COMPSCI 715
Advanced Computer Graphics

Methodology - Abstracts

Schedule 1st Half

| Week	Activities	Assignments
1	Tue: course outline, Wed: project topics, Thu: feedforward learning (guest lecture)	Register teams
2	Tue + Thu: exergaming (guest lectures), Wed: academic writing overview, abstracts	Abstract (1.5%)
3	Tue + Thu: Unity, Wed: writing introductions	Introduction (2.5%)
4	Tue + Thu: 3D sketching / user interfaces, Wed: writing about related work	Related work (2.5%)
5	Team meetings, Wed: design & implement.	1st prototype (1.5%)
6	Team meetings, Wed + Thu: demos (2.5%)	2nd prototype (1.5 %)

Mid-semester break. So far 12% of individual assignments.

Today's Mission

1. What is the overall structure of a typical research publication?
2. How do you write an "abstract"?
3. How will the abstract for your project look like?

Writing Assignments (18%)
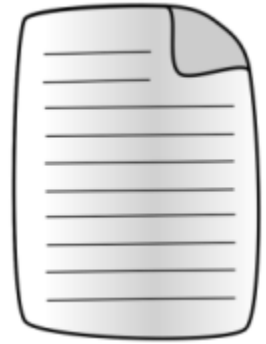
- Submitted individually through the assignment dropbox: https://adb.auckland.ac.nz/
- Should adhere to scientific standards as taught in the lectorials
  - Must use LaTeX (ACM or IEEE style)
  - Must not be plagiarized from someone else
- Aligned with your project - will help you!
  - Assignments break down full report into parts: 1.5% + 3 x 2.5% + 1.5% + 2.5% = 13%
  - By final report deadline mostly already complete, opportunity to improve the parts from feedback (5%)
 - Possibility of publishing at scientific conference

Typical Research Paper Structure

1. **Introduction**: What is the research problem? Introduce and motivate it. Summarize your contributions.
2. **Related Work:** What have others done? How is it different? Cite, summarize other solutions & compare it with your own.
3. **Design:** Your solution. Describe it in enough detail so others can implement / replicate it. Software architecture (e.g. class diagram)? User interface (e.g. screen diagram)? Algorithms?
4. **Implementation:** How have you implemented your solution? Tools and technologies used? Implementation challenges?
5. **Evaluation:** Explain the methodology you used for evaluation. Present the results. Discuss them.
6. **Conclusion**: Summarize contributions. Point out future work.

The Funnel Strategy

General Overview (Context)

Specific Details (Focus)

Approach for describing something so that others understand it

- Start with an overview, describe the general idea first
- Helps readers to get a "full picture" first
  (even if it is just a vague one)
- Then lead them gently into the details
- Readers will understand the details much better in the context of the overview
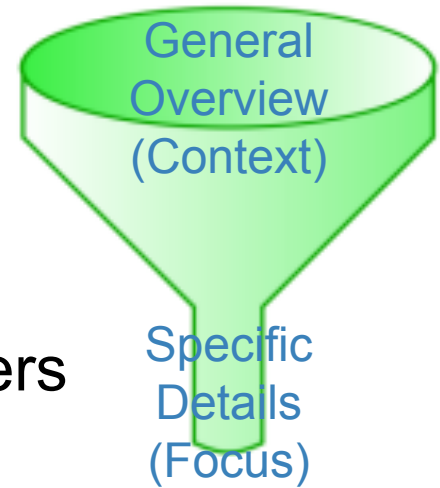
If you jump into the details too early and without sufficient context, readers will get confused.

Abstract
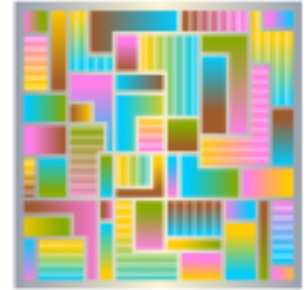
Aim: concise summary of your paper

- Informative: concisely describe the problem and your solution contributions; every word has a purpose
- Complete: contains all important contributions
- Self-contained: can understand the main points of the whole paper just by reading abstract (no references)

Structure

1. Introduce/specify/motivate problem (funnel, ~1-3 sentences)
2. Summarize your solution contributions (main part)
3. Summarize evaluation results / conclusions (~1-3 sentences, more if the paper is about a study)

Exercise

Learn from good and bad example abstracts

1. Read the abstract

2. Identify the following parts:
   a. Introduction of the problem
   b. Contributions (novel solutions)
   c. Evaluation results / conclusions

3. Discuss:
   What are the good and bad points?
   How could it be improved?

Good Abstract Example 1

To fulfill the unique debugging requirements of graphics programming, specialized tools are needed to aid in the debugging process. Modern graphics debuggers allow developers to inspect the current graphics state of a running application, and influence their control flow. However, they do not make maximum use of information about previous graphics states, despite the possible utility of this information in debugging.

We propose GLDebug, an OpenGL debugger with novel features for using historical information to assist with graphics debugging. GLDebug provides the ability to capture and recall OpenGL state and function call information. Developers can retrace the graphics state history of OpenGL applications and compare different recorded states, which may come from different applications. State differences are made clearly visible, so that the source of state-based errors can be tracked down more easily.

GLDebug was evaluated in a user study, with promising results: the participants found the tool helped them when working on four different OpenGL debugging tasks. [...] The results indicate that historical information is useful [...]

Good Abstract Example 2

Past research into exercise video games has found that they can help to motivate people to exercise, but these exergames have been single purpose (usually fitness only) and have shown poor user adherence. In this paper, we designed an exergame suitable for customization for specific health outcomes, with the intention of inducing long term use. This exergame was designed to be played using an exercise bike, along with various immersive technologies, such as the Kinect and the Oculus Rift. [...]

In order to evaluate this exergame, we conducted a user study comparing exercise without a game to exercise with two versions of the game: one using the Oculus Rift, and one displayed on an ordinary screen. Use of the exergame, with or without the Oculus Rift showed a small but statistically significant increase in exercise performance relative to the non-gaming condition, with the screen condition faring slightly better than the Oculus condition. The exergame showed a significant increase in user motivation and enjoyment when compared to the non gaming condition, with the Oculus condition found to be slightly more motivating than the screen condition.

Good Abstract Example 3

Layout managers are used to control the placement of widgets in graphical user interfaces (GUIs). Constraint-based layout managers are among the most powerful. However, they are also more complex and their layouts are prone to problems such as over-constrained specifications and widget overlap. This poses challenges for GUI builder tools, which ideally should address these issues automatically.

We present a new GUI builder – the Auckland Layout Editor (ALE) – that addresses these challenges by enabling GUI designers to specify constraint-based layouts using simple, mouse-based operations. We give a detailed description of ALE's edit operations, which do not require direct constraint editing. ALE guarantees that all edit operations lead to sound specifications, ensuring solvable and non-overlapping layouts. To achieve that, we present a new algorithm that automatically generates the constraints necessary to keep a layout non-overlapping. Furthermore, we discuss how our innovations can be combined with manual constraint editing in a sound way. [...] All these features permit GUI developers to focus more on the overall UI design.

Bad Abstract Example 1

This report outlines and briefly describes the progress of the project "[...]" which allows non-technical users to do [...]. The purpose of this report is to document the findings, work completed till date and further work to be completed in future.

The report includes brief discussions regarding the design decisions made at different stages, plan of action for future and outline of the project requirements. The report also contains a gantt chart of the entire course of project, amount of work completed and discussion on the split of the different phases.

Bad Abstract Example 2

In the few short years that Digital sculpting has been around, it has become very popular. It is primarily used in the creation of 3D models, which find application in a lot of areas such as automobile modeling, computer facial modeling, geographic terrain modeling and many more. Due to the evolution and growth of network technology on design environments, it has been perceived that, technologies of collaborative computer based systems can support geographically dispersed design teams by providing them an environment in which they can interact, communicate, share ideas and work with each other as if working together from a single geographic location. Visual collaboration can make engineering teams more productive, resolve design and manufacturing issues early, and improve product innovation and quality. The paper attempts to present an effort to build a Collaborative 3D Sculptor editor, which provides the basic sculpting functionalities to a team of designers connected by a computer network who can work on a digital object together in real-time.

Bad Abstract Example 3

This report describes the motivation, research findings, progress and strategy on the implementation of the Applicability Statement 2 (AS2) standard. The project is sponsored by [...], an e-commerce company.

AS2 specifies a secure and reliable way of sending files over the internet using Hypertext Transfer Protocol (HTTP). The files are encoded using Multipurpose Internet Mail Extensions (MIME) that allows the encryption and signing of data with digital x.509 certificate. Sending a signed and encrypted AS2 message, then requesting a signed AS2 receipt, offers Confidentiality, Integrity, Authentication and non repudiation of receipt (NRR) of a business transaction. [...]

The main goal and motivation of this project is to create an AS2 component for our industry sponsor's existing software. Extreme programming methodology is to be used to develop the implementation of AS2 standard during the project. Currently we are researching on tools, HTTP and MIME component to use for the project.

Good or Bad? Example 1

The aim of this project is to develop a system that records the interactions of a user with various applications, and use this data to make sensible suggestions to the user as to what the system should do next. This involves accessing the events in applications and the operating system. Furthermore, it involves the use of machine learning algorithms such as for Bayesian Network that analyse collected data and make sensible probabilistic predictions. Finally, predictions of likely user actions need to be presented in a graphic user interface that helps users to quickly recognize the actions the system is suggesting.

Good or Bad? Example 2

Home telehealth applications are increasingly gaining in popularity among patients due their promise to use healthcare resources more effectively and hence to lower costs. [...] However, due their high cost, vendor lock-in, and doctor centric design, these systems are not suitable for general healthcare applications such as improving cardiac fitness, monitoring overall health, improving muscle strength and balance of elderly, or assisting with dieting programs.

We argue that many of these goals can be supported in a cost effective manner by leveraging mainstream sensing devices such as game controllers and smartphones. Open-ended web-based telehealth systems can be integrated with such devices, in order to add a social component, collect health data unobtrusively, and provide feedback and health related information. In this paper, we systematically categorise and analyse consumer-level sensing devices in terms of their potential to extend the capability of telehealth systems. We show that the devices have immense potential as tools for therapy and rehabilitation activities, diagnosis, health monitoring and social support, and we reveal opportunities for professionals [...] to participate in this trend.

This Week's Assignment: Write an Abstract (1.5%)

Write an abstract for your project (~200 words)

- Individual submission, no group work
- Worth 1.5% of your final mark
- The contributions and results are hypothetical: imagine your project is over and was successful
- Be professional: try to imitate well-written abstracts
- Use LaTeX, e.g. https://www.writelatex.com/

Submit PDF by Sunday 3/8 7pm to assignment dropbox: https://adb.auckland.ac.nz

All the best :-)