Nottingham Trent University

School of Science and Technology

Simulating Visual Impairments in a Virtual Reality Environment

by

Dominic Peter Reynolds

in

2020

Project report in part fulfilment

of the requirements for the degree of

Bachelor of Science with Honours

in

Computer Science with Games Technology

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Dominic Peter Reynolds

Abstract

Enter abstract here. The abstract should include: A) Brief statement of problem B) Brief exposition of methods and procedures and C) Brief summary of findings.

After the title, the abstract is the next level of detail regarding your work. The scientific community relies on 'The Abstract' as the main means of communicating research interests. There are many collections of abstracts published from which interested parties can trace the original work. They form the first step in a researcher's quest for up to date information regarding work being carried out worldwide.

The abstract is a one A4 page, 1.5 Line Spacing, retrospective account of the achievements, techniques and conclusions of the report. On no account are you to exceed one page. Do not go into a great long explanation of the general area, be very precise and stick to what you have achieved. This is filed by the library and enquirers from other institutions are sent a photocopy of this single sheet and thus immediately assess the work's relevance to them. They will know about the general subject area and its problems; what they want to know is whether you have found a solution. Be sure to include as much relevant information as possible on that page.

The abstract is very much an impersonal, factual, retrospective account of your finished project as might be written by somebody else. The tone of the English might be 'The work introduces the general area of..... and then investigates an apparently new method for..... The method is partially successful in that it...... '.

Acknowledgements

Enter acknowledgements here. It is usual to acknowledge those that have assisted you in your work and will normally include your main project supervisor. The order of acknowledgments (most important first) and their respective length indicates their relative importance to you.

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Insert > Reference > Index and Tables … > Table of Figures > Caption Label => Table



Introduction

Introduction

This chapter is the introduction to the main text and is intended to describe the background of the work, state the reasons for the investigation and what benefits will result in the long term. You should repeat, and briefly expand on, the points made in the abstract. Bear in mind this is the 'INTRODUCTION' to the entire project report and NOT just an introduction to the general subject area of your project. As such it should touch on all aspects of the following chapters. It is a guide to what follows in your project report in much the same way as the abstract is a VERY short description of the work. It should include an indication of the contents of the various chapters of the report.

Do not repeat large pieces of standard texts or theory here. You may well have done work in an area that is novel to you and think that a lengthy explanation in your own words will show that you now understand the area. This is a very common fault in student reports so do try to avoid falling into the same trap as your predecessors and probably peers too. A simple reference to a standard text will suffice. If necessary the reader can then go and read the standard text on the subject.

This chapter should include some historical details (most likely from standard text books on the subject) and a brief overview of recent work in the subject area.

This chapter should also include the intended scope of the project and, most importantly, set it in context. That is you should make clear the intended benefits to general computing and those who practise it.

Prepare Your Report

Use this document and its formatting as the template for your Project report.

Typing must be on A4 paper, Verdana font size 10, Double Line Spacing, on one side of the paper only and with margins of 2.5cm at top, right and bottom edges and 4cm at the left edge. Pages must be numbered at centre bottom according to the conventions of 9.4. That is Abstract, Acknowledgements, Contents and List of Figures are numbered in consecutive lowercase Roman numbers. The pages bearing the main body of the report, i.e.: the 6 Chapters, are numbered consecutively, (1, 2, 3, ..,6) followed by the References and Bibliography. The Appendices may be numbered following on after the main body or, more usually, have the Appendix identifying letter followed by page number within Appendix. (i.e.: Appendix A is numbered A1, A2, A3, A4..., Appendix B is numbered B1, B2, B3, B4....).

Use Style and formatting options to edit your document. Please use only the following Styles in your report.

* Section Heading 1 – Verdana Font, 14 pt, Bold
* Section Heading 2 - Verdana Font, 13 pt, Bold
* Section Heading 3 - Verdana Font, 12 pt, Bold
* Section Heading 4 - Verdana Font, 12 pt
* Abstract - Verdana, 10 pt, 1.5 Line Spacing
* Normal – Verdana, 10 pt, Double Line Spacing
* Bulleted - Verdana, 10 pt, , 1.5 Line Spacing
* References and Bibliography - Verdana, 10 pt, 1.5 Line Spacing
* Figure and Table Caption - Verdana, 10 pt, Bold

Heading Styles

For different level of section heading use an appropriate style and the numbering of the section will be done automatically. Four levels of section headings have been defined, Section Heading 1 through Section Heading 4.

The headings have been defined in the Verdana font, and all are aligned on the left. Varying font sizes and styles have been defined. The alignment and the font sizes and weights can all be changed by doing a Format, Style, selecting the desired style, and making any necessary modifications.

Numbering of Headings

This template numbers the headings in a legal numbering format. It is recommended to use the same style even if you are not using this template.

Document Paragraphs

First Paragraph Following a Heading

All headings will be followed automatically by a paragraph with a style called Normal. Normal paragraphs do not have an indent on the first line.



CONTEXT

Introduction

This should include a literature review in order to detail the State-of-the-Art in the field and the main areas for improvement/further research. One of the main reasons for the literature review is to avoid accidentally repeating a technique that has been tried before. In your literature survey, do be precise about the volume numbers of journals and exact ranges of abstracts you have searched. These details must be precise enough for anyone following up your work to avoid searching the same material. If searching computer data bases, including the CD-ROM data bases available in the library, then give precise details of the search keys used. Perhaps a printed copy of the session/s as an appendix might show this clearly. A new idea for a project is usually not entirely new. The project may try to apply an existing technology in a new area or for a different type of customer, or enhance or specialize the current functionality of the technology.

As a result of your literature review you should be able to elaborate on the limitations of existing methods of solution for your particular problem.

Insert Pictures

Insert a picture.



Figure : Microsoft XP

To generate a List of Figures or List of Tables, select the text under the appropriate heading, and do an Insert, Index and Tables.

Insert Tables

Insert tables

Table : Microsoft Office.

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| 22.00 | 11.00 | 19.00 | 12.00 |



New Ideas

Introduction

As a result of your 'Context' chapter you should have narrowed down your area of research. This 'focussing' of attention on one aspect of the field will have been aided by reading about other peoples' work in the field. You may be proposing a development of one of their ideas or perhaps an idea that came to you that differs from anything tried before.

For a software development you might include an explicit list of the requirements, a description of investigation of requirements ( if appropriate), and a discussion of how requirements relate to Background research.

For a research-based investigation you might include the planning for the process (methodology) to be adopted, the criteria to be used for evaluation, and a discussion of reasons for this process and comparison with alternatives.

The proposed development or investigation must be realistic bearing in mind the entire project is supposed to take 400 hours of your time. Thus, evidence of project planning must be included in this chapter; estimates of work load for the various phases, setting these in context with other estimated workloads (e.g. course work and revision) and other deadlines. This should allow you to establish your project timetable (perhaps in the form of a Gantt chart) showing the interaction of these various factors and the set objectives/milestones. In your planning you should include contingency planning to allow for the unexpected disaster. Various project planning tools are covered in the course to allow you to do this.



IMPLEMENTATION or INVESTIGATION

Introduction

Here you give details of the development or investigation of the new material proposed in 'New Ideas'. This must be done in a business-like manner. The development of any software must follow a suitable analysis and design methodology. There are CASE tools available to you for some methodologies, others will have to be a 'paper' design. An investigation must also follow a suitable methodology and use appropriate techniques and tools.

Software-based projects, requiring the production of a software solution for a set of requirements, should demonstrate that the software development has undergone appropriate analysis, design, project management, structured programming and testing. Research-based projects, requiring an investigation of a research question or client’s requirements, or being used to test a hypothesis, should demonstrate that the investigation has been properly conducted, is based on scientific principles and uses appropriate tools, techniques and standards. An investigation must produce a technical outcome from some development (software or hardware (e.g. networks, displays)) or testing (e.g. of system/network performance, system security, HCI/usability analysis). Sometimes a software prototype or a testing framework will be produced for the evaluation or testing of the research or hypothesis. Work based purely on literature review is not acceptable.

Some projects aim to provide software for general use as their final product and these must include relevant aspects of HCI (Human Computer Interaction) and address such features of usability such as 'user friendliness' and most likely employ GUI (graphical user interface) standards such as Windows.

In any case, students often ask what should go in this chapter, how to describe what they have done, what is relevant, how much of existing work to include, what to include from what they have done, etc. The simplest and surest way is to refer to your diary of the work you have done and report on it in chronological order.

The complete requirements analysis, problem analysis & design of software must be done rigorously and included in full in an appendix. Avoid cross-referencing it too often, thus causing the reader to keep flicking pages back and forth, rather reproduce sections that you wish to draw the reader's attention to. That is, highlight the parts that you found particularly difficult to implement and feel rather proud of having solved. Do not include lengthy descriptions of standard techniques or methodologies, simply state that 'such-and-such was designed using such-and-such technique (give a reference, not just 'SSADM' but 'SSADM [James 1996]' where the reference is a standard text on the technique!)' and highlight where you found shortcomings in the technique that didn't quite cope with your particular problem. Highlight exceptions to the standard.



RESULTS / DISCUSSION

Introduction

The technique developed in your project is supposed to show improvement on techniques previously available. Therefore it may be necessary to spend time investigating whether this is true. Perhaps you need to set up some sort of quantitative test and do a little statistical analysis to confirm the improvement. This chapter will provide evidence, from the tests that you carry out, of the outcomes of your project.

Explain the success and limitations of your work and show how this relates to the aims and objectives set out in the introduction.



CONCLUSIONS / FUTURE WORK

## Conclusions

Whatever it was that your results showed should be summarised here. Your project or may or may not have achieved all that you set out to at the start.

This is your opportunity to conclude whether the project was a ‘success’ and how it might have been tackled differently in hindsight.

## Future work

In either case there should be some reference to future work, either to forward and expand on the successful outcome or to test ways of overcoming the shortfall in your ideas that didn't work out quite as expected but there should be something that shows you can see further implications of what you have achieved.

## Legal, Social, Ethical and Professional Issues

This section should include a discussion of the four LESPIs and the way in which you project has/will/could impact on each.

## Synoptic Reflections

This section will comprise of a reflection on the project in relation to employment aspirations and the skills that you have developed towards this through engagement with the project.

ReferenceS

Vogt, C. 1999. Creating Long Documents using Microsoft Word. Published on the Web at the Nottingham Trent University.

**Note:** References are a list that includes the essential bibliographical details for each item to which you have referred in the body of your paper. It should ONLY include items to which you have made direct reference. A direct reference is where you have quoted/reproduced text or diagrams from another author or mentioned/referred to the work of another author in your report. That is quoted directly what they have said about something or mentioned their views or conclusions in your report. For details of citation and references see the information in the Project Guide.

A Bibliography is a list of published materials that you have read or consulted for general information in the preparation of your work, concerning the subject of your Project, but have not made any direct reference to in your report i.e. 'background reading'.

You should always provide a Reference List. **A Bibliography is optional but when provided it should include all items in your Reference List as well as any additional items consulted in preparation of your work.**

Bibliography

Vogt, C. 1999. Creating Long Documents using Microsoft Word. Published on the Web at the Nottingham Trent University.

Coote, H., Dobbs, B. & Jones, C. (1996). Defining databases. Wiley: Melbourne.

Applications and Science in Soft Computing, Lotfi, Ahmad; Garibaldi, Jonathon M. (Eds.) 2004, X, 346 p. Springer, ISBN: 3-540-40856-8

**Note:** A Bibliography is a list of published materials that you have read or consulted for general information in the preparation of your work, concerning the subject of your Project, but have not made any direct reference to in your report i.e. 'background reading'.

You should always provide a Reference List. **A Bibliography is optional but when provided it should include all items in your Reference List as well as any additional items consulted in preparation of your work.**

Appendix A

The content of these will differ with the different types of project. Any design and analysis charts/diagrams will be included here in full. In projects where software has been developed there will be an appendix for this. Our departmental requirement is that a CD, DVD or USB memory stick of all source code is submitted to your project supervisor. The appendix contained in the report will refer to this CD, DVD, or USB memory stick, provide a directory style listing of the files submitted and instructions for rebuilding and running the software. This might be source code of programs written in high level languages (C, C++, etc) together with any pertinent files ('make' files, non-standard libraries, etc). Alternatively, or in addition, you can place some or all of the source code in the appendix. In any case the source code needed to reconstruct any software you have developed must be submitted in its entirety in the CD, DVD, or USB memory stick. (Any code that has been used from a third party should reference the original developer).

Hardware designs will require schematics/circuit diagrams, PCB layouts, simulation tests and pin outs.

Most projects will require some form of user documentation to explain how to use the software/hardware produced. A researcher following up the work may wish to utilise the work of the original author and an appendix laying out the format of input files and how to interpret the output is required.