Computing Science and Mathematics
University of Stirling

Contextual Understanding for Intent Detection on an Embedded System

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Dissertation Outline

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Chapter 1

Introduction

The purpose of this project is to allow pre-existing software, based on an embedded system, to identify objects and their actions and determine their intent via a visual input. This is to be achieved with the use of advanced scene segmentation and intelligent neural networks. By definition, ”Intent detection” is the ability to recognise, classify, and confirm an object/persons intent, whether it be through a set of actions, tone of voice or body language. Intent detection and computer vision are therefore inevitably linked. Computer vision applications using intent detection allow users to determine the direction of a situation before it begins, potentially creating safer conditions, increased efficiency, and easier accomplishment of tasks. There are several instances of Computer Vision applications being used in the present, such as face recognition, object tracking and standardised object identification. Applications specific to intent detection are discussed and analysed in the following *state of the art* section.

1.1 Background and Context

The problem to be addressed within the project is the inability of the current software to intuitively determine the behaviour/purpose of an identifiable object. This is something that cannot be achieved without building and identifying contextual elements (whether or not these come from pre-trained CNN with predetermined classes or data sets) around said objects. Potential issues that may arise within the project are primarily linked to the ability of the software to identify separate objects around a subject of interest, and successfully classify/categorise these objects individually or in a group using a pre-trained identifier from existing data sets. Furthermore the potential to be able to construct a possible model around a subject (3D or otherwise), to identify any ”hidden objects” that may be essential to determining the behaviour or context of a subject and/or object within its surrounding environment, could prove exceptionally difficult within the projects scope, however feasible this potential method may be.

1.2 Scope and Objectives

Define the scope and objectives of your project. Define the expected results and how others will gain from the work.

Chapter 2

State-of-The-Art

Discuss the work of others in the same area as your project. Show critical awareness of what others have done, and how you hope to extend or complement existing capabilities.

It is important to write a *critical* literature review that identifies gaps in current solutions and that clearly shows how the project was driven to address these gaps. This chapter should therefore feed into well-defined requirements for the project. Avoid a banal description of related work that does not carefully analyse its strengths and weaknesses.

This section may also include a discussion of relevant technologies and a critical analysis of which technologies you plan to use for the project.

Give references to other work by using citations like [4]. Use the *cite* command to cite references. Books [1], standards [2], reports [3], journal articles [6], conference papers [4], and web pages [5] are conventionally presented in slightly different ways. If a web page does not have a date, you should give the date on which you consulted it.

Citations are created with a *thebibliography* environment and *bibitem* commands in a '.bbl' file. Unless you are willing to invest time in creating BibTEX bibliographies, you can do this by hand.

Chapter 3

Problem description and analysis

This section should give a description and analysis of the problem to be solved. This might include a requirements capture exercise, possibly involving the consultation of potential users and identifying use cases or scenarios. Demonstrate how you are performing the project as a computing professional (i.e. application of systematic techniques, awareness of relevant professional issues).

3.1 First Section

Subdivide your text into sections with the \section command.

3.1.1 First Subsection

If necessary, also use subsections. Subsections are entered using the \subsection command.

First Subsubsection

If you really need subsubsections, enter these using the \subsubsection command.

Figures are created with the *figure* environment, while tables are created with the *table* environment. They are identified by the \label command, and are referenced by the \ref command. Graphics are inserted with the \graphic command. Captions are entered using the \caption command. As an example of a figure, consider figure 3.1.

The native format for LaTeX graphics is EPS (Encapsulated PostScript). Graphical editors are usually capable of producing EPS. When outputting to PDF (Portable Document Format), the native graphics format is also PDF. Conversion of EPS to PDF is supported by a number of TeX toolsets.

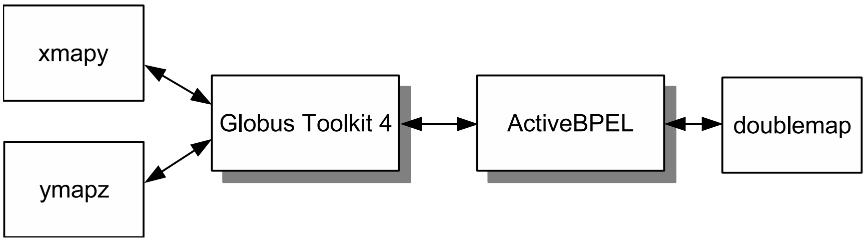

Figure 3.1: Highly Technical Diagram

Chapter 4

Project Plan

Give an updated plan for the remainder of the project. This should identify the remaining pieces of work (deliverables) and when you plan to complete them. In particular, describe what you will demonstrate when the final report is due.

References

[1] D. Greene and P. C. Williams. *Linear Accelerators for Radiation Therapy.* IOP Publishing Ltd., Bristol and Philadelphia, 1997.

[2] ISO/IEC. *Information Processing Systems – Open Systems Interconnection – LOTOS – A Formal Description Technique based on the Temporal Ordering of Observational Behaviour.* ISO/IEC 8807. International Organization for Standardization, Geneva, Switzerland, 1989.

[3] J. Jacobson and O. Andersen. Software controlled medical devices. Technical Report SP-Rapport 1997:11, European Network of Clubs for Reliability and Safety of Software, Apr. 1997. ISBN 91-7848-669-6.

[4] Ji He and K. J. Turner. Specification and verification of synchronous hardware using LOTOS. In J. Wu, S. T. Chanson, and Q. Gao, editors, *Proc. Formal Methods for Protocol Engineering and Distributed Systems (FORTE XII/PSTV XIX)*, pages 295–312, London, UK, Oct. 1999. Kluwer Academic Publishers.

[5] K. J. Turner. World-wide Environment for Learning LOTOS. *http://www.cs.stir.ac.uk/well/*, June 2000.

[6] K. J. Turner. Representing and analysing composed web services using CRESS. *Network and Computer Applications*, 30(2):541–562, Apr. 2007.