**Higher Nationals - Summative Assignment Feedback Form**

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| --- | --- | --- | --- |
| **Student Name/ID** | Huynh Van Qui/GCC210153 | | |
| **Unit Title** | Computing Research Project | | |
| **Assignment Number** | 1 | **Assessor** | Tran Thi Kim Khanh |
| **Submission Date** | December 23, 2023 | **Date Received 1st submission** |  |
| **Re-submission Date** |  | **Date Received 2nd submission** |  |
| **Assessor Feedback:**  \*Please note that constructive and useful feedback should allow students to understand:   1. Strengths of performance 2. Limitations of performance 3. Any improvements needed in future assessments   Feedback should be against the learning outcomes and assessment criteria to help students understand how these inform the process of judging the overall grade.  Feedback should give full guidance to the students on how they have met the learning outcomes and assessment criteria. | | | |
| **Grade:** | **Assessor Signature:** | | **Date:** |
| **Resubmission Feedback:**  \*Please note resubmission feedback is focussed only on the resubmitted work | | | |
| **Grade:** | **Assessor Signature:** | | **Date:** |
| **Internal Verifier’s Comments:** | | | |
| **Signature & Date:** | | | |

\* Please note that grade decisions are provisional. They are only confirmed once internal and external moderation has taken place and grades decisions have been agreed at the assessment.

Unit 16: Computing Research Project

Assignment Brief 2

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| --- | --- |
| Unit Number and Title | Unit 16: Computing Research Project |
| Academic Year | 2023 - 2024 |
| Unit Tutor | Nguyen The Lam Tung |
| Assignment Title | Proposing and conducting a research project |
| Issue Date | 01 September 2023 |
| Submission Date | 01 August 2023 |
| Submission Format | |
| |  |  | | --- | --- | | *Format* | The submission is in the form of an individual written report that shows how you have manage the project. This should be written in a concise, formal business style using single spacing and font size 12. You are required to make use of headings, paragraphs and subsections as appropriate, and all work must be supported with research and referenced using the Harvard referencing system. Please also provide a bibliography using the Harvard referencing system. | | *Submission* | Students are compulsory to submit the assignment in due date and in a way requested by the Tutors. The form of submission will be a soft copy in PDF posted on corresponding course of <http://cms.greenwich.edu.vn/> | | *Note* | The Assignment must be your own work, and not copied by or from another student or from books etc. If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference your sources, using the Harvard style. Make sure that you know how to reference properly, and that understand the guidelines on plagiarism. *If you do not, you definitely get fail*. | | |
| Unit Learning Outcomes | |
| LO4: Reflect on the application of research methodologies and concepts. | |
| Transferable skills and competencies developed | |
| The assignment offers students the chance to explore various aspects of big data from the perspective of computing professionals or data scientists. It also encourages investigations into the applications, benefits, limitations, and responsibilities associated with big data and provides solutions to the problems it aims to solve. | |
| Vocational scenario | |
| Introduction to theme  Big Data  Over the past decade, the term "big data" has gained increasing popularity. Initially, it referred to data generated in massive volumes, such as internet search queries, weather sensor data, and social media information. Nowadays, big data represents large amounts of information from diverse sources that cannot be processed conventionally or without computational intervention. Big data can be stored in structured, unstructured, or semi-structured formats. Many systems and organizations generate massive quantities of big data on a daily basis, some of which are publicly available for analysis. Consequently, machine learning systems have been developed to sift through this data, rapidly identify patterns, and solve problems. This has led to the emergence of data science analytics as a discipline to design, build, and test machine learning and artificial intelligence systems. Leveraging big data requires a broad range of knowledge and skills, creating new opportunities for previously inaccessible organizations. It allows businesses to gain a comprehensive understanding of global trends, enabling more accurate and up-to-date decision-making. Big data can help identify potential business risks earlier and minimize costs without compromising innovation. However, the rapid application of big data raises concerns about security, the ethical storage of personal data from multiple sources, and the sustainability of energy requirements in large data warehouses.  Task  As you have completed your research project in the assignment 1, now it is time to look back and learn some lessons from your work. You need to prepare a report to describe your personal development. Remember to write your own experience, thoughts and it is specific to YOU NOT explaining the general concepts. | |
| Assignment activity and guidance | |
| Here are some suggestions which you can put in the report:   * Project’s proposal, the research process(sequential example) how it helped you completed your research * Reflection on the merits, limitations and potential pitfalls of the chosen methods: examples qualitative research, secondary research; the relationship between the two in your research * The roles of Literature review in your project * How did you create project plan and how often you did you update it. Why you need you need to update the plan * How often did you meet the tutor and how the tutor helped you to create more effective research. * How did you choose participations(sample types, sizes) and the importance of it? * How did you present your research result? * Consider other research approach and improvements in future research * ….. | |

**Learning Outcomes and Assessment Criteria**

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| --- | --- | --- |
| Pass | Merit | Distinction |
| **LO4** Reflect on the application of research methodologies and concepts | | **LO4**  **D3** Demonstrate reflection and engagement in the resource process leading to recommended actions for future improvement. |
| **P6** Reflect on the effectiveness of research methods applied for meeting objectives of the computing research project.  **P7** Consider alternative research methodologies and lessons learnt in view of the outcomes. | **M4** Provide critical reflection and insight that results in recommended Actions for improvements and future research considerations. |

Contents

[I. Introduction 7](#_Toc154244431)

[II. Reflection of research 7](#_Toc154244432)

[1. Research Proposal 7](#_Toc154244433)

[a. Overview 7](#_Toc154244434)

[b. Limitations 7](#_Toc154244435)

[c. Lesson learnt 8](#_Toc154244436)

[2. Literature review 8](#_Toc154244437)

[a. Overview 8](#_Toc154244438)

[b. Limitations 8](#_Toc154244439)

[c. Lesson learnt 8](#_Toc154244440)

[3. Project Plan 9](#_Toc154244441)

[a. Overview 9](#_Toc154244442)

[b. Limitations 9](#_Toc154244443)

[c. Lesson learnt 9](#_Toc154244444)

[4. Research Process 10](#_Toc154244445)

[a. Overview 10](#_Toc154244446)

[b. Limitations 10](#_Toc154244447)

[c. Lesson learnt 10](#_Toc154244448)

[5. Research Methods 10](#_Toc154244449)

[5.1. Qualitative research 10](#_Toc154244450)

[5.2. Quantitative research 11](#_Toc154244451)

[6. Presentation of result 12](#_Toc154244452)

[a. Primary Research 12](#_Toc154244453)

[b. Secondary Research 12](#_Toc154244454)

[c. Research Present 13](#_Toc154244455)

[III. Conclusion 14](#_Toc154244456)

[IV. References 15](#_Toc154244457)

# Introduction

**Title:** Upgrade delivery drone by using Big Data, Terrestrial laser scanning, and scan-to-BIM

**The purpose of the research:**

In Assignment 1, I completed tasks including writing the proposal, writing the literature review, doing the primary research and secondary research. For assignment 2, I will revisit and assess the steps in the whole research project to identify the pros and cons of the research, as well as the learning and experiences acquired during the research process. The aim of this research project is to upgrade delivery drone by using Big Data, Terrestrial laser scanning, and scan-to-BIM

# Reflection of research

## Research Proposal

### Overview

* **Definition**: A research proposal is an introductory document that maps out the areas of study the researcher intends to address. The research proposal is usually prepared in advance of starting a project. (indeed, 2023)
* **Benefits**: This research proposal me several benefits. For example, it helps me see clearly and focus on the purpose of my research. This proposal also proves the feasibility of the project. Furthermore, it helped me improve skills such as content identification, project planning, and proposal writing. In addition, It provides step-by-step instructions for designing and carrying out the research work

### Limitations

During the process of writing a research proposal, I encountered a difficulty: not being able to choose a topic. Therefore, I spent a lot of time choosing a suitable topic to write a research proposal. In addition, asking research questions is also quite a time-consuming task.

### Lesson learnt

From the difficulties of writing a proposal, I have learned lessons such as being decisive when choosing a topic. Moreover, I was guided by the tutor on how to properly name the title topic. The tutor also guided me on how to write more in-depth research questions to facilitate searching for documents.

## Literature review

### Overview

* Definition: A literature review is a survey of scholarly sources on a specific topic such as relevant theories, methods and knowledge.
* Benefits: The literature review helps me synthesise information about theory, methods, and techniques. From there, provide technology applications into new fields. Furthermore, it helps me understand more about the current knowledge of the field being researched.

### Limitations

One of the challenges I encountered was finding materials; Because my keywords are not suitable, this task becomes difficult. At the same time, because my vocabulary is still limited, when reading articles, I still do not understand all the information the author mentioned. Moreover, because I spent a lot of time choosing a topic for myself, reading the articles became rushed, so I did not read and understand all the author's opinions and comments in the article.

### Lesson learnt

Thanks to my tutor's guidance, I was able to find documents related to my topic with greater ease. Moreover, I have learned how to select articles more effectively by reading their titles and filtering out those that are not necessary for my research. I have also improved my reading skills by focusing on the abstracts and conclusions of the articles. As a result, I am now able to draw mind maps more effectively for my literature review by identifying the key problems and solutions presented in each article.

## Project Plan

### Overview

I started by choosing a topic for the project by observing life around me. Next, I define the project scope, key goals, and objectives of the project. Furthermore, I design brainstorm diagrams from issues surrounding my topic so that I can focus on related articles to save time. In addition, after finding the articles, I started designing a mind map with the keywords, problems and solutions of those articles. After drawing the mind map, I started writing literature reviews, also the mind map helps me write easier and not get lost on topic. Then I pose hypotheses. Additionally, I ask qualitative and quantitative questions to prepare for secondary research. After that, I began to determine the population for my research and chose simple random sampling. Next, I started conducting the survey by creating a question form using Google Forms to send to the surveyors. After receiving the feedback, I began to evaluate and analyze the feedback based on my hypothesis. From there, I can further consolidate and develop my hypotheses. Finally, after completing the project, I draw lessons and experiences for future research.

### Limitations

I had some difficulties when I started this project, particularly in finding a suitable topic for myself. Then, I ran into further problems when trying to name my topic. Moreover, I faced challenges in finding relevant articles related to the topic. As I have never studied scanning-related technologies before, I found it quite c4onfusing when reading articles. When it came to the primary research part, I felt puzzled about which sampling type would be most appropriate for my topic.

### Lesson learnt

I encountered some difficulties while working on my project, but they taught me valuable lessons for the future. Firstly, I learned to make decisive choices when it comes to selecting a topic for a project. Secondly, I gained a better understanding of how to name the project title and efficiently search for articles using appropriate keywords. Additionally, I learned how to choose the most suitable sampling method for my project.

## Research Process

### Overview

The sequential research method is an ideal choice for my project as it provides a comprehensive and structured framework for conducting research. It helps me to define a clear and relevant research topic that matches the project’s goals, and to select an appropriate research model that suits the type of data and analysis required. Moreover, it guides me to plan and execute the data collection and analysis processes in a systematic and rigorous manner, ensuring the validity and reliability of the findings. Additionally, it enables me to develop and test hypotheses based on the data, and to document the results and implications for further research and practice. The sequential research method thus improves the quality and efficiency of my research project.

### Limitations

During the process, I faced the challenge of selecting a sequential model for my project. Additionally, integrating and interpreting data from multiple sources was difficult.

### Lesson learnt

I received guidance from my tutor on selecting the appropriate model type based on their points. Additionally, I learned how to organize my stages to ensure I achieve my set goals.

## Research Methods

### 5.1. Qualitative research

#### Overview

Qualitative research has helped me collect rich and useful information for my project. It tells me which parts of the system model the surveyor is satisfied with, and which parts they would like to change or improve. I selected a questionnaire and created a questionnaire to send to the respondents. This method is convenient for both the surveyor and the surveyed person, especially since it can keep the surveyed person's information confidential.

#### Limitations

It is challenging to ask qualitative questions that are related to the topic and hypotheses. Initially, the questions I asked were too broad and scattered. Moreover, time limitations allowed me to contact only 5 volunteers for the survey.

#### Lesson learnt

I learned skills such as how to write qualitative questions through the tutor's instructions. Additionally, through those instructions, my questions have been narrowed in scope and focused more on my hypotheses and topic.

### 5.2. Quantitative research

#### a. Overview

Quantitative research can reduce bias and subjectivity by using standardized and measurable data. Furthermore, the data will have greater reliability because consistent and replicable results can be produced using controlled and structured processes. Additionally, I can collect statistical data on survey respondents' satisfaction.

#### b. Limitations

In the process of posing quantitative research questions, I encountered problems related to asking appropriate questions to measure the effectiveness of the project's technologies and system models. In addition, the questions I asked still required quite a bit of technological understanding to answer and teach the points that needed to be addressed.

#### c. Lesson learnt

Through asking quantitative research questions, I have accumulated the skill of asking questions appropriate to my topic and hypotheses. The questions also contribute to developing and reinforcing the hypotheses I have proposed.

## Presentation of result

### Primary Research

* **Summarise the research process:**

My survey included asking qualitative and quantitative questions about my topic. I then created a questionnaire using Google Forms and emailed it to survey respondents. My population target included students, office workers, frequent online shoppers, and service providers. After receiving feedback, I began the process of analyzing and researching the findings.

* **The results I achieved:**

After I analyzed and studied the survey results, most people agreed that this system model is more convenient, faster and more cost-effective than the old models. In addition, they also say that this model will protect the environment because it does not cause CO2 emissions. Meanwhile, there is an opinion that they are concerned about the security issues of this model. At the same time, delivery service providers are concerned that drones will be easily damaged due to various reasons.

* **Improvements or changes:**

To address security concerns, I will research how to encrypt data. At the same time, I will add a two-step confirmation function when receiving goods to ensure the package will be delivered correctly to the orderer. On the other hand, to reduce damage to the drone I applied weather forecasting methods to reduce damage to the drone.

### Secondary Research

* **Summarise the research process:**

After choosing a topic, I started searching for related articles using keywords and limited the publication year, thereby limiting many unrelated articles. After that, I read and searched for articles with titles related to my topic. After selecting the articles, I read the abstracts of the article to understand the article's content briefly. Next, I read the conclusion to see the research results of the article.

* **The results I achieved:**

After finding suitable articles, I conducted research on the technologies proposed by the articles. Through that, I learned more about Big Data, algorithms to calculate routes for drones and advanced scanning technologies. From that technological understanding, I can apply and perfect the system model.

* **Improvements or changes:**

Through research articles, I have learned the benefits of Big Data, terrestrial laser scanning and scan-to-BIM methods. Thus, I can apply those technologies to improve the drone transportation system model. Although my understanding of these tools is still limited, I will try to learn and improve the system. In addition, during the research process, I also came up with the idea of applying weather forecasts to minimize damage to drones.

### Research Present

* **Summarize the process of finding and defining the hypotheses:**

I observed today's booth service and believe that a drone delivery system model can replace traditional methods. This system will make the delivery process more convenient for customers who reside on higher floors of a building. Currently, customers have to move up and down the building to receive goods, which is time-consuming and inconvenient. To solve this problem, I researched technologies such as Terrestrial laser scanning, scan-to-BIM method, and Big Data to apply to delivery drones. I anticipate that when this system model is applied, deliveries will become faster, more convenient, and more accurate. Additionally, delivery costs will significantly reduce, which will in turn increase profits for both delivery service providers and businesses.

After conducting research, I applied various technologies to perfect my system, including Terrestrial laser scanning, scan-to-BIM, forecasting weather using FP-tree algorithm based on MapReduce, and Improved Artificial Fish Swarm Algorithm (IAFSA). Firstly, I will apply Terrestrial laser scanning and scan-to-BIM method to scan the exterior of the building, and build a 3D model of the building to identify windows that facilitate delivery. 3D models of buildings will be stored in the Big Data system. When a customer orders a pack, information about the location of the building and the apartment will be provided to the system. After receiving the customer's information, the system will start the weather forecast function to predict whether the weather will get worse in the next short period of time. If not, the drone will start travelling to the delivery point. Additionally, the drone is equipped with the IAFSA algorithm to find the shortest path and can avoid obstacles.

* **To verify and improve the hypotheses:**

In order to test and improve my hypothesis, I conducted a survey and designed a questionnaire for individuals who frequently use online delivery services. The questions focused on issues such as reliability, concerns, cost-benefits, and convenience of delivery. I obtained responses from survey volunteers through online communication via email. By referring to the feedback received, I can compare it with the hypothesis and make necessary improvements to the system, addressing any shortcomings.

# Conclusion

In a previous article, I shared the results of my research which focused on the use of Big Data, Terrestrial laser scanning, and scan-to-BIM to improve the delivery drone for online delivery services. To begin, I outlined the research goals, identified the necessary technologies, and developed a research plan. Throughout the process, I consulted with my tutor for guidance and feedback on my ideas. The tutor provided valuable feedback on searching for articles and writing the Literature Review. However, I encountered a number of difficulties during the research process, particularly in selecting a topic and understanding technical terms. Additionally, conducting primary research was time-consuming and challenging. With the help of my tutor, I was able to overcome these obstacles and gain valuable experience in research that will benefit me in the future.

# References

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