



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)

Detection of Energy Consumption and Performance of Third-party Applications using Machine Learning and Artificial Intelligence

RESEARCH GROUP (as per the Topic assessment Form)

Machine Learning and Soft Computing (MLSC)
Artificial Intelligence (AI)

PROJECT NUMBER

TMP-2022_23-19

(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 |
|--------|-----------------|-------------|-------------|------------------------|
| Format | | | | |
| 1 | Rahman S.H. | IT19189086 | 0775098855 | IT19189086@my.sliit.lk |
| 2 | Thiranya M.A.R. | IT19129440 | 0719229336 | IT19129440@my.sliit.lk |

| | | | | |
|---|---------------------|------------|------------|------------------------|
| 3 | Jayasinghe H.M.C.P. | IT19048338 | 0761230552 | IT19048338@my.sliit.lk |
| 4 | Rajapaksha R.M. | IT19156316 | 0776026063 | IT19156316@my.sliit.lk |

SUPERVISOR, CO_SUPERVISOR Details

| SUPERVISOR Name | CO-SUPERVISOR Name |
|--------------------------------|--------------------------------|
| Sanjeevi Chandrasiri | Madhuka Nadeeshani |
| Signature | Signature |
| Attach the email as Appendix 1 | Attach the email as Appendix 2 |
| 2022/09/06 | 2022/09/06 |
| Date | Date |

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

| | | | | |
|-------------------|--|-----------------|-----------------|-----------------------------------|
| Ms.Malika Lakmali | Lecturer Department of Mathematics and Statistics | | 071 7192341 | 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)

Today, every second matters to compete in this fast-changing world. A user might question an application's performance and risk before trying to install it. A software developer considers performance one of the most significant elements when developing or building software. It would be more beneficial for a user and a developer or any other individual who uses the software if we could see how the third-party software we are about to install will balance the performance and capacity of our device/machine. There are occurrences where a user might regret the choice of installing a faulty third-party application which not only decreases the performance of his/her device but threatens the security and privacy of the user's device. When it comes to the developer's perspective, a developer first needs to attempt to program from a language stack and find out that his/her machine is not compatible with the overloaded energy consumption and performance, thus making the machine slow. The developer would regret its choice of language stack and move on to other options, which could be time-consuming and exhausting.

The problems occurring under the performance and energy consumption after installing third-party applications on any device are listed below:

- Any PC does not function well once the third-party software is installed and will not support anything until the specific software is uninstalled.
- Once the third-party program is installed, the PC becomes slow in performance and tasks, affecting the performance of other software.
- There can be risks to security and privacy issues to malware and virus attacks coming from the third-party application, which the user will be unaware of.
- As software engineers and members of the software development team, there is stress accompanied by the lack of performance of device machines due to disk space or limited RAM capacity, increasing time consumption for all team members.

References:

- Himeur, Y., Ghanem, K., Alsalemi, A., Bensaali, F. and Amira, A. (2021). Artificial intelligence based anomaly detection of energy consumption in buildings: A review, current trends and new perspectives. *Applied Energy*, [online] 287, p.116601. doi:10.1016/j.apenergy.2021.116601.
- Eid, S., Makady, S. and Ismail, M. (2020). Detecting software performance problems using source code analysis techniques. *Egyptian Informatics Journal*, 21(4), pp.219–229. doi:10.1016/j.eij.2020.02.002.

Hrci Marketing. (n.d.). Top 5 Common Performance Problems. [online] Available at: <https://www.hrci.org/community/blogs-and-announcements/hr-leads-business-blog/hr-leads-business/2022/02/14/top-5-common-performance-problems> [Accessed 15 Jul. 2022].

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

The world is coping with time and technology nowadays. To compete in this rapidly changing world, we must always be quicker than others regarding technology. Modern technology's masterpiece is fast new software inventions. Therefore, when a client uses software or a developer creates software, they primarily evaluate the software's performance on their computer or mobile device before installing any third-party software that will meet their needs. Therefore, when a user installs any third-party software, our implemented tool will be able to detect, analyze and provide solutions to the potential device harm and security concerns that could come with installing a third-party application. When a developer begins working with a new language stack, he/she will be able to identify potential harm that could occur to the PC if they were to proceed. While working with any stack, they will be able to identify coding standards, performance ethics and maintenance with the help of the tool.

To offer a solution to the above scenario, we propose a '**Non-Specific Technology Risk Calculator**', a framework, desktop, and mobile application to achieve the objectives and provide a solution to the problem. We offer software that would assist a user to find out a third-party application's working performance and compatibility, and provide a user with in-depth information about what the application is about, and what harms/drawbacks could occur if the user proceeds with the installation. The tool will use the device specifications and third-party software specifications to compare them to understand how they affect the performance, RAM, and CPU capacity that could potentially harm the device's hardware and performance, and offer suggestions to overcome it.

Our suggested application/framework will detect and compare the mobile and desktop applications' device specifications of the user and third-party software applications. Furthermore, if the third-party application specifications match the mobile/desktop specification, our suggested application will allow the installation to proceed. Otherwise, if they do not, our suggested mobile application will provide a drawback report to alert the user, who can choose whether to proceed with the installation or stop it at their discretion. Our suggested desktop/mobile application should alert the user if the software becomes overheated or overloaded with excess RAM.

Moving on to the framework, a developer initially installs our framework together with the default programming languages. Our proposed framework should be able to download all the required packages. Our framework will make the necessary suggestions while the developer is constructing the software. Once the installation is complete, the developer should run it along with the required port number. If the developer desires, they can examine the software-created component by component to see if the developed portion complies with the code quality, standards, and performance our framework offers.

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

- Detection of the User Device and Third-Party Application Performance and Compatibility.
- Comparison of User device performance compatibility with the third-party application (before installation).
- Initiation of the Non-Specific Technology Risk Calculator framework with developer platform and configuration of the framework extension.
- Generation and analysis report of improvements/compatibility of the developing language and application aspects.

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 | Detection of the User Device and Third-Party Application Performance and Compatibility..... |
| Implement the mobile/desktop specification detector which will identify both the device and the third-party application's specific requirements. The main task is to make the detector compatible with all types of Operating systems (Android, iOS, etc.) that will work for both mobile and desktop devices. The detector will not only detect the specifications but also retrieve information from a web app portal to obtain specifications from similar third-party applications and suggest them to the user. | |



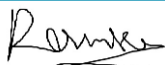
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|----------|--|
| MEMBER 2 | Comparison of User device performance compatibility with the third-party application (before installation). |
| | <p>Implement the comparison algorithm to detect and compare the performance and energy consumption for both third-party applications and the user's device. The task is to obtain the information related to specifications and provide an analysis of the comparison in the form of a report. Implementation will be done to detect the energy consumption and performance and display a warning message to the user, asking permission to proceed with installation despite the drawbacks that are detected. The tool will also provide new metrics for a smooth performance level of the user's device.</p> |
| MEMBER 3 | Initiation of the Non-Specific Technology Risk Calculator framework with developer platform and configuration of the framework extension. |
| | <p>The main task is to develop basic packages for the framework for the developer. The framework will be implemented with an environmental tracking tool, completely initiated with the CMS/terminal. A package library will also be developed for different programming languages, that will not only ensure programming compatibility but also provide suggestions and best standard practices with the language. The task will also include the development of a dev bot, which will be able to assist the programmer to carry out the above.</p> |
| MEMBER 4 | Generation and analysis report of improvements/compatibility of the developing language and application aspects. |
| | <p>The main task is to implement an algorithm which will extract the specifications of the developing language and/or application and provide a deep analysis of improvements, compatibility range and performance metrics. The task will also involve an algorithm that will be implemented to detect the energy consumption being used from the programming stack and issue a warning message to the developer. An extension for Visual Studio Code will also be developed to detect</p> |

and identify any syntax errors during the development process and provide a visual representation in the form of a report to the developer.

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 | Rahman S.H. | IT19189086 |  |
| 2 | Thiranya M.A.R. | IT19129440 |  |
| 3 | Jayasinghe H.M.C.P. | IT19048338 | <i>chathura</i> |
| 4 | Rajapaksha R.M. | IT19156316 |  |

Appendix 1

Supervisor acknowledgement (Ms. Sanjeevi Chandrasiri)



Sanji Chandrasiri

to me, Madhuka, Malika, Jayasingha, Thiranya, Rajapaksha ▼

2:27 PM (0 minutes ago) ☆ ↩ ⋮

Dear student,

I acknowledge the project charter document.

Best Regards,

Appendix 2

Co-Supervisor acknowledgement (Ms. Madhuka Nadeeshani)



Madhuka Nadeeshani

to me, Sanji, Malika, Jayasingha, Thiranya, Rajapaksha ▼

1:50 PM (7 minutes ago) ☆ ↩ ⋮

Dear student,

I acknowledge the project charter document.

Best Regards,
Madhuka

Appendix 3

External-Supervisor acknowledgement (Ms. Malika Lakmali)



Malika Lakmali

to me, Sanji, Madhuka, Jayasingha, Thiranya, Rajapaksha ▼

12:14 PM (8 minutes ago) ☆ ↩

Dear Student,

I acknowledge the document.

Best Regards,

[cid:a56663fa-b72c-4c79-813f-2c4c647e27ef]

[cid:f80c15a1-9ca6-4989-8f62-b4e1bea251ae]<<https://www.sliit.lk/>> [cid:48a8e40d-468c-4fee-a844-94417ded0d4a]

<<https://www.facebook.com/sliit.lk/>> [cid:e6301c7e-3fdc-4695-9d3a-0710962982b6]

Lakmali Guruge

Lecturer

Department of Mathematics and Statistics