COSC345 Project Experience Report

AutoCull (Group 11)

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***Abstract*—This document is intended to detail the experience of Group 11 throughout the development of AutoCull for COSC345. Included is a reflective assessment of the project management, design, implementation and testing processes. Lessons learned and recommendations for future iterations of the project are also discussed. Along with personal contributions to the project as a whole.**

***Index Terms*—TODO: keywords**

I. COSC345 Introduction

COSC345 is a 300-level software engineering course offered at the University of Otago. The course aims to provide students with practical experience in the field of software engineering and delivery, and is designed as a capstone course for both computer science and software engineering students.

This allows for the application of theoretical knowledge gained in previous papers, as well as the development of soft skills such as teamwork, communication and project management. The application of good software engineering practices is also a key learning outcome of the course, with students gaining a better understanding of why these practices are important in a real-world setting.

The course is structured around a single project completed in groups of 4–6 students over the course of a semester. The project is largely self-directed, with groups expected to attend a weekly mentoring session with a course mentor; meeting times outside of this are to be organised by the group themselves.

A. Project Overview

Professional digital photography is data intensive. A single photoshoot can quickly amount to hundreds or even thousands of digital images, many of which are similar or near-duplicates. Manually culling these near-identical images can be time-consuming and tedious but is a critical stage in the post-processing workflow of editing and delivery.

AutoCull is a desktop application which makes use of ML/AI algorithms to assist a photographer in culling large quantities of photos. In addition to culling, the application provides feedback to the photographer on the objective quality of their photos, providing a quick and easy way to identify their strong and weak images. This feedback can help photographers improve their skills over time, as well as providing a second opinion on the quality of their work.

Whilst the digital media market is already saturated with post-processing applications, there are comparitively few applications with such a strong focus on the culling process itself. AutoCull aims to fill this gap in the market, providing a tool which can significantly reduce the time a photographer spends on post-processing, and providing the feedback they may not otherwise receive. Subsequently, this allows photographers to spend more time doing what they love – taking (and editing) photos.

B. Objectives and Features

The objectives and features of AutoCull include:

- Assisting photographers in culling large quantities of photos using ML/AI algorithms.
- Providing feedback on the objective quality of photos to help photographers improve their skills.
- Streamlining the post-processing workflow to save time and effort for photographers.

II. Development Process

As COSC345 is a paper with a far greater focus on practical experience than theoretical knowledge, the development process is largely self-directed, with groups expected to manage their own time and resources to complete the project within the semester timeframe. This section aims to detail the development process undertaken by Group 11.

A. Project Management

Group 11 adopted an agile development methodology, with two-week sprints and regular stand-up meetings. This allowed for team members to put agile methodologies into practice, further cementing the theoretical knowledge gained in previous papers.

The team utilised Taiga as a project management tool, as per the requirements of the course. This allowed for a centralised means of user-story management, sprint planning, and task assignment.

For development the team used Gitbucket as a version control system, with each team member working on a local repostiory and then pushing changes to the remote.

B. Design Process

The design process for AutoCull involved the several stages, including requirements gathering, system architecture design, and user interface design. With certain aspects of the project dictated by the project specifications provided.

Requirements gathering involved consulting with both actively working photographers and those with a keen interest in photography. This allowed for a better understanding of the needs of the target users. Key insights from requirement gathering included:

- Potential users did not want an application to replace the likes of photoshop.
- The photos should not be automatically culled, the user should have the final say, and the applicaiton should not update the local filesystem.
- The use of AI/LLM giving the photographer score and feedback on a collection was well recieved by potential customes.

System architecture design pulled on the prior knowledge of team members, as well as content throughout COSC345. The architecture was designed to be modular and extensible, allowing for future features to be added with minimal disruption to existing functionality. With the understanding that we wanted to create a desktop application, the team decided to use Python as the primary programming language, leveraging the Tkinter library for the user interface.

User interface design focused on creating a simple and intuitive interface, with a focus on usability and user experience. Wireframes and mockups were created using Figma, allowing for rapid prototyping and iteration based on feedback from potential users.

C. Implementation

D. Testing and Quality Assurance

III. Reflective Assessment of the Development Process

A. Project Planning and Management

B. Design Process

C. Implementation

D. Testing and Quality Assurance

E. Maintaining the Integrity of the Specifications

The IEEEtran class file is used to format your paper and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your paper as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

IV. Prepare Your Paper Before Styling

Before you begin to format your paper, first write and save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sections IV-A to IV-H below for more information on proofreading, spelling and grammar.

Keep your text and graphic files separate until after the text has been formatted and styled. Do not number text heads—LaTeX will do that for you.

A. Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, ac, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

B. Units

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”.
- Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.
- Do not mix complete spellings and abbreviations of units: “Wb/m^2” or “webers per square meter”, not “webers/m^2”. Spell out units when they appear in text: “. . . a few henries”, not “. . . a few H”.
- Use a zero before decimal points: “0.25”, not “.25”. Use “cm^3”, not “cc”.)

C. Equations

Number equations consecutively. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

$$a + b = \gamma \tag{1}$$

Be sure that the symbols in your equation have been defined before or immediately following the equation. Use “(1)”, not “Eq. (1)” or “equation (1)”, except at the beginning of a sentence: “Equation (1) is . . .”

D. LaTeX-Specific Advice

Please use “soft” (e.g., `\eqref{Eq}`) cross references instead of “hard” references (e.g., `(1)`). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don't use the {eqnarray} equation environment. Use {align} or {IEEEeqnarray} instead. The {eqnarray} environment leaves unsightly spaces around relation symbols.

Please note that the {subequations} environment in LaTeX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you've discovered a new method of counting.

BibTeX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BibTeX to produce a bibliography you must send the .bib files.

LaTeX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LaTeX does not have precognitive abilities. If you put a \label command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a \label command should not go before the caption of a figure or a table.

Do not use \nonumber inside the {array} environment. It will not stop equation numbers inside {array} (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

E. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [7].

F. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

G. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

H. Figures and Tables

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 1", even at the beginning of a sentence.

TABLE I
TABLE TYPE STYLES

Table Head	**Table Column Head**		
	Table column subhead	***Subhead***	***Subhead***
copy	More table copy[a]		

[a]Sample of a Table footnote.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when

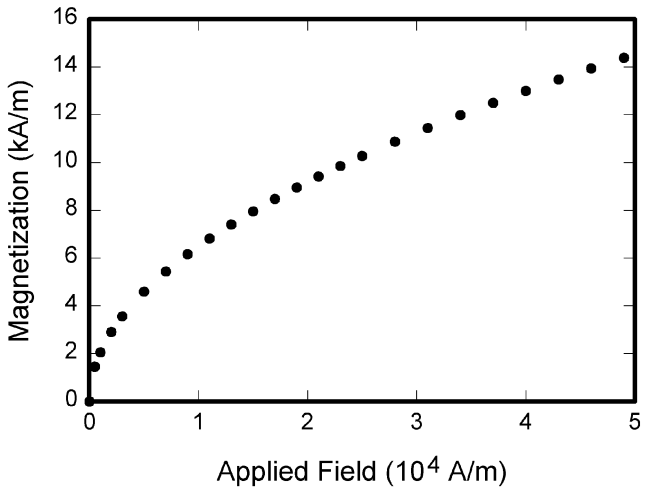

Fig. 1. Example of a figure caption.

writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

Please number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] was the first ..."

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors' names; do not use "et al.". Papers that have not been published, even if they have been submitted for publication, should be cited as "unpublished" [4]. Papers that have been accepted for publication should be cited as "in press" [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

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