drain, and subdural discharge. The clinical experts express that after awful cerebrum injury (TBI), ICH happens that prompts demise or body loss of motion for lifetime if clinically flops in precise diagnosing and treatment processes [7].

II. LITERATURE SURVEY

1) An Automated Early Ischemic Stroke Detection System using CNN Deep Learning Algorithm

Authors: Chiun-Li Chin, Bing-Jhang Lin, Guei-Ru Wu, TzuChieh Weng, Cheng-Shiun Yang, Rui-CihSu, YuJen Pan (2017)

Over the past few years, stroke has been among the top ten causes of death in Taiwan. Stroke symptoms belong to an emergency condition, the sooner the patient is treated, the more chance the patient recovers. However, the location of ischemic stroke in the CT image is not obvious, so the diagnosis need to rely on doctors to assess the image. The purpose of this paper is to develop an automated early ischemic stroke detection system using CNN deep learning algorithm. After entering the CT image of the brain, the system will begin image preprocessing to remove the impossible area which is not the possible of the stroke area. Then we will select the patch images and use Data Augmentation method to increase the number of patch images. Finally, we will input the patch images into the convolutional neural network for training and testing. In this paper, we used 256 patch images to train and test a CNN module that it had the ability to recognize the ischemic stroke. From the experimental results, we can find that the accuracy of the proposed method is higher than 90%. It means that the method proposed in this paper can effectively assist the doctor to diagnose.

2) Large scale deep learning for computer aided detection of mammographic lesions

Authors: Thijs Kooi, Geert Litjens, Bram Van Ginneken et al

Late advances in AI yielded new procedures to prepare profound brain organizations, which brought about exceptionally fruitful applications in many example acknowledgment errands like article identification and discourse acknowledgment. In this paper we give a no holds barred examination between a cutting edge in mammography computer aided design framework, depending on a physically planned highlight set and a Convolutional Brain Organization (CNN), going for the gold that can eventually peruse mammograms freely. The two frameworks are prepared on an enormous informational index of around 45,000 pictures and results show the CNN beats the conventional computer aided design framework at low responsiveness and performs tantamount at high responsiveness. We accordingly research how much elements, for example, area and patient data and normally utilized manual elements can in any case supplement the organization and see upgrades at high particularity over the CNN particularly with area and setting highlights, which contain data not accessible to the CNN. Furthermore, a peruser study was performed, where the organization was contrasted with ensured screening radiologists on a fix level and we tracked down no massive distinction between the organization and the perusers.

3) Mammogram image visual enhancement mass segmentation and classification

Authors: Nijad Al-Najdawi, Mariam Biltawi and Sara Tedmori

The most efficient method for screening for breast cancer and finding abnormalities is mammography. Be that as it may, early recognition of bosom malignant growth is subject to both the radiologist's capacity to understand mammograms and the nature of mammogram pictures. In this paper, the scientists have explored joining a few picture improvement calculations to upgrade the presentation of bosom locale division. The majority that show up in mammogram pictures are additionally broke down and grouped into four classifications that include: harmless, plausible harmless and conceivable threatening, likely dangerous and conceivable harmless, and threatening. The principal commitment of this work is to uncover the ideal blend of different improvement strategies and to fragment bosom district to acquire better visual understanding, examination, and order of mammogram masses to help radiologists in going with additional exact choices. The trial dataset comprises of a sum of in excess of 1300 mammogram pictures from both the Lord Hussein Malignant growth Place and Jordan Emergency clinic. Results accomplished growth arrangement exactness upsides of 90.7%. Besides, the outcomes showed a responsiveness of 96.2% and an explicitness of 94.4% for the mass characterizing calculation. Both institutes' radiologists have acknowledged the findings and confirmed that this work has resulted in higher-quality visual images and that tumor segmentation and classification has assisted radiologists in making diagnoses.

4) Computer aided detection of ischemic stroke using segmentation and texture features

Authors: N. Hema Rajini and R. Bhavani

Computed tomography images are widely used in the diagnosis of ischemic stroke because of its faster acquisition and compatibility with most life support devices. This paper presents a new approach to automated detection of ischemic stroke using segmentation, midline shift and image feature characteristics, which separate the ischemic stroke region from healthy tissues in computed tomography images. The proposed method consists of five stages namely, pre-processing, segmentation, tracing midline of the brain, extraction of texture features and classification.

The application of the proposed method for early detection of ischemic stroke is demonstrated to improve efficiency and accuracy of clinical practice. The results are quantitatively evaluated by a human expert. The average overlap metric, average precision and average recall between the results obtained using the proposed approach and the ground truth are 0.98, 0.99 and 0.98, respectively. A classification with accuracy of 98%, 97%, 96% and 92% has been obtained by SVM, *k*-NN, ANN and decision tree.

III. OBJECTIVE

Using machine learning techniques, our objective from this project is to identify and tackle the problem which is tremendously affecting todays youth's depression. This project aims at properly identifying depression levels by using two approaches such as facial expression based emotion recognition [8] and calculation of depression level from answers belonging to the questions asked to the user. From questions asked to the answer, we with this software try to recommend movies and tv series with certain genres to target and reduce depression level from users

A. Methodologies

Haar cascade Classifier for Face Detection:

In this system we used Haar classifier algorithm for face detection when one of these features is found, the algorithm allows the face candidate to pass to the next stage of detection. A face candidate is a rectangular section of the original image called a sub-window. Generally these sub-windows have a fixed size (typically24×24 pixels). This Sub-window is often scaled in order to obtain a variety of different size faces. The algorithm scans the entire image with this window and denote search respective section a face candidate. The algorithm uses an integral image in order to processHaar features of a face candidate in constant time. It uses cascade of stages which is used to eliminate non-face candidates quickly. Each stage consists of many different Haar features. Each feature is classified by a Hear feature classifier. The Hear feature classifiers generate an output which can then be provided to the stage comparator. The stage comparator sums the outputs of the Haar feature classifiers and compares this value with a stage threshold to determine if the stage should be passed. If all stages are passed the face candidate is concluded to be a face.

1) Haar Feature Classifier

A Haar feature classifier uses the rectangle integral tocalculate the value of a feature. The Haar featureclassifier multiplies the weight of each rectangle by itsarea and the results are added together. Several Haarfeature classifiers compose a stage. A stage comparatorsums all the Haar feature classifier results in a stage andcompares this summation with a stage threshold. Eachstage does not have a set number of Haar features.Depending on the parameters of the training dataindividual stages can have a varying number of Haarfeatures.

2) Haar Features

Haar features are composed of either two or threerectangles. Face candidates are scanned and searched forHaar features of the current stage. Each Haar feature hasa value that is calculated by taking the area of eachrectangle, multiplying each by their respective weightsand then summing the results.

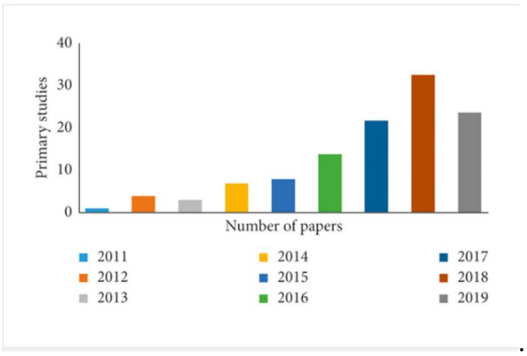
IV. SYSTEM ANALYSIS

A. Existing System

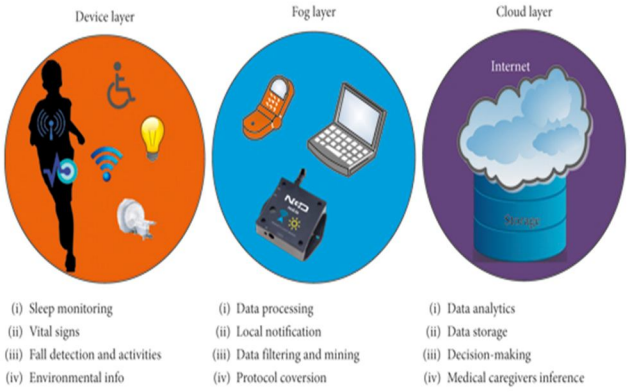
to create an application program that is focused on the user and addresses the growing issue of depression among teenagers. Fundamentally to plan and foster an application which can be useful to the typical client , where AI is assuming a major part to compute the downturn level of the client as indicated by the client Info or face demeanor location (boundaries like face edges) .

B. Proposed System

The Internet of Things using mobile computing has a lot of applications in the field of healthcare which enable it more reliable, providing quality treatment. Some research studies describe how the healthcare is affected using mobile computing, the security of IoT devices in healthcare using mobile computing, and application of the IoT in healthcare systems [11]. Figure 4 shows the fluctuation and rising of the IoT-based research in healthcare using mobile computing in yearly distribution of the studies in the field.



V. ARCHITECTURE



VI. MODULES

A. Login Module

This module is responsible for creating account for the user and storing results and suggestions generated by the system.

B. Dashboard Module

Provides the user interface for accessing the depression detection system, which includes feature to capture image using the built-in laptop camera and allows user to select an image used for processing for the other modules. Dashboard module also include questionnaire test which user can give for test analysis.

C. Face Detection Module

This module is responsible for loading of FER dataset and HAAR feature based cascade classifier. It detects frontal face in an image well. It is real time and faster in comparison to other face detector. We use an implementation from OpenCV.

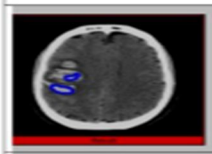
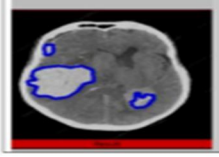
D. Expression Detection Module

This module uses an Exception CNN module(Mini_Xception,2017). We will train a classification CNN model architecture which takes bounded face (48*48pixels) as input and predicts probabilities of 7 emotions in the output layer.

E. Suggestion Module

Depending on the result of user which is generated from previous module. This module collects movies and teen shows which are similar to the emotions of the current user and also might help to tackle depression related issues and finally we generate and present this list to user

VII. RESULTS AND ANALYSIS

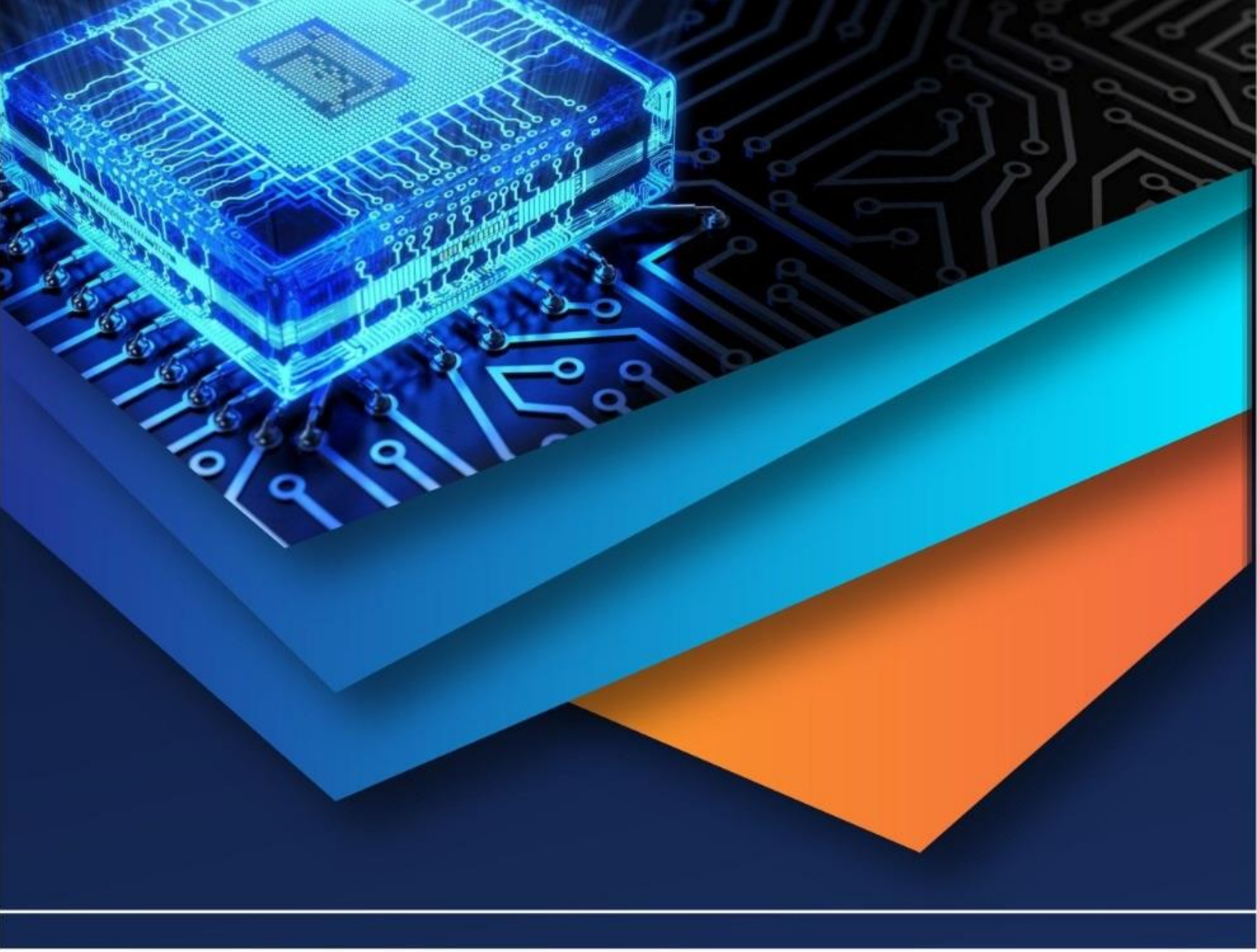
INPUT IMAGE	TYPE OF HEMORRHAGE	AREA OF % AFFECTED
	Internal Cereberal Hemorrhage	4.5%
	Epidural Hemorrhage	44.665%

VIII. CONCLUSION

If a hemorrhage is detected, the system has been successfully trained using brain CT images and classified. Using markers and the watershed algorithm, the issue of over-segmentation has been resolved. After division with the extricated shape highlights, choice tree classifier is utilized. CT pictures with and without hemorrhages are thought of. The in general arrangement precision is viewed as close to 100%, 97%also, almost 100% for ICH, SDH and SAH individually.

REFERENCES

[1] Ajay Patel, Sil. C. Van De Leemput , Mathias Prokop, Bram Van Ginneken , RashindraManniesing Intracranial hemorrhage Identification in 3D Non Contrast CT, 2019 .
[2] Chiun-Li Chin, Bing-Jhang Lin, Guei-Ru Wu, TzuChieh Weng, Cheng-Shiun Yang, Rui-CihSu, YuJen Pan (2017) " An Automated Early Ischemic Stroke Detection System using CNN Deep Learning Algorithm" in Icast2017
[3] M. D. Hssayeni, M. S., M. S. Croock, P. D., A. AlAni, P. D., H. F. Al-khafaji, M. D., Z. A. Yahya, M. D., B.Ghoraani, and P. D. Intracranial hemorrhage segmentation using deep convolutional model, 2019
[4] Rizal Romadhoni, RiyantoSigit, SigitWasista, "Segmentation of Head CT – Scan to Calculate Percentage of Brain Hemorrhage Volume" InInternational Electronics Symposium on Knowledge Creation and Intelligent ComputingIES-KCIC,301 (2017)
[5] Maryam TaghizadehDehkordi "A new active contour model for tumor segmentation" In IEEE 3rd International Conference on Pattern Recognition and Image Analysis IPRIA, April 19- 20, 233 (2017)
[6] Mahmoud Ai-Ayyoub, DuaaAlawad, Khaldun AlDarabsah and InadAljarrah, 2013. Automatic Detectionand Classification of Brain Hemorrhages. WSEASTransactions on Computers, E-ISSN: 2224-2872, October2013.
[7] Fatima, Sridevi M., Saba Naaz and KauserAnjum,[2015]. Diagnosis and Classification of BrainHemorrhage Using CAD System. NCRIET-2015 andIndian J. Sci. Res. 12(1): 121-125,2015.
[8] Alyaa Hussein Ali, Shahad Imad Abdulsalam, IhsaanSubhiNema [2015]. Detection And Segmentation ofHemorrhage stroke Using Textural Analysis on Brain CTimages. International Journal of Soft Computing andEnginneering (IJSCE), ISSN: 2231-2307.
[9] C.Amutha Devi and Dr. S. P. Rajagopalan [2013]. Brain Classification Based on Multilayer Perceptron Using Watershed Segment and Gabor Filter. Journal ofTheoretical and Applied Information Technology, ISSN 1992-8645.
[10] Anju Bala, An Improved Watershed Image Segmentation. Technique using MATLAB. International Journal OfScientific and Enginnering Research, Volume 3; Issue 6, June 2012



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