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A Scrutiny on COVID-19 Detection using Convolutional Neural Network and Image Processing

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ABSTRACT

The world is facing pandemics as Coronavirus is spreading wide far and wide every country rapidly since late 2019, that infect not alone human but put in concert animals. Associate outsize type of people area unit affected at intervals several aeon from the first detail and it remainexpanding everylocationover the world. The factors rather like the speed of infection and spreading area unit very high. it's calculable that in Asian nation the speed of spreading is 1:14, which means the virus unfold from one covid patient to 14 others returning involved with him/her. The services offered by most post-covid-19 clinics at intervals the govt. sector embrace checking the vital parameters and body mass index, ECG, blood test, CT scan, supermolecule testing, etc. The foremost drawback is that the testing a private with of those services to sight covid-19 may be a protracted technique, and if the results once that check go positive then the patient should be in quarantine for 2 weeks/14 days or further. A clinical Investigation of CORONA VIRUS contaminatedcase has exposed that these sorts of sufferers area unit mainly sick with internal organ infection once getting exposed to the COVID. This study is geared toward making economical deep learning models, skilled with upper body X-ray pictures, intended forquicktransmission of COVID sufferers. We have a tendency to used publically out there upper body X ray pictures of grown-up COVID sufferers for the event of computing primarily groundcategorization models for CORONA VIRUS and different significantmicrobes. To extend the dataset amount and enlargewidespread models, we have a tendency to performed twenty five differing types of augmentations on the first pictures. More-over, we have a tendency to utilised the transfer learning move toward for the coaching and examining of the categorization models. The fusion of 2 finest acting models exhibited the best calculationcorrectness for traditional, CORONA, non CORONA, pneumonia, and TB pictures.Artificial Intelligence primarily based categorization models learnedfrom side to side with the transfer learning advance will with efficiency categorize the upper body X ray pictures representing premeditatedmalady. This technique is a lot of economical than antecedently revealed strategies. it's single step in front towards the accomplishment of AI primarily grounded strategies for categorization issues in medical specialty picturing associated with CORONA.The majoraspire of the project be sight the virusin the company of the chest X-ray of the patients.

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Artificial Intelligent, Deep Learning, Machine Learning, data Science area unit variety of the modern technologies that have a super scope at intervals this state takes location.Deep learning provides a useful analysis to review chest x-ray flick for screening covid-19. A Convolutional neural network may be a DL model, most commonly applied to analyzing a plain image. Flick of the covid patient, disease infected patient, and healthy person X-rays square measure progressing to be the information for work and testing the model.Detection coronavirus with the model can facilitate in getting the results previous graphical record and thereby helps in stop the unfold, designation of the illness, medicine& antigen detection, management and plenty of further.

Keywords

COVID-19; X-ray imaging; Deep learning; Convolutional Neural Network

Introduction

CORONA VIRUS became a deadly illness as many of us everylocation the world area unit affected and most of them area unit is dead. The virus mainly spreads through coughs, sneezes of an infected person. One square measure usually merely infected by eupnoeic the virus if they are at intervals proximity or by having physical contact with the patient. Total of 111,740,598 cases were better-known, 86,907,998 were recovered and one or two of,473,879 were dead therefore for. There area unit twenty 2,301,784 active cases. Most of the parents infected with the CORONA virus experience sickness. There area unit several tests form of a diagnostic assay, CT scan, supermolecule testing, etcfor coronavirus. The foremost common checks taken for characteristic infection area unit the agent check and supermolecule take a look at.

A infective agent check tells that if the patient is presently infected or not, associate protein check might tell that if you had a past infection. but these tests area unit dear and can take time a prolonged time. One in all fighting with CORONA VIRUS is that the power to sight the patients early and location patients beneath with care. the target of the project is to make a picture classification model which will predict CORONA with a chest x ray scan of the patients . Detection this illness from radiology outtaken is one of the ways that during which to diagnose the patients. Variety of the primary analyses showed unique abnormalities at intervals the chest radiograms of a patients infected with virus. Exhibiting virus illness presence were better-known by a board-certified specialist. Transfer learning on a collection of 2000 radiograms square measure usually accustomed train four modern convolutional neural networks, at the side of ResNet18, ResNet50, SqueezeNet, and DenseNet-121, to identify CORONA illness at intervals the analyzed chest X-ray and conjointly the model most closely fits to sight covid-19 is ResNet with high accuracy with eighteen layers deeper. The image of the normal person and a covid patient.

The researches created in several location has according that the utilization of AI-based tools in resolution CT scans,based on work with X-ray, image classification problems in tending, etc.

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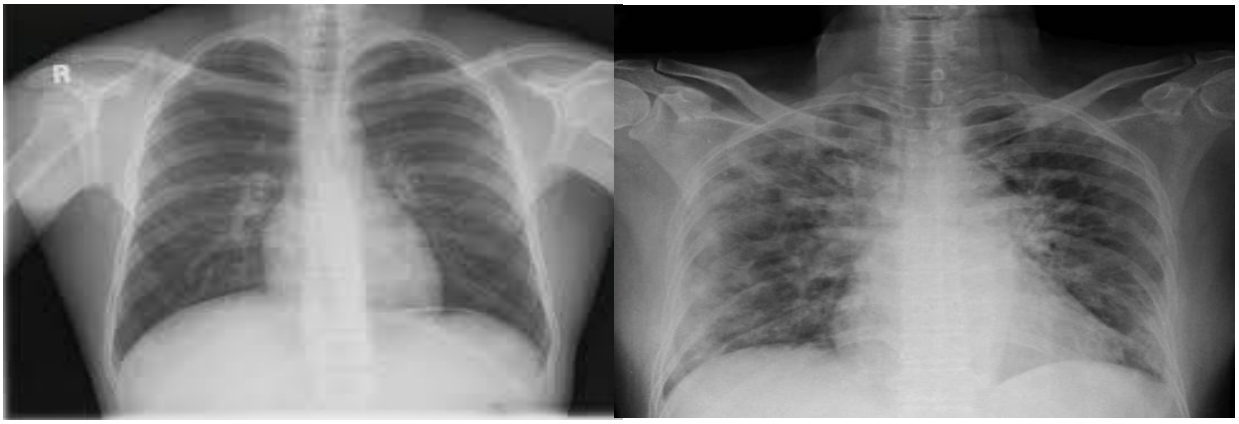
Deep learning is one in all the terribly powerful tools for psychological feature problems, learning sophisticated, and conjointly the frequency of their analysis and usage of deep learning rule mistreatment the Convolutional Neural Network(CNN) that will facilitate in detection CORONA from Chest X-rays for rapid designation competently.A convolutional neural community is a form of deep neural community that is most widely used to analyse visible creativity in deep learning. It follows a pattern in all its work motion picture and apply identical pattern on the check data to predict the result.



Normal X-ray

COVID-19 Patient X

The researches created in many location has according that the utilization of AI-based tools in resolution CT scans,based on coaching with X-ray pictures,image classification issues in tending, etc. Deep learning is one amongst the very powerful tools for psychological feature issues, learning complicated, and also the frequency of their analysis and usage of deep learning rule victimisation the Convolutional Neural Network(CNN) will facilitate in detection CORONA from Chest X-rays pictures for rapid abrupt.

A convolutional neural network also said as an important category of deep neural networks, most commonly used to analyze the visual imagination. It follows a pattern in all its coaching pictures and apply identical pattern on the check knowledge to predict the result.

Literature review

[1] Deep remaining associations have emerged as a gathering of unfathomably significant models showing persuading precision and respectable blend rehearses. In this paper, we inspect the multiplication definitions behind the waiting structure blocks, which suggest that the forward and in turn around signs can be clearly induced from one square to whatever other square, when using character mappings as the skip affiliations and after-

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development incitation. A movement of evacuation tests support the meaning of these character mappings. This impels us to propose another excess unit, which makes planning less complex and improves theory.

[2] Research significance: The comprehensive type of this paper has been recognized by IEEE Internet of Things journal, if it's not all that much difficulty, allude to the journal variation. During the disease shirking and control period, our examination can be valuable in expectation, finding and assessing for the patients spoiled with COVID-19 (the novel Covid) taking into account breathing characteristics. According to the latest clinical investigation, the respiratory illustration of COVID-19 isn't equivalent to the respiratory instances of flu and the ordinary infection. One gigantic sign that occurs in the COVID-19 is Tachypnea. People defiled with COVID-19 have all the more quick breath. Our assessment can be utilized to perceive distinctive respiratory models and our device can be first off put to sensible use.

[3] The scene of relentless discriminating Respiratory disorder Coronavirus 2 has brought in excess of 2.5 million occasions of Corona Virus sickness (COVID-19) in the humankind up until this point, with that quantity long-lasting to create. To have power over reducing the increase of the ailment, assessing enormous amounts of assumed cases for legitimate disconnect and management is a need. Pathogenic lab examining the best level anyway is monotonous with basic fake results. Hence, elective illustrative ways are frantically expected to fight the sickness.

[4] We research the effect of the convolutional network significance on its precision in the colossal degree picture affirmation setting. Our standard responsibility is a thorough evaluation of associations of extending significance using a plan with infinitesimal (3x3) convolution channels, which shows that an immense improvement for the previous workmanship arrangements can be cultivated by pushing the significance to 16-19 weight layers. These revelations were the reason of our ImageNet Challenge 2014 convenience, where our gathering got the first and the second locations in the localisation and game plan tracks independently. We furthermore show that our depictions summarize well to other datasets, where they achieve top tier results

[5] We are in attendance to the understanding of inauguration modules in convolutional neural associations like a center development in normal convolution and the intensity wise distinguishable convolution movement (a intensity wise convolution followed by a bulleted convolution). In this illumination, a intensity wise detachable convolution can be seen as an inauguration module with a highest gigantic amount of apexes. This discernment drives us to put forward a novel significant convolutional neural association configuration stimulated by inauguration where inauguration modules have been dislocated with intensity wise distinguishable convolutions.

[6] Seven Covids are known to cause disease in individuals (2,5,6). Two strains, outrageous extreme on respiratory condition in Covid-19 (SARS-CoV) and Middle East respiration

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problem of Covid-19 (MERS-CoV), have Zoonotic beginnings and have been associated with flare-ups of genuine respiratory illnesses in individuals (6). Though 2019-nCoV, too, is acknowledged to have a zoonotic root, individual to-singular transmission has been recorded

[7] The epic (COVID-19) pandemic is compacting the clinical benefits systems across the globe and very few of them are almost failing. The acknowledgment of this contamination as early as possible will help in tarnishing the spread of it as the disease is changing itself as fast as could truly be considered typical and as of now there are around 4,300 strains of the contamination according to the reports. Clinical assessments have shown that a huge bit of the COVID-19 patients experience the evil impacts of a lung infection like influenza. Thusly, it is possible to examine lung sickness using imaging techniques.

Topic

Computer vision is one in every of the foremost exciting divisions of technology. heaps of analysis has been carried during this field for many years. The process of pictures becomes quicker and economical because of cloud technologies and powerful GPUs and TPUs. Cars, robots, and drones begin to grasp what we have a tendency to see in motion picture and videos. The interface “computer vision” between machines and humans can gain rather more importance inside following few years. Computer Vision is taken into account to be the most popular field within the era of AI.

It are often agitated for newbies as there square measure some challenges that the majority folks face whereas creating a transition into laptop vision In straightforward words laptop vision may be a field of deep learning that enables the machine to spot, method pictures rather like humans. In terms of parsing pictures humans perform extraordinarily well however once it involves machines sleuthing objectsinvolves multiple and sophisticated steps, together with feature extraction (edges detection, shapes), feature classification.

Subtopic

OpenCV contains implementations of over 2500 algorithms! it's freely accessible for business still as tutorial functions. The library hasinterfaces for multiple languages, together with Python, Java, and C++.

Methods

An image is often diagrammatic as a third-dimensional array. this is often be} as a result of a machine can represent everything as numbers and in python, NumPy are often accustomed represent it whereas in C programing language it are often diagrammatic as format Mat. For Images, usually, a generic word is employed known as constituents or pixel values. Within the case of color pictures, we've got 3 coloured channels. thencecoloured pictures can have multiple

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values for single constituent values betting on the resolution and color depth, those arrays will vary in size. thecolour values go from zero to 255. These color channels square measure usually diagrammatic as Red inexperienced Blue (RGB)

For example. Reading pictures in Opencv is easy, purpose to be noted here that By default, the imread perform reads pictures within the BGR (Blue inexperienced Red) format. We will browse pictures in several formats victimization further flags within the imread function

The image has been properly loaded by openCV as a numpyarray, however the colour of every constituent has been sorted as BGR. Matplotlib's plot expects associate RGB image thus, for an accurate show of the image, it's necessary to swap those channels. This operation are often done either by victimization OpenCV conversion functions cv2.cvtColor() or by operating directly with the numpy array. Resizing pictures As general most laptop vision models work on mounted input shapes. True pain arises after we perform internet scrapping to scrap image datasets. Resizing is basically useful in coaching deep learning models. but totally different interpolation and downsampling functions additionally represent the umbrella of OpenCV with the subsequent parameters Blending pictures With the magic of OpenCV, we will add or mix 2 pictures with the assistance of the cv2.addWeighted() methodology. addWeighted() perform returns NumPy array containing constituent values of the ensuing image. mixing is nothing however the addition of 2 image matrices. thus if we wish to feature 2 pictures then which means terribly straightforward we've got to feature various 2 matrices. For aggregating 2 matrices, the scale of the 2 pictures ought to be constant.

Methodology

Edges in pictures square measure the points wherever brightness changes drastically and includes a variety of discontinuities like

- Depth Discontinuities
- Orientation Discontinuities

Edge detection has become terribly helpful for extracting options of pictures for various image recognition applications just like the classification of objects

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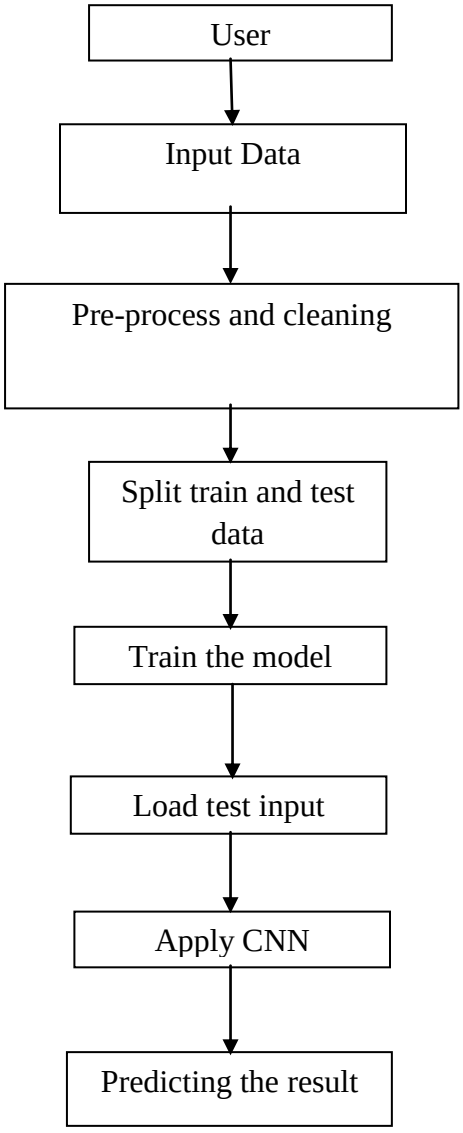
Data Analysis



Results

Viruses are the most notable explanations behind respiratory tainting. The imaging disclosures of viral pneumonia are various and cover with those of other nonviral powerful and combustible conditions. Regardless, conspicuous confirmation of the secret viral microorganisms may not for the most part be basic. There are different markers for perceiving viral microorganisms

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dependent on imaging plans, which are connected with the pathogenesis of viral illnesses. Diseases in a comparative viral family share a tantamount pathogenesis of pneumonia, and the imaging plans have discernable ascribes. A Normalized Light CNN model adjusted from a Light CNN model. We acquainted a standardized layer with this model in both preparing and test stage. The standardized layer standardizes the yield highlights, causing it to address pictures better. We assess our model on LFW dataset. The exactness of face check arrives at 98.46%, which is superior to the first model.

The COVID-19 pandemic is causing a significant episode in excess of 150 nations all throughout the planet, seriously affecting the wellbeing and life of numerous individuals all around the world. One of the urgent advance in battling COVID-19 is the capacity to recognize the contaminated patients sufficiently early, and put them under unique consideration. Recognizing this sickness from radiography and radiology pictures is maybe perhaps the quickest approaches to analyze the patients. A portion of the early investigations showed explicit anomalies in the chest radiograms of patients contaminated with COVID-19. Roused by before works, we study the use of profound learning models to distinguish COVID-19 patients from their chest radiography pictures.

All patients are suspected with 2019 were conceded to an assigned emergency clinic in Wuhan. We tentatively gathered and dissected information on patients with research facility affirmed 2019-nCoV disease by ongoing RT-PCR and cutting edge sequencing. Information were gotten with normalized information assortment structures shared by WHO and the International Severe Acute Respiratory and Emerging Infection Consortium from electronic clinical records. Analysts additionally straightforwardly spoke with patients or their families to discover epidemiological and manifestation information. Results were likewise thought about between patients who had been conceded to the emergency unit and the individuals who had not.

Discussions

With a beginning stage in China, has extend quickly among individuals livelihood in different nations, and is moving toward roughly several lakhs cases overall as indicated by the insights of European Center for Disease Prevention and Control. There are a predetermined amount of COVID-19 examination packs reachable in urgent situation clinics because of the intensifying cases every day. In this manner, it is important to carry out a programmed identification framework as a fast elective determination alternative to forestall COVID-19 distribution along with individuals. In this investigation, 5 pre-prepared convolutional neural organization grounded models have been projected for the location of Covid pneumonia tainted long-suffering utilizing upper body X-beam radiographs.

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Conclusion

Deep learning may be a versatile series of neural network learning techniques. Neural networks inspired a programming model that enables a machine to be instructed based on empirical evidence. Convolutional neural networks are a form of deep neural network that is widely used to analyse visual images in deep learning. Biological processes influenced convolutional networks, in which the property pattern between neurons creates the animal cortical area's consortium. Biological processes inspired convolutional networks, in which the property pattern between neurons resembles the arrangement of the animal cortical region. Any input image can move through a series of convolution layers with filters, Pooling, totally connected layers (FC), and associated Softmax perform to classify an object with deep learning CNN models. One among the most elements of Neural Networks is Convolutional neural networks. They are made up of neurons with weights and prejudices that can be learned. Every somatic cell receives a variety of inputs and computes a weighted average of them before passing it through associate activation and responding with an output. A Convolutional neural network may be a neural network that has one additional convolutional layer and is employed in the main for image process, classification, segmentation, and additionally for alternative auto correlated information. Then CNN works well on a picture because it takes all the pixels and generates a pattern from the testing information. The pattern generated is applied to the coaching information to come up with the high accuracy result.

Limitations and Future Studies

The current framework for pneumonia discovery fundamentally depends on people, which have sensible exactness yet with a significant expense of time and assets. The normal time it takes a prepared radiologist to peruse a chest X-beam picture is around 5-6 minutes. It is hard to speed that up in light of the fact that chest X-beam perusing is an exceptionally deliberate cycle.

The Covid 2019 epic (COVID-2019), which initially emergerd up in China in Wuhan city in December 2019, spread rapidly across the planet and turned out a pandemic. This has caused an tremendous impact on both everyday life, general well being, and the worldwide economy. It is basic to identifying the positive cases as right on time as could be expected to forestall the further spread of this pandemic and to rapidly treat influenced patients.

Acknowledgement

Epidemiological examinations have proposed that the episode was related with a fish market in Wuhan. Here we study a solitary patient who was a specialist at the market and who was conceded to the Central Hospital of Wuhan on 26 December 2019 while encountering a serious respiratory disorder that included fever, discombobulation and a hack.

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Received 05 March 2021; Accepted 01 April 2021.

References

[1] K. He, X. Zhang, S. Ren and J. Sun, "Identity mappings in deep residual networks", European conf. on computer vision, pp. 630-645, 2016, October.

[2] Wang Y, Hu M, Li Q, Zhang XP, Zhai G, Yao N (2020) Abnormal respiratory patterns classifier may contribute to large-scale screening of people infected with COVID-19 in an accurate and unobtrusive manner. arXiv preprint arXiv:2002.05534

[3] Murugesan, M., Thilagamani, S. ," Efficient anomaly detection in surveillance videos based on multi layer perception recurrent neural network", Journal of Microprocessors and Microsystems, Volume 79, Issue November 2020, https://doi.org/10.1016/j.micpro.2020.103303

[4] K. Simonyan and A. Zisserman, "Very deep convolutional networks for large-scale image recognition", arXiv preprint arXiv:1409.1556, 2014.

[5] Thilagamani, S., Nandhakumar, C. ." Implementing green revolution for organic plant forming using KNN-classification technique", International Journal of Advanced Science and Technology, Volume 29 , Isuue 7S, pp. 1707–1712

[6] Kanne JP (2020) Chest CT findings in 2019 novel coronavirus (2019-nCoV) infections from Wuhan, China: key points for the radiologist

[7] Thejeshwar SS, Chokkareddy C, Eswaran K, Precise Prediction of COVID-19 in Chest X-Ray Images Using KE Sieve Algorithm

[8] Koo HJ, Lim S, Choe J, Choi SH, Sung H, Do KH (2018) Radiographic and CT features of viral pneumonia. Radiographics 38(3):719–739.

[9] Thilagamani, S., Shanti, N.," Gaussian and gabor filter approach for object segmentation", Journal of Computing and Information Science in Engineering, 2014, 14(2), 021006, https://doi.org/10.1115/1.4026458

[10] ShervinMinaee ,RaheleKafieh ,MilanSonka ,ShakibYazdani ,GhazalehJamalipourSoufi, "Deep-COVID: Predicting COVID-19 from chest X-ray images using deep transfer learning"

[11] Rhagini, A., Thilagamani, S. ,"Women defence system for detecting interpersonal crimes", International Journal of Advanced Science and Technology, 2020, Volume 29,Issue7S, pp. 1669–1675

[12] Narin A, Kaya C, Pamuk Z (2020) Automatic detection of coronavirus disease (covid-19) using x-ray images and deep convolutional neural networks. arXiv preprint arXiv:2003.10849

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 3831 – 3843
Received 05 March 2021; Accepted 01 April 2021.

[13] K.Deepa, S.Thilagamani, "Segmentation Techniques for Overlapped Latent Fingerprint Matching", International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075, Volume-8 Issue-12, October 2019. DOI: 10.35940/ijitee.L2863.1081219
[14] Lee E.Y., Ng M.Y., Khong P.L. COVID-19 pneumonia: what has CT taught us? Lancet Infect. Dis. 2020;20(4):384–385.
[15] Holshue M.L., DeBolt C. First case of 2019 novel coronavirus in the United States. N. Engl. J. Med. 2020;328:929–936.
[16] Deepa, K., Kokila, M., Nandhini, A., Pavethra, A., Umadevi, M. "Rainfall prediction using CNN", International Journal of Advanced Science and Technology, 2020, 29(7 Special Issue), pp. 1623–1627. http://sersc.org/journals/index.php/IJAST/article/view/10849Contribute a rapid review or request one for "Chest X-ray image analysis and classification for COVID-19 pneumonia detection using DOI (10.1101/2020.08.20.20178913)
[17] Karim, M. R. et al. Deepcovidexplainer: explainable covid-19 predictions based on chest x-ray images (2020).
[18] Deepa. K , LekhaSree. R , Renuga Devi. B , Sadhana. V , Virgin Jenifer. S ,"Cervical Cancer Classification", International Journal of Emerging Trends in Engineering Research, 2020, 8(3), pp. 804–807 https://doi.org/10.30534/ijeter/2020/32832020Deng, J. et al. Imagenet: a large-scale hierarchical image database. In 2009 IEEE Conference on Computer Vision and Pattern Recognition 248–255 (IEEE, 2009).
[19] Huang, G., Liu, Z., & Weinberger, K. Q. Densely connected convolutional networks. arXiv preprint arXiv:1608.06993 (2016).
[20] Majeed, T., Rashid, R., Ali, D., &Asaad, A. Covid-19 detection using cnn transfer learning from x-ray images. medRxiv (2020).
[21] Farooq, M., &Hafeez, A. Covid-resnet: a deep learning framework for screening of covid19 from radiographs (2020).
[22] Zhang, Y. et al. Covid-da: deep domain adaptation from typical pneumonia to covid-19. arXiv:2005.01577 (2020).
[23] Santhi, P., Lavanya, S., Prediction of diabetes using neural networks, International Journal of Advanced Science and Technology, 2020, 29(7 Special Issue), pp. 1160–1168
[24] Luz, E. et al. Towards an effective and efficient deep learning model for covid-19 patterns detection in x-ray images. arXiv:2004.05717 (2020).
[25] Xu, X. et al. Deep learning system to screen coronavirus disease 2019 pneumonia. arXiv:2002.09334 (2020).
[26] LeCun, Y., Bengio, Y., & Hinton, G. Deep learning. Nature **521**, 436–444 (2015).
[27] TuilnOzturk, MuhamedTaloEylulAzraYildirim, OzalYildirim, Automated detection of COVID-19 cases using deep neural networks with X-ray images
[28] Wu F., Zhao S., Yu B. A new coronavirus associated with human respiratory disease in China
[29] Zu Z.Y., Jiang M.D., Xu P.P., Chen W., Ni Q.Q., Lu G.M., Zhang L.J. Coronavirus disease 2019 (COVID-19): a perspective from China. Radiology. 2020 doi: 10.1148/radiol.2020200490.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 3831 – 3843
Received 05 March 2021; Accepted 01 April 2021.

[30] Santhi, P., Mahalakshmi, G., Classification of magnetic resonance images using eight directions gray level co-occurrence matrix (8dglcm) based feature extraction, International Journal of Engineering and Advanced Technology, 2019, 8(4), pp. 839–846
[31] Lee E.Y., Ng M.Y., Khong P.L. COVID-19 pneumonia: what has CT taught us? Lancet Infect. Dis. 2020;20(4):384–385.
[32] Li Y., Xia L. Coronavirus Disease 2019 (COVID-19): role of chest CT in diagnosis and management. Am. J. Roentgenol. 2020
[33] Selvaraju R.R., Cogswell M., Das A., Vedantam R., Parikh D., Batra D. Proceedings of the IEEE International Conference on Computer Vision. 2017. Grad-cam: visual explanations from deep networks via gradient-based localization; pp. 618–626
[34] Vijayakumar, P, Pandiaraja, P, Balamurugan, B & Karuppiah, M 2019, 'A Novel Performance enhancing Task Scheduling Algorithm for Cloud based E-Health Environment', International Journal of E-Health and Medical Communications , Vol 10,Issue 2,pp 102-117
[35] Shen D., Wu G., Suk H.I. Deep learning in medical image analysis. Annu. Rev. Biomed. Eng. 2017;19:221–248
[36] K Sumathi, P Pandiaraja 2019," Dynamic alternate buffer switching and congestion control in wireless multimedia sensor networks" , Journal of Peer-to-Peer Networking and Applications , Springer , Volume 13,Issue 6,Pages 2001-2010.
[37] Krizhevsky A., Sutskever I., Hinton G.E. Advances in Neural Information Processing Systems. 2012. Imagenet classification with deep convolutional neural networks
[38] Lorente Edgar. COVID-19 pneumonia - evolution over a week
[39] P. Pandiaraja, N Deepa 2019 ," A Novel Data Privacy-Preserving Protocol for Multi-data Users by using genetic algorithm" , Journal of Soft Computing , Springer , Volume 23 ,Issue 18, Pages 8539-8553
[40] Sethy P.K., Behera S.K. 2020. Detection of Coronavirus Disease (COVID-19) Based on Deep Features
[41] N Deepa , P. Pandiaraja, 2020 ," Hybrid Context Aware Recommendation System for E-Health Care by merkle hash tree from cloud using evolutionary algorithm" , Journal of Soft Computing , Springer , Volume 24 ,Issue 10, Pages 7149–7161
[42] Barstugan M., Ozkaya U., Ozturk S. 2020. Coronavirus (COVID-19) Classification Using CT Images by Machine Learning Methods. arXiv preprint arXiv:2003.09424.
[43] Shankar, A., Pandiaraja, P., Sumathi, K., Stephan, T., Sharma, P. ," Privacy preserving E-voting cloud system based on ID based encryption " Journal of Peer-to-Peer Networking and Applications , Springer , https://doi.org/10.1007/s12083-020-00977-4.
[44] S. J. Pan and Q. Yang, "A survey on transfer learning," IEEE Transactions on Knowledge and Data Engineering, vol. 22, no. 10, pp. 1345–1359.
[45] C. Zheng, X. Deng, Q. Fu et al., Deep learning-based detection for COVID-19 from chest CT using weak label, medRxiv, 2020.
[46] N Deepa , P. Pandiaraja, 2020 , " E health care data privacy preserving efficient file retrieval from the cloud service provider using attribute based file encryption ", Journal of Ambient Intelligence and Humanized Computing , Springer , https://doi.org/10.1007/s12652-020-01911-5.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 3831 – 3843
Received 05 March 2021; Accepted 01 April 2021.

[47] Sumathi, K., Naveena, K., Prashanth, P., Revanthkumar, S., Srikeerthanaa, A.P.,E-health based patient surveilling device, International Journal of Emerging Trends in Engineering Research, 2020, 8(3), pp. 792–796
[48] V. Chouhan, S. K. Singh, A. Khamparia et al., "A novel transfer learning based approach for pneumonia detection in chest X-ray images," Applied Sciences, vol. 10, no. 2, p. 559, 2020.