ASSIGNMENT REPORT- 1

(*Task : To identify broader thrust area of research*)

Submitted by

(Mogalraj Kushal Dath)

Registration Number : 12100559

Course Name : Fundamentals of Research

Course Code : GEN530

Section Number : K21ML

Submitted to

(Dr. G.Akilarasu)

School of Computer Science and Engineering

LOVELY PROFESSIONAL UNIVERSITY

1.1 List of prominent funding agencies (5 Funding Agencies) and the thrust area of research identified by these funding agencies :

S.No.	Name of the Funding agencies	Thrust area	Weblink
1	Defence Research and Development Organisation(DRDO)	Bio-Technology (Currently working in LS and BD panel for military purpose)	https://www.drdo.gov.in/life-sciences-research-board/formats
2	Indian Council of Medical Research	Communicable Diseases (Currently working on Covn-19)	https://main.icmr.nic.in/thrust/thrust.htm
3	Science and Technology Application for rural development	Microelectronics	https://academicjournals.org/journal/ISABB-JFAS/article-full-text-pdf/48E757244874
4	Department of Atomic Energy (DAE)	Radiation Technology (For the use of Agriculture and Medicine)	https://dae.gov.in/node/634
5	Ministry of Electronics and Information Technology	New Generation Networks and Communication Technology	https://www.meity.gov.in/thrust-areas

2.1 List of 5 prominent industries/Companies and the thrust area of research identified by these companies :

S.No.	Name of the Industry/Company	Thrust area	Weblink
1	Adnano Technologies	Nano technology (Currently using a polyethylene sheet to fight covid-19)	https://ad-nanotech.com/about-us/
2	NVIDIA Corporation	3D – Deep Learning (Currently working on developing the natural language processing)	https://www.nvidia.com/en-us/about-nvidia/
3	TATA Power Solar	Solar power Generation (Currently working on a 3MW Solar power plant in Maharashtra)	https://www.tatapower.com/
4	ASM Technologies	Electric Vehicles (Currently working on developing the Driver Assistance System)	https://www.asmltd.com/electric-vehicle-ev/
5	Cipher	Cyber Security (Recently tied up with ICBA for preventing attacks on Regional and Community Banks)	https://cipher.com/

3.1 List of SCOPUS indexed upcoming conferences and the thrust areas identified by those conferences (10 upcoming Conferences of 2021) :

S.No.	Name of the Conference	Venue, and Date	Weblink	Thrust area
1	National Conference on Agriculture and Food Sciences (NCAFS)	Davanagere (India) And 03/11/2021	http://nationalconference.org.in/Conference/6292/NCAFS/	Technological Advancement in Agriculture
2	National Conference on Communications (NCC)	Coorg (India) And 16/11/2021	http://nationalconference.org.in/Conference/6366/NCC/	Advancement in area of Communication and Signal processing
3	National Conference on Industrial Civil and Mechanical Engineering (NCICME)	Nashik (India) And 02/10/2021	http://nationalconferences.org/Conference/6991/NCICME/	Development in Concrete Technology and Sustainable materials
4	International Conference on Big data and Smart Computing (ICBDSC)	Varanasi (India) And 25/10/2021	http://academicsconference.com/Conference/17691/ICBDSC/	Advancement in Autonomous Systems and Robotics
5	National Conference on Smart Energy Systems (NCSES)	Kodaikanal (India) And 30/10/2021	http://nationalconference.org.in/Conference/6275/NCSES/	Rapid Strides and Advancement in AI Techniques and optimization in power systems
6	National Conference on Business Management, Economics and Social Science (NCBMESS)	Dharwad (India) And 11/12/2021	http://nationalconferences.org/Conference/7399/NCBMESS/	Cross cultural management and leadership, Globalization, trade and development

7	International Conference on Latest Research on Corona Virus and its Vaccine (ICRCVV)	Ooty (India) And 22/12/2021	http://researchconferences.in /Conference/1381/ICRCVV/	Development of Vaccine Process of covid-19 and Production
8	National Conference on recent Advances in Science, Engineering, Technology and Management (NCRASETM)	Bengaluru (India) And 5/12/2021	http://wrfer.org/ Conference/18178/NCRASETM/	Gathering all the recent Innovations to advance the technology through all streams
9	International Conference on Aerospace and Aerodynamics (ICAA)	Dehradun (India) And 02/11/2021	http://iferp.org /Conference/4395/ICAA/	Platform to share cutting edge developments on the fields of aerospace and aerodynamics
10	World Disability and Rehabilitation Conference (WDRC)	Solapur (India) And 30/09/2021	http://asar.org.in /Conference/23280/WDRC/	Advancement in new techniques and horizons that will contribute to advanced research in science

4.1 List of 5 Research happening/Case Study/News :

S.No.	Article Title	Source	Additional Information
1	Bibliometric analysis related to mathematical research through database dimensions	https://iopscience.iop.org/article/10.1088/1742-6596/1776/1/012055/meta	Purpose of this research paper is to conduct bibliometric research in online scientific publications.

2	Peer to Peer communication between the Autonomous vehicles using virtual private network	http://eprints.eudl.eu/id/eprint/3863/	Main purpose of this research is to develop a reliable communication software for the between self driving vehicles.
3	LitCovid: A database of Coronavirus Research	https://www.tandfonline.com/doi/full/10.1080/02763869.2021.1873639	Main purpose of this literature is to provide an effective, relevant data and scientifical research updates on coronavirus.
4	Implementation of Convolutional Neural Network approach for covid-19 disease detection	https://journals.physiology.org/doi/abs/10.1152/physiolgenomics.00084.2020%40apsselect.2020.7.issue-12	This CNN is used in Fully Automated Detection of covid-19 disease and it is helpful because we don't have to extract any diseased tissue from the patients.
5	Physics-informed Machine Learning: Case Studies for weather and climate modelling	https://royalsocietypublishing.org/doi/full/10.1098/rsta.2020.0093	This case study describe about how physics domain knowledge used in ML models to get an more accurate results on weather and climate.

5.1 Based on the above reviews finalizing one of the research thrust area with proper justification :

Research Area : Combined deep CNN - LSTM Network for the detection of cororavirus using X-ray Images.

Introduction :

The covid pandamic that has spread across the world has set all areas on lockdown. Coronavirus detection at an starting stage plays an important role to control it before it is highly infectious. Numerous Analysts have Exhibited the different ways to deal with identifying coronavirus using X-ray pictures. These days, automatic disease detection has turned into a vital issue in medical sciences because of fast population. So, Eventually a deep learning model based system that combine CNN and LSTM networks to automatically detect covid-19. A dataset is formed comprising 4575 images for developing a model.

Convolutional Neural Network : (CNN)

A CNN is a series of convolution and pooling layers before a fully connected layer. The convolution layer has a set of Kernels for deciding a tensor of feature Maps. To increase the non-linearity in feature maps, the rectified linear unit (Relu) activation function is utilized. Relu is used for keeping the threshold input to zero. pooling layer is used to reduce the size of the input by removing unnecessary data to complete the task faster. Max pooling is the most common method, which produces the maximum value in an input region. Fully connected layer is used to classify the input data into various categories.

Long short-term memory (LSTM) :

It is an improvement of recurrent neural network (RNN). It proposes memory blocks rather than a conventional RNN units in addressing the vanishing and exploding gradient issue. This Network can recall and connect past data to the data in the present It is formed with the three gates such as an input gate, a 'forget' gate, and an output gate. 'forget' gate allows the selective passage of data using a sigmoid layer and a dot product.

Combined CNN-LSTM : CNN is used for the feature extraction and LSTM is utilized to classify dependent data on those features. This hybrid network has 30 layers : 12 convolution, 5 pooling layers, one fully connected, one LSTM and one output layers with softmax functio Every convolution block is joind with a few 2D-CNN's and one pooling layer, trailed by a dropout layer by a 25% dropout rate. Finally, the function map moved to LSTM for extracting time information.

Experimental results for combined CNN-LSTM : accuracy score = 99.2%; specificity = 99.2%; sensitivity = 99.3% ; F1-score = 98.9%.

Conclusion :

By analyzing the outcomes, it is exhibited that combined CNN-LSTM has significant effects on detecting covid-19. Broad test results uncovered that the proposed design outperforms a competitive CNN. The sample size is moderately little that should be expanded to test the generalizability of the created framework. This would be overcomed if the quality pictures are to be found in coming days. data just spotlights on the posterior-anterior (PA) perspective on X-rays, thus it can't seperate different perspectives of X-rays. Covid pictures including various illness side effects can't be productively classified.