

Can you use Viola-Jones face detection for counting people?

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This document describes the assignment for CS34110 Computer Vision. This assignment specification should be considered alongside the **scenario specification** for this module.

1 Aims and objectives

The aims of this assignment are:

- to make you read and analyse real scientific papers describing computer vision methods
- to give you practice in analysing other people's work
- to give you practice in writing
- to make you consider real world applications of computer science research

The objective is to produce a document that describes, explains and criticises a paper describing a computer vision method, and which considers the use of that method to address a real-world problem in computer vision.

- describe the context of the problem: why is this a problem and why is this a problem worth solving;

- briefly describe the main points of the solution.

This should not be a repetition of the paper but should show that you understand the problem and proposed method. This part should prepare you for the rest of your article.

2.2 Critique of proposed method: 30 marks

This section should, based on the original article, evaluate the method. This includes a discussion about:

2 Specification: the work you have to do

You have to read a paper on face detection [1]. This paper could be used as part of a solution to the module's scenario (see separate scenario specification). Your job is to write an article on this paper. The article should have the following sections:

2.1 Introduction: 20 marks

The introduction should:

- describe the problem the paper is tackling;

- how well the method solves the addressed problem;

- the failure modes of the method;

- the successes of the method.

Some of that may be in the paper (most papers discuss limitations) but there might be more, given recent developments, omissions and/or errors of the author(s) of the paper. You may at this stage want to perform experiments of your own using the software described in the paper, versions of which are available in various places. Where does it work well? Where does it fall down?

2.3 Application of the proposed method to the scenario: 25 marks

The paper [1] describes a method that could be applied to this year's module scenario. If you were designing a system to address the module scenario in some way, how might you use the algorithm from [1]?

In this section you may want to consider the broader system, including camera number, camera placement, and details of the installation. How accurate would you expect your system to be? Are there things you can do in the setup which will help you to mitigate the issues with the algorithm identified in your critique?

2.4 Conclusion: 10 marks

You need to draw overall conclusions. The conclusions should cover issues such as the advantages and disadvantages of the technique in general, the application of the technique to the scenario, and a brief discussion of other techniques and enhancements.

2.5 Self-evaluation: 5 marks

At the end of your paper you should include a self-evaluation. You need to evaluate your own work, covering issues such as how well you understood the paper and reported on it. This part should include the grade (as per Tables 1 or 2 in Section 5.7 of the students handbook¹) that *you* think your work is worth.

2.6 Bibliography: 10 marks

You should have a full bibliography of all papers, books, online sources and software you have read and/or used during this assignment. You will

probably find that referring to textbooks is useful, and that trying out software is useful. You should not need to write any software; there are free implementations of this algorithm in many libraries.

The usual departmental rules about plagiarism apply; the work should be entirely your own and any code, work, sentences of text or ideas that come from other people should be fully cited.

3 Formatting

Your article should be formatted similarly to the document you are currently reading:

- two columns;
- justified text;
- margins of about 0.5in;
- font size of 10pt, 11pt or 12pt.

You can use a template such as the one provided by the IEEE for their conference papers; this can be found online in LaTeX and in Word formats. Your article should be between 4 and 6 pages long including figures, tables, references, etc.

The hand-in date/time is **24 November 2014 at 4pm**. The hand in must be done through Blackboard. Note that you will have to upload a pdf file. Submissions in any other format will not be marked.

References

- [1] Paul Viola and Michael Jones. Robust real-time face detection. *International Journal of Computer Vision*, 57(2):137–154, 2004.

¹<http://www.aber.ac.uk/~dcswww/Dept/Teaching/Handbook/handbook.pdf>