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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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DEEP LEARNING-BASED FRAMEWORK TO DETERMINE THE DEGREE OF COVID-19 INFECTIONS FROM CHEST X-RAY

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Abstract.

The corona virus disease-19 (COVID-19) epidemic, the whole globe is suffering from a medical condition catastrophe that is unprecedented in scale. As the coronavirus spreads, scientists are worried about offering or helping in the supply of remedies to preserve lives and end the epidemic. Artificial intelligence (AI), for example, has occurred altered to deal with the difficulties raised by pandemics. We provide an in-depth learning approach for locating and extracting attributes of COVID-19 from Chest X-rays. Hierarchical multilevel ResNet50 (HMResNet50) was adjusted to better COVID-19 data, which was collected to build this dataset with images of a typical chest X-ray from numerous public sources. We employed information enhancement methods such as randomized rotations with a ten-ten-degree slant, random noise, and horizontal flips to generate numerous images of chest X-ray. Outcome of the research is encouraging: the suggested models correctly identified COVID-19 chest X-rays or standard with an accuracy of 99.10 % for Resnet50 and 97.20 % for hierarchal Multilevel Resnet50. The findings suggest that the proposed is effective, with high performance and simple COVID-19 recognition methods.

Key words. Deep learning, COVID-19, Hierarchical multilevel ResNet50, Chest X-ray.

Introduction.

As the worldwide outbreak of coronavirus disease-19 (COVID-19) continues, numerous doctors from many Specialties are still in play critical functions in diagnosis and therapy. Much of the current radiological literature has concentrated on COVID-19 symptoms in chest CT [1]. However, because of problems with infection control associated with transporting patients to CT suites, inefficiency in the disinfection of the CT room, and an absence of CT accessibility in some of the world's regions, the most popular technique for detecting and keeping track of chest abnormalities is portable chest radiography (CXR) [2]. However, the Radiology College observes that the CT removal of contaminants required throughout COVID-19 patient visualization could interfere with accessible radiological assistance and suggests that adaptable chest imaging be used to minimize the risk of infection between them [3]. Furthermore, in situations where there are considerable medical concerns regarding COVID-19, a positive CXR could prevent the need for CT [4]. Furthermore, CXR use in early illness identification may be critical in locations throughout the globe with restricted access to trustworthy real-time data. COVID screening using an opposite synthesis polymerase chain reaction method [5]. To aid the medical community in battling this epidemic, this image-based article review aims to highlight the most typical indications and patterns of chest abnormalities on CXR in COVID-19. We employ Hierarchical Multilevel Resnet50 to evaluate the significance of COVID-19 infections using CXR [6].

The research is structured the following Section II details the suggested approach, Section III explores the results, and Section IV draws a conclusion.

Research [7] provided a hybrid architecture for effectively identifying and determining COVID-19 from audio signals of coughing using multiple ML methods. The use in terms of the genetic algorithm in conjunction with ML approaches improves the accuracy of the framework. The study creates a new machine learning (ML)--based mathematical framework for COVID-19 is identified automatically by CXR scans of actual individuals. The algorithm was constructed, instructed, and verified to discriminate four types of COVID-19, viruses, bacteria, and healthy CXR images [8]. The research describes a novel metaheuristic-based fusing approach to recognize COVID-19 employing X-rays. Preprocessing, approaches for categorization and feature extraction are all part of the proposed model. The "Weiner filtering (WF)" method is first employed for image preparation [9]. The work shows how deep learning model transfer learning may be applied to recognize COVID-19 utilizing images from three regular X-rays, ultrasound, and CT scans were the medical imaging techniques employed. Using advanced deep-learning image classification algorithms, the purpose is to provide overworked medical staff with a second set of eyes [10]. The study develops CVDNet, a Deep CNN approach utilizing images of X-rays of the chest to distinguish between new cases of pneumonia and typical COVID-19 infections. The structure suggested depends on the remaining neural network and consists of two concurrent layers with different kernel dimensions to capture local as well as global source data [11]. The research's major purpose is to merge pre-trained deep transfer learning (DTL) structures with classic ML frameworks as a computerized instrument. COVID-19 can be detected by utilizing CXRs. To account for the shortage of photographs, DTL extracts visual features for enhanced classification [12]. The challenge proposes a deep learning model with semi-supervision that uses both labeled

and unlabeled data. To classify chest imaging as COVID-19, respiratory infections, or healthy individuals, it builds and assesses an implementation of the Mix Match architecture for a semi-supervised deep learning system [13]. The paper proposes a deep learning method that radiologists or healthcare practitioners may utilize to quickly and accurately identify COVID-19 instances. However, it is difficult to create these AI systems since there isn't a large enough collection of publicly available X-ray and CT images [14]. The instance, the study using radioscopy imaging systems could be valuable in sensing COVID-19 since X-ray and CT image descriptions give vital material about the infection instigated by the COVID-19 virus [15]. CXRs were produced utilizing an Auxiliary Classification Generation Adversarial Network (ACGAN) [16].

Materials and Methods.

The initial step in using deep learning is to prepare the dataset. We utilize a CXR of the chest images to examine the condition of the healthy chest because COVID-19 targets the lining of our airways or epithelial cells. To improve the suggested classification models, we use chest X-ray images rather 7 than scans using computer tomography in this work. Furthermore, portable radiography devices may be examined in segregated wards, eliminating the danger of hospital infections, together with the need for personal protective clothing. In this experiment, the five thousand images that make up the dataset for this research are in total. 3,000 distinctive chest X-ray scans were designated from various public estimation records, with "Chest X-Ray Imageries (Pneumonia)" and "Covid-19 Radiography Data" on Kaggle. The GitHub source COVID-19 Imaging Information contains 623 COVID-19 chest scan images. As a consequence, it applied image improvement to increase the overall number of images to 2,000. Table 1 shows the X-ray image comparison in data composition.

Table 1. *Dataset composition comparison for chest X-ray images.*

	With data augmentation	**Without data augmentation**
Normal	3 500	3 000
COVID-19	2 000	625
Total of images	5 500	3 625

Hierarchical Multilevel ResNet50: Hierarchical Multilevel ResNet50 is used to detect COVID-19. The frozen and trainable layers are highlighted in Figure 1, which depicts the proposed architecture for Hierarchical multilevel Resnet50.This distinction assists in optimizing the model by freezing some layers while enabling others to be improved during training.

Hierarchical multilevel ResNet50 refers to a variant of the ResNet50 architecture that includes multiple levels of hierarchical structures for feature extraction. ResNet50 is frequently used for image categorization. It has 50 layers and uses residual connections to increase training and prevent the vanishing gradient issue. The network gathers data from a dissimilar amount of the input images at each level. This offers the network to record both global and local characteristics, resulting in augmented image recognition performance. Typically, the hierarchical multilevel ResNet50 architecture

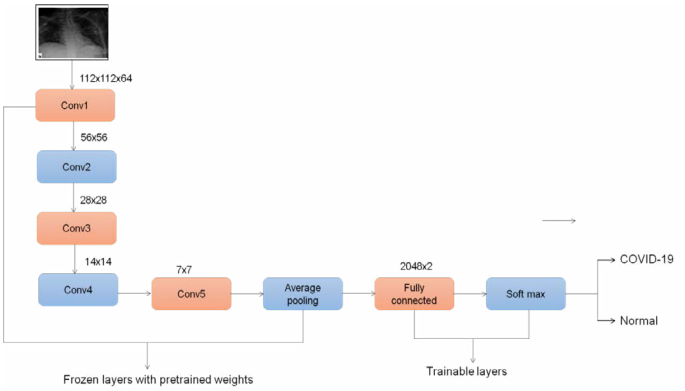

Figure 1. *Proposed hierarchical multilevel ResNet50.*

comprises a progression of ResNet50 sub-networks, each of which extracts features from a different scale of the input image. The concluding effect is created by combining these sub-networks using a hierarchical fusion procedure. Overall, the hierarchical multilevel ResNet50 deep learning (DL) building is a strong DL architecture appropriate for image classification tasks that connect the extraction of both global and local information. Hierarchical MultilevelResNet50 is used to detect COVID-19.

- A 7x7 pixel kernels and 64-filtering convolution layers, consequently an optimal layer of pools through progress duration of two practical.
- Two convolutional layers are used: one with 64 filtration and a 1 * 1 kernel dimensions, followed by another with 64 filtering and a 3 * 3 kernel length. The following convolutional layer uses a 256-filter scheme with a 1 × 1 kernel dimension. When reproducing each of these levels three times, nine distinct ones are created.
- Three layers of convolution are employed, with the first having 128 filters and a 1 * 1 kernel dimension; the following layer has 128 filtration and a 3 * 3 kernel length; and the final one has 512 filtration and a 1 * 1 kernel length. We gained 12 layers as a result of the 4 tiers' duplication.
- Continuing that, there are two layers with 2 561 024 and 3 * 3 filtration dimensions, along with one of 2 561 024 and 1 * 1 filtering length. This is performed six times, yielding an entire set of 18 layers.
- The convolution layer has 512 filtration and a 1 * 1 kernel dimension, then follows two additional ones with 5 122 048 filtering and 1 * 1 and 3 * 3 kernel size. It is done multiple times, for an aggregate of nine layers.

The last stage involves typical pooling, next to an entirely linked layer with 1000 nodes, a SoftMax method, along with a layer being the outcome.

Results.

In this study, we present a finding of the Hierarchical multilevel ResNet50 method to provide deep learning making an effort to obtain attributes and determine COVID-19 using the x rays. This phase compares and contrasts some of existing methods, including deep neural networks (DNN) [17], InceptionV3 [18], and VGG16 [19] with our proposed method.

Accuracy: Accuracy is an indicator of statistics employed to evaluate a product's effectiveness prediction model. It evaluates

the number of true forecasts generated by the algorithm out of all forecasts provided. Figure 2 compares the accuracy of the suggested HM ResNet50 approach with existing methods. As demonstrated, the HM ResNet50 has the highest accuracy of 99.1%, compared to DNN, Inception V3, and VGG 16. This indicates the higher effectiveness of the suggested technique in evaluating accuracy.

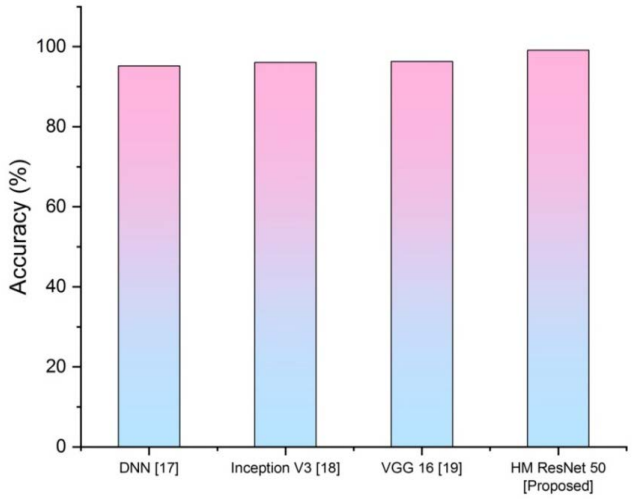

Figure 2. *Comparison of Accuracy.*

Sensitivity: Sensitivity is a term used in a variety of domains, including engineering and statistics, medicine, and psychology to describe the ability of a system, instrument, or individual to detect or respond to changes or stimuli in the environment or a given situation. Figure 3 compares the level of sensitivity of the suggested technique to traditional methods. As demonstrated, the HM ResNet50 has a maximum sensitivity of 99.36%, outperforming existing approaches. It suggests that the proposed method is superior for identifying COVID-19 cases than existing methods.

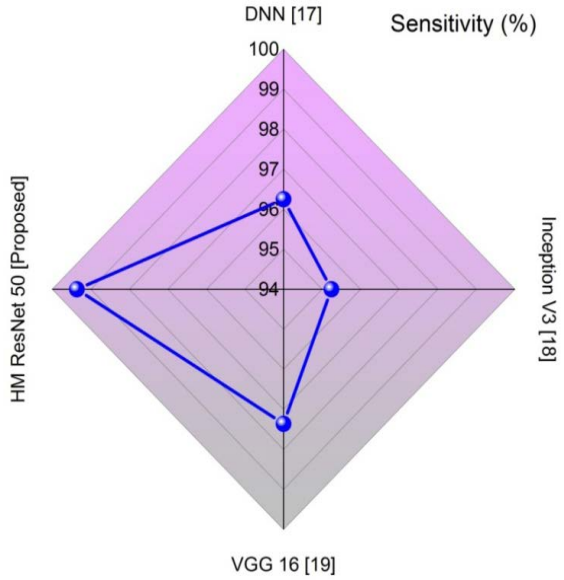

Figure 3. *Comparison of Sensitivity.*

Specificity: In general, specificity refers to the degree to which something is specific. However, the meaning of specificity varies according to the context. The suggested method's specificity is contrasted with traditional approaches in Figure 4. The HM ResNet50 model outperforms DNN, Inception V3, and VGG 16 with a specificity of 99.36%. This implies that healthy cases can be identified more accurately using the approach that was suggested.

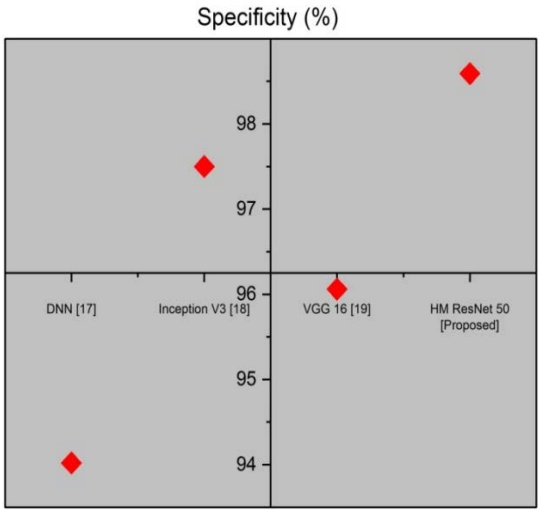

Figure 4. *Comparison of specificity.*

Precision: A statistical parameter called precision is used to calculate the percentage of true positives between all forecasts provided through models or classifiers that are positive. In other words, precision tells us how often the model's positive predictions are correct. Figure 5 shows that the suggested technique's precision is higher than that of conventional methods. With a precision of 98.7%, the HM ResNet50 outperforms DNN, Inception V3, and VGG 16. This suggests that the suggested approach is more precise in detecting COVID-19 cases.

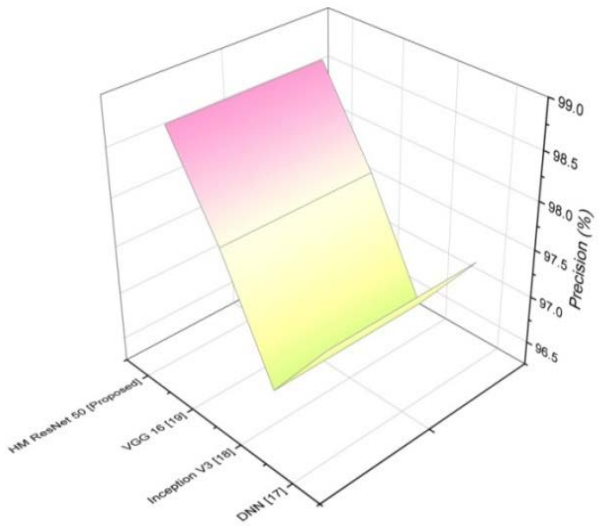

Figure 5. *Comparison of precision.*

Conclusion.

To stop the novel Coronavirus prevention earlier folk's diagnosis of the virus is essential. Furthermore, to quickly identify the disease, we established a deeper learning transfer system that compares an X-ray of the chest images from individuals both with and without COVID-19. The accuracy of the recommended categorization scheme for recognizing COVID-19 is more than 99,10 percent. Given the results of our research, we think that supporting physicians is only natural, and other medical professionals make medical judgments because of its excellent overall performance. This article provides a thorough explanation of how to locate COVID-19 rapidly using DDL techniques. The worldwide medical industry is struggling due of COVID-19, which has claimed millions of lives. Computer-aided analysis early detection may help save lives and appropriate treatment since doctors have limited time owing to the vast number of patients they must treat after hours or during an emergency. To provide a better result, we are thinking of integrating the three models discussed in this paper and training each layer separately in subsequent research.

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