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 entail 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)	DiaBeta: Intelligent, Secured Smart App for Complete Diabetes Lifestyle Management
RESEARCH GROUP **(as per the Topic assessment Form)**	TMP-22-162
PROJECT NUMBER	(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	Jayasekara J.T.N. N	IT19115894	0769676556	it19115894@my.sliit.lk
2	Gunasekera R. H	IT19184272	0704220755	it19184272@my.sliit.lk
3	Ravindu Hasanka V. G	IT19156798	0777146481	it19156798@my.sliit.lk
4	Hasintha Kashmika H.B. G	IT19115962	0775842695	it19115962@my.sliit.lk

SUPERVISOR Name	CO-SUPERVISOR Name
Ms. P.K. Suriya Kumari	Mr. Ravi Supunya
Signature	**Signature**
Appendix 1	**Appendix 2**
Date	**Date**

SUPERVISOR, CO_ SUPERVISOR Details

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)

In today's Sri Lankan health sector, the rapid expansion of noncommunicable diseases is a major issue. One of the most common non-communicable diseases is diabetes. Diabetic patients are increasing worldwide, and the rate in low- and middle-income nations is concerning. In emerging and low-income nations, diabetes medication is still expensive, leading to high mortality. According to recent statistics by the International Diabetes Federation (IDF), the prevalence of diabetes among adults in Sri Lanka is 8.5%. At present, one in 12 adults in the country suffers from diabetes, which totals to 1.16 million [1].

Considering diabetes is a lifelong illness that cannot be cured, prevention and control are essential. However, effective lifestyle management takes awareness, education, and consideration. Information and communication technology has made life simpler by making it easier to locate information. As smartphone prices continue to fall, smartphone-based applications are growing increasingly popular [2].

Most patients neglect to attend clinic sessions, consultations, and treatments as they are not aware of their current situation [3] and haven't kept track with their illness [4]. Most of them haven't followed a proper diet meal plan and keeping track of daily glucose level is also difficult for the patients. If there is a way to know more about their current diabetes situation, reminders of clinic session dates, keep track of daily food consumption, glucose level and future risk of heart, kidney and eye [5], suggest proper diet and exercise [6] to avoid future risk it will be more valuable for the diabetes patients.

[1] Bandara, S., 2021. talkingeconomics - Beat Diabetes in Sri Lanka: Too Much Sugar is Not that Sweet. [online] Ips.lk. Available at: <https://www.ips.lk/talkingeconomics/2016/04/07/beat-diabetes-in-sri-lanka-too-much-sugar-is-not-that-sweet/> [Accessed 16 December 2021].

[2] Callahan, A., Bedosky, L. and Kacy Church, M., 2021. 16 Best Diabetes Apps to Try in 2021. [online] EverydayHealth.com. Available at: <https://www.everydayhealth.com/hs/type-2-diabetes-care/diabetes-apps/> [Accessed 16 December 2021].

[3] H. Ahmed, E. M. G. Younis, and A. A. Ali, "Predicting Diabetes using Distributed Machine Learning based on Apache Spark," IEEE Xplore, Feb. 01, 2020. https://ieeexplore.ieee.org/document/9047795 (accessed Dec. 16, 2021).

[4] R. Y. Toledo, A. A. Alzahrani, and L. Martínez, "A Food Recommender System Considering Nutritional Information and User Preferences," IEEE Access, vol. 7, pp. 96695–96711, 2019, doi: 10.1109/ACCESS.2019.2929413.

[5] S. Ananthi and V. Bhuvaneswari, "Prediction of heart and kidney risks in diabetic prone population using fuzzy classification," IEEE Xplore, Jan. 01, 2017. https://ieeexplore.ieee.org/document/8117713 (accessed Dec. 16, 2021).

[6] G. Usic, "Development of a Patient-Specific Model for Patients with Diabetes Type I Using Meal and Exercise Guidelines from Modern Schools of Diabetes," IEEE Xplore, Oct. 01, 2020. https://ieeexplore.ieee.org/document/9280228 (accessed Dec. 16, 2021).

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

As a result of extensive research conducted in the field of health informatics, it was realized that a mobile application with the entire diabetes lifestyle management, which mainly featured data analytic for disease classification, visualization, analytical processing, and awareness on data changes is important and useful according to the research problem.

In order to satisfy this necessity, we decided to build a mobile application called, "DiaBeta" which is an Intelligent, Secured Smart App for Complete Diabetes Lifestyle Management.

DiaBeta has features that help you make the most out of the app, such as predicting the diabetes in early stages, reminders for the clinic session, daily tracking of blood sugar level, identifying current diabetes situations, predicting future heart, kidney and eye risk, and automatically connecting with glucose monitors and reading data etc. All the data and charts are easy to send to your doctor, so you can work together to adjust your treatment and better manage your diabetes based on real, accurate information.

Our application is here to support diabetes patients in figuring out which foods are best for keeping your blood sugar in a healthy range. The app makes it easy for you to track daily food consumption and discover more information about the foods you put in your body. This app is intelligent enough to provide an accurate diet for the users according to their current glucose level.

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

The proposed DiaBeta app will help users reduce their risk of diabetes by identifying their current diabetic stage with up-to-date information and predict their future levels, provide smart diet plans according to user's current diabetic stages, provide personalized exercise prescription, identify user's health risks (kidney, eyes, heart), help users to log their glucose data by connecting to smart devices and keep track of users' daily steps and calories, they burn.

DiaBeta is a life-saving application that can be used to get a more accurate, personalized diet plan not only for diabetics around the world but also for non-diabetics. DiaBeta provides accurate, clinically, validated, standardized solutions.

WORKLOAD ALLOCATION (**extract from the topic assessment form after the correction suggested by the topic assessment panel.**)

(Please provide a brief description about the workload allocation)

MEMBER 1	IT19115894

Implement diabetes level prediction using machine learning and health history logging. When it comes to existing mobile applications in google play store, there aren't many that use a machine learning technique to predict users' current and future stages. Instead, most of them use a basic questionnaire to determine the user stage. DiaBeta can more precisely forecast users' current and future diabetes phases using machine learning approaches.

- Gather requirements and historical details of patients.
- Disease classification through past data records of patients and data visualization.
- Forecast the current stage of the patient.
- Predict future diabetes level and keep track of the user's data. (Sugar levels, medicines, insulin, and other health vitals etc.)

Inputs: Glucose, Blood Pressure, Insulin, Skin Thickness, BMI, Age, Gender

Outputs: User diabetes level, User's data visualization

MEMBER 2	IT19184272

Implement a healthy meal and wellness plan. There are some applications which suggest diet plans but most of them do not provide accurate meal plans according to users' diabetes level. Although there are other applications, they provide mostly foreign but not local cuisine. Users need to provide their current meal plan for DiaBeta App to generate a more accurate, personalized diet plan using a matching algorithm.

- Gather requirements and historical details of patients.
- Calculating BMR, BMI and personalize matching meal plan and exercise prescription.
- Recommend healthy diet plans to prevent and reduce the risk of developing diabetes.

- Provide exercise prescription plans to control and lower users' blood sugar level by making the body more sensitive to insulin.

Inputs: fasting blood sugar level, lipid profile, blood pressure, weight in kg, height in cm, age in years, Gender

Outputs: personalized meal plan with local cuisine, personalized exercise prescription.

MEMBER 3 IT19156798

Implement feature to identify health risk by analyzing user's current health records. DiaBeta provides an accurate health risk identification for kidney, eye, heart, etc. by using machine learning techniques and providing health tips to users to reduce their health risks.

- Gather requirements and historical details of patients.
- Compare the patient's history details with the current situation for decision making on ongoing treatments.
- Identify user's Heart risks, Eyes Risk and Kidney risks by analyzing users' data.
- Analyze the data sets to generate reports based on charts.

Inputs: Glucose, Blood Pressure, cholesterol, Skin Thickness, BMI, Age, C-reactive protein levels, Gender

Outputs: User health risk level.

MEMBER 4 IT19115962

Implement IOT devices connectivity and 3rd party app integrations. Most diabetes applications need to input sugar level manually. In DiaBeta we connect our application via Bluetooth to the devices and log their glucose level automatically when they measure their blood sugar. The DiaBeta application supports tracking users' daily steps and calories they burn.

- Get access to physical devices (glucose monitor) to help and manage patient conditions.
- Keep track of user's glucose level daily and log it.
- Keep track of carbs and body mass index details.

- Gather necessary information about exercise details of the user.

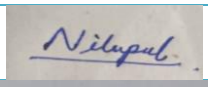
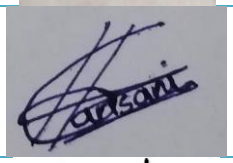
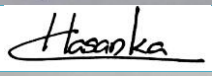
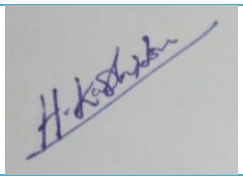
Inputs: Blood Glucose Content, Blood Pressure (Systolic Blood Pressure, Diastolic Blood Pressure), BMI (Height, Weight), Track of Carbs, Age, Gender, Heart Rate, Type of Exercise

Outputs: Users' daily glucose level, steps count and calories they burn.

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 of 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	Jayasekara J.T.N. N	IT19115894	
2	Gunasekera R. H	IT19184272	
3	Ravindu Hasanka V.G.	IT19156798	
4	Hasintha Kashmika H.B. G	IT19115962	

Appendix 1

2022-Regular-Topic Assesment form of TMP-22-162 for Supervisor Ms.P.K.Suriya Kumari Endorsement

Suriyaa Kumari <suriyaa.k@sliit.lk>
Fri 12/17/2021 11:50 PM
To: Jayasekara J.T.N.N. it19115894

[EXTERNAL EMAIL] ***This email has been received from an external source – pleas review before actioning, clicking on links, or opening attachments.***

Dear Research Team,

As the supervisor, I acknowledge the submission of the topic assessment.

Best Regards,

Get Outlook for Android

Appendix 2

2022-Regular-Topic Assessment form of TMP-22-162 for Co Supervisor Mr.Ravi Supunya Endorsement

Ravi Supunya <ravi.s@sliit.lk>
Sat 12/18/2021 11:10 AM
To: Jayasekara J.T.N.N. it19115894

[EXTERNAL EMAIL] ***This email has been received from an external source – pleas review before actioning, clicking on links, or opening attachments.***

This is ok

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