Sri Lanka Institute of Information Technology

PROJECT REGISTRATION FORM

(This form should be completed and uploaded to the Cloud space on or before XXXXXXXXX)

The purpose of this form is to allow final year students of the B.Sc. (Hon) degree program to enlist in the final year project group. Enlisting in a project entails specifying the project title and the details of four members in the group, the internal supervisor (compulsory), external supervisor (may be from the industry) and indicating a brief description of the project. The description of the project entered on this form will not be considered as the formal project proposal. It should however indicate the scope of the project and provide the main potential outcome.

PROJECT TITLE (As per the accepted topic assessment form)	Smart assistant to ease the process of Covid-19 and Pneumonia Detection
RESEARCH GROUP **(as per the Topic assessment Form)**	ICT for Development
PROJECT NUMBER	TMP-21-201 (will be assigned by the lecture in charge)

PROJECT GROUP MEMBER DETAILS: (Please start with group leader's details)

	STUDENT NAME	STUDENT NO.	CONTACT NO.	EMAIL ADDRESS
1	Akalanka B.A	IT18114836	0771171272	it18114836@my.sliit.lk
2	Nimantha W.A.R.	IT18125962	0777073398	It18125962@my.sliit.lk
3	Senevirathne K.D.A	IT18115130	0775544283	it18115130@my.sliit.lk
4	Dias M.H.V	IT18121698	0767454700	it18121698@my.sliit.lk

SUPERVISOR, CO_ SUPERVISOR Details

SUPERVISOR Name	**CO-SUPERVISOR Name**
Ms. KBA Bhagyanie Chathurika	**Ms. W. Chamari Madushani Silva**
Signature	**Signature**
Attach the email as Appendix 1	**Attach the email as Appendix 2**
Date	**Date**

EXTERNAL SUPERVISOR Details (if any, may be from the industry)

				Attach the email as Appendix 3
Name	Affiliation	Contact Address	Contact Numbers	Signature/Date

ACCEPTANCE BY CDAP MEMBER (This part will be filled by the RP team)

Name	Signature	Date

PROJECT DETAILS

Brief Description of your Research Problem: (extract from the topic assessment form)

Covid-19 has become the foremost lung-related disease now a days with the ongoing pandemic situation. Therefore, it has become vital to identify patients as soon as possible and to differentiate Covid-19 patients from other patients with lung-related diseases like pneumonia. A major problem when doing this is the time it takes for the results to come out from the existing testing methods. Even though methods that can generate faster results exist these methods are too expensive for third-world countries like Sri Lanka. Sometimes the accuracy of a PCR test is in a low level compared to technologies like identifying covid-19 using CT scan. When it comes to the technical side it takes lots of time to the image uploading and processing part. Is one of the commonly found difficulties in existing applications.
Chest X-Rays are a cheap and faster method that is used to diagnose other lung-related diseases like Pneumonia, covid-19. This research will be focused on the possibility of using chest X-Rays to identify Covid-19 and differentiate them from other selected lung-related diseases.

References

[1] Tabik, S.;A. Gómez-Ríos, J. L. Martín-Rodríguez, I. Sevillano-García, M. Rey-Area, D. Charte,, "COVIDGR Dataset and COVID-SDNet Methodology for Predicting COVID-19 Based on Chest X-Ray Images," IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS,, 2020.

[2] Sumit Gupta,Harsh Sharma, Jai Sethia Jain, Priti Bansal, "Feature Extraction and Classification of Chest X-Ray Images Using CNN to Detect Pneumonia," IEEE, 2020.

[3] Arun Sharma , Sheeba Rani , and Dinesh Gupta, "Artificial Intelligence-Based Classification of Chest X-Ray Images into COVID-19 and Other Infectious Diseases," International Journal of Biomedical Imaging, October 2020.

Description of the Solution: (extract from the topic assessment form)

As a team, we propose a mobile application that assists patients to detect chest disease (covid-19, pneumonia) very quickly by just safely staying at home. As a solution for taking the risk of meeting the doctor at a hospital during a global pandemic situation, spending extra money for PCR tests, etc., we propose this app to ease the process of lung disease identification for the patients and the doctors. To maximize the accuracy level of the final report we suppose to identify pneumonia/covid-19 using a CT scan.

Firstly, an x-ray/CT scan of a patient will be scanned/uploaded using the application. Then the system itself detects the presence of pneumonia and covid-19 clouds from the x-ray. We planned to implement this process using image processing techniques. The proposed architecture will be used to detect Covid-19, pneumonia positive patients from the X-ray volumes. The entry flow facilitates

as the initial part of the architecture which accepts the X-ray volumes, extracts the features, and passes it to the second flow of the architecture. In this research we suppose to address the problem of the time which takes to upload and process the image. Therefore, in the first level we have planned to minimize the time using a new method. If a patient wants a result which has the maximum accuracy, he/she can use CT scan identification to detect the disease.

Features extracted from the first level of the application are given as input to the next level to classify the image and detect the disease. The diagnosis of the disease will be done at this level. After the classification process, the patient will be asked some questions regarding the current medical situation of his/her. This Question answering will be implemented using machine learning. We plan to get the maximum probability of having a certain disease (covid-19, pneumonia) by questioning the patient using a question and answering system.
This questioning helps to get a real idea about the patients' current situation as it asks for information about all the symptoms that occurred. To get the exact idea about the disease and to maximize the accuracy of the application as the fourth level, the patient will be asked about his/her medical history and identify habits like smoking, etc. using the question answering system feature. Finally, the patient will be advised about the precautionary methods and what he/she wants to do right at the moment.

Main expected outcomes of the project: (extract from the topic assessment form)

An effective chest disease detection application that helps patients to identify whether they are suffering from covid-19/pneumonia or not without waiting for a long time and advice patients with health precautionary methods and recommendations.

WORKLOAD ALLOCATION (**extract from the topic assessment form after correcting the suggestions given by the topic assessment panel.**)

(Please provide a brief description about the workload allocation)

MEMBER 1

- **Chest CT scan images acquisition, which is a process of acquiring from the physical device**
- **Chest CT scan images enhancement, which is a technique of processing the Chest CT scan images according to the specific application, enhanced chest CT scan image is more suitable than the original chest CT scan image that have acquired.**
- **Chest CT scan image segmentation, which is a process of partitioning chest CT scan images into meaningful regions, the segmentation based on different measurements taken from the chest CT scan**
- **Developing a model for chest CT scan image identification using a machine learning technique**
- **Develop a method for classifying Covid-19 by identifying the chest CT scan image patterns**

MEMBER 2

- **Understanding correct objects and automatically process the data of that specific object and ready for the disease identification process**
- **Segment the captured chest x-ray image to identify the image.**
- **Adding colour filtering algorithm to the captured image**
- **Organize processed Data for disease identification algorithms.**
- **Develop a model for image acquisition and enhancement.**
- **Develop an algorithm to analyze a sample of captured chest x-ray images to predict Covid-19 or Pneumonia.**
- **Develop a method for classifying Covid-19 and Pneumonia.**

MEMBER 3

- **Data sampling – symptoms of pneumonia and covid-19 patients**
- **Select key attribute and creating new dataset**
- **Evaluate predicted model for identify pneumonia or covid-19 using symptoms**
- **Building algorithm for classification.**
- **Training a neural network to classify disease**

MEMBER 4

- **Data sampling – behaviors and other diseases of pneumonia and covid-19 patients**
- **Select key attribute and creating new dataset**
- **Evaluate the predicted model for identify the risk level of the person using behaviors and other diseases.**

- **Building and customizing algorithm for predict risk level**
- **Training a neural network to predict risk level**

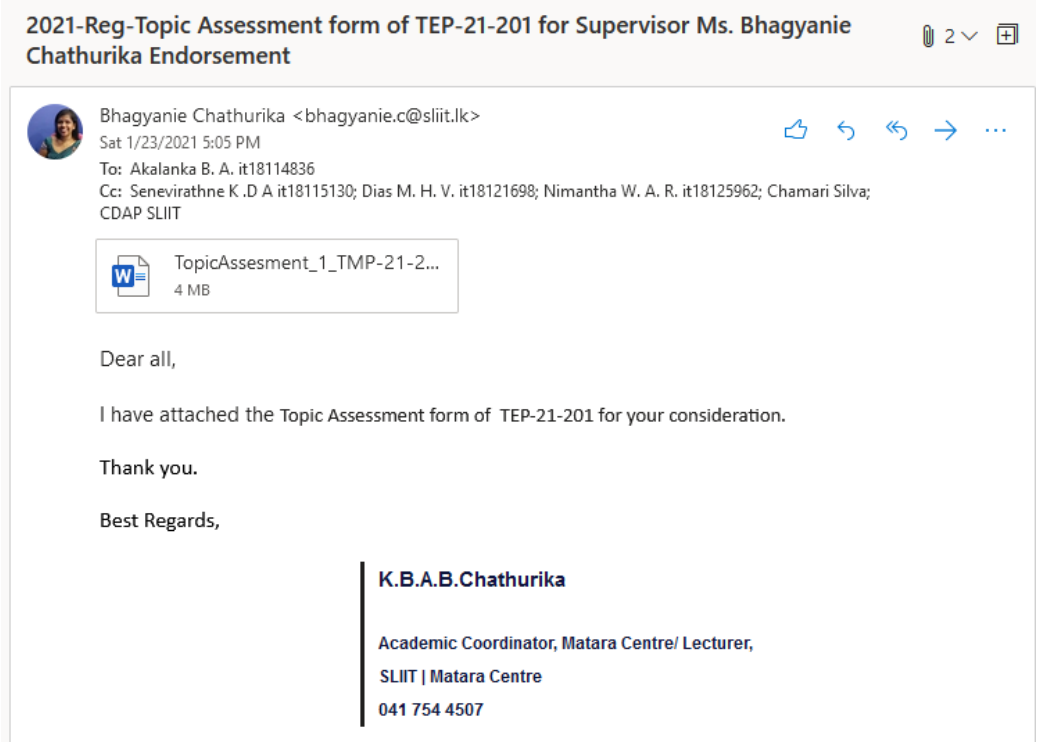
DECLARATION (Students should add the Digital Signature)

"We declare that the project would involve material prepared by the Group members and that it would not fully or partially incorporate any material prepared by other persons for a fee or free of charge or that it would include material previously submitted by a candidate for a Degree or Diploma in any other University or Institute of Higher Learning and that, to the best of our knowledge and belief, it would not incorporate any material previously published or written by another person in relation to another project except with prior written approval from the supervisor and/or the coordinator of such project and that such unauthorized reproductions will construe offences punishable under the SLIIT Regulations.

We are aware, that if we are found guilty for the above mentioned offences or any project related plagiarism, the SLIIT has right to suspend the project at any time and or to suspend us from the examination and or from the Institution for minimum period of one year".

	STUDENT NAME	STUDENT NO.	Signature
1	Akalanka B.A	IT18114836	
2	Nimantha W.A.R	IT18125962	
3	Senevirathne K.D.A	IT18115130	
4	Dias M.H.V	IT18121698	

Appendix 1



2021-Reg-Topic Assessment form of TEP-21-201 for Supervisor Ms. Bhagyanie Chathurika Endorsement

2

Bhagyanie Chathurika <bhagyanie.c@sliit.lk>
Sat 1/23/2021 5:05 PM
To: Akalanka B. A. it18114836
Cc: Senevirathne K .D A it18115130; Dias M. H. V. it18121698; Nimantha W. A. R. it18125962; Chamari Silva; CDAP SLIIT

TopicAssesment_1_TMP-21-2...
4 MB

Dear all,

I have attached the Topic Assessment form of TEP-21-201 for your consideration.

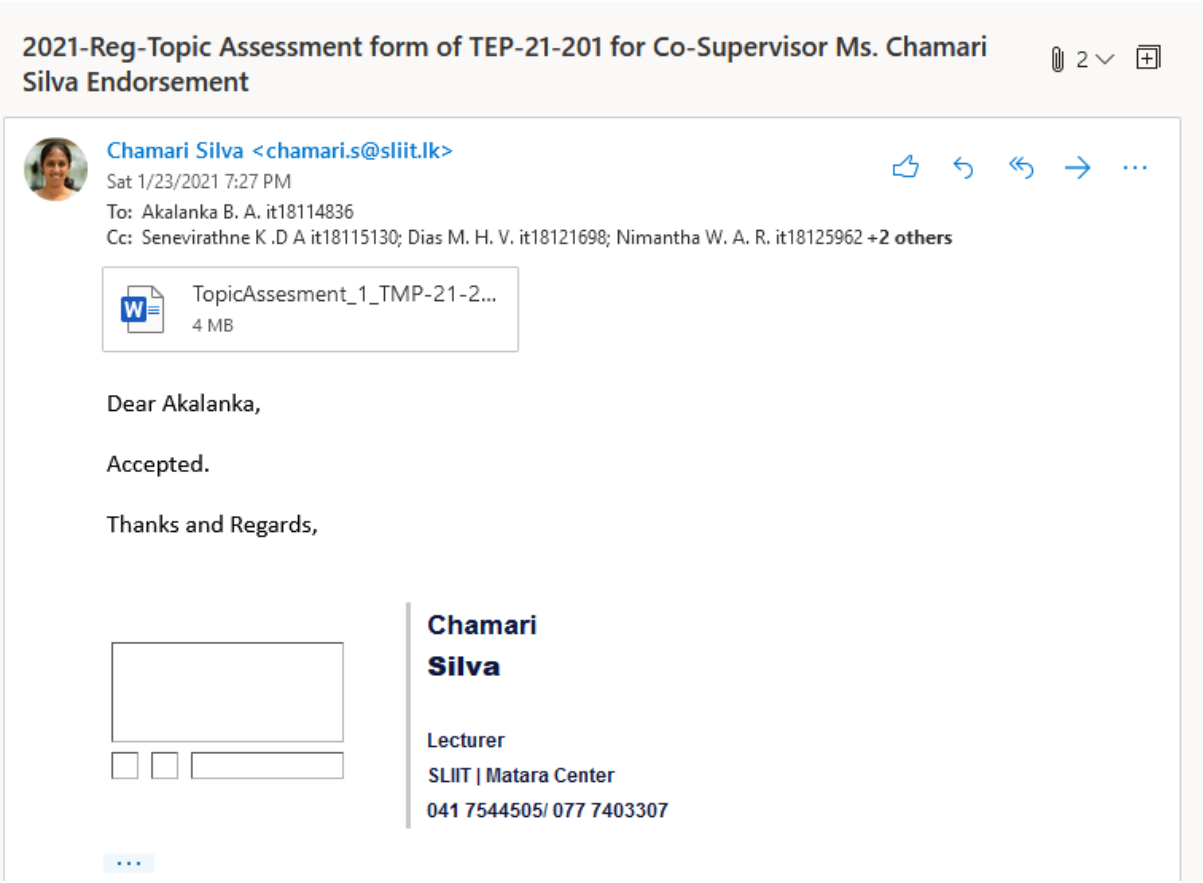
Thank you.

Best Regards,

K.B.A.B.Chathurika

Academic Coordinator, Matara Centre/ Lecturer,
SLIIT | Matara Centre
041 754 4507

Appendix 2



2021-Reg-Topic Assessment form of TEP-21-201 for Co-Supervisor Ms. Chamari Silva Endorsement

2

Chamari Silva <chamari.s@sliit.lk>
Sat 1/23/2021 7:27 PM
To: Akalanka B. A. it18114836
Cc: Senevirathne K .D A it18115130; Dias M. H. V. it18121698; Nimantha W. A. R. it18125962 **+2 others**

TopicAssesment_1_TMP-21-2...
4 MB

Dear Akalanka,

Accepted.

Thanks and Regards,

Chamari
Silva

Lecturer
SLIIT | Matara Center
041 7544505/ 077 7403307