8/28/21[1]

Animations for Computer Games

COMP 477/6311

Fall 2021

Evaluation Components

1) OVERVIEW

There are four types of evaluation components for this course: **Assignments**, **In-class exams**, **State-of-the-Art Analysis (SOAA)**, **Project** and **Participation**. This document describes all these components.

This is a course designed to familiarize the students with the state-of-the-art techniques and algorithms use in modern game development. Topics include principles of traditional animation, production pipeline, animation hardware and software, orientation representation and interpolation, modeling physical and articulated objects, forward and inverse kinematics, face animation, motion control and capture, key-frame animation, procedural animation, camera animation.

2) ASSIGNMENTS

Depending on the track you chose there are three individual assignments in this course. All assignments are C/C++ programming assignments using QT5 and Eigen libraries in a self-contained framework. You are not allowed to use any external library or code. If you use any external library or code, you will be awarded a grade of 0 for that assignment.

Assignments will be released and returned according to the published schedule.

Assignments will be graded demo style. Demos will take place during the labs (see schedule) and the slots will be available on a first come first serve in moodle 1-2 weeks before.

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[1] This document might change throughout the term, please check moodle periodically and download the latest version.

Important note: in this semester the order of the topics has changed to create a better flow of the material. As this change is on a trial basis the assignments are out of order: A3 is first, followed by A1 and A2.

3) IN-CLASS EXAMS

This class has two 45min long examinations held during class time. Tentative dates are published in the course administration document.

The exams are scheduled during the class time, they are mandatory and any absence except for medical reasons[2] will result in a grade of 0.

If you miss the exam due to medical reasons or short-term absence, the instructor will either administrate an oral examination or will re-distribute the grade at the discretion of the instructor.

4) STATE-OF-THE-ART ANALYSIS (SOAA)

You are required to review 2 research papers individually or 3 research papers in a team of 2 students. (COMP6311 students must do this component individually).

The papers must be from one of the following venues:

- SIGGRAPH 2020, 2021
- SIGGRAPH Asia 2020, 2021
- Symposium of Computer Animation (SCA) 2020, 2021
- Motion, Interaction and Games (MIG) 2020, 2021

The papers you pick must be relevant to the course content.

Proceedings of all these 3 conferences are available from campus.

One review should be 1-2 pages and should follow the format and content outlined below, including a decision. Note that all the papers accepted in the conference have

[2] Medical reason requires a valid medical note or a valid short-term absence form in accordance with university regulations.

already undergone a thorough review, so I expect that most of the papers reviewed to be accepted ☺

You are graded by the analytical skills you demonstrate in discussing the papers, the technical insight you demonstrate in your review and the amount of interesting non-trivial details you uncover about the paper.

A high score is obtained if you really read and understand not only the paper you chose, but also the context in which this paper is placed, and you can make nuanced comments and observe subtle issues about the paper. If you only scratch the surface, you should expect maximum half of the grade. You are expected to spend around 10-15 hours to do each review.

You should place your name and student ID on the header of all pages and use the font Times New Roman size 12, single space for all text and 2cm for all margins. You need to submit a document in PDF format. Details on what you will use to submit will be posted in MOODLE.

The soft deadline for this component is **October 27th, 2021**. The hard deadline for this component is **November 29th, 2021, 23:59**. Failure to submit by the hard deadline will result in a grade of 0 for this component.

A) HOW TO REVIEW A PAPER?

Evaluating your or someone else's work objectively is a very important skill to master. It will help you focus your energy on the important aspects of your problem thus maximizing your output and generating high quality work.

In this context we are looking at technical research papers in computer animation and games. Most such papers propose methods that solve some of the animation pipeline problems: animation physics, character animation, motion synthesis, character control, etc.

When reviewing a paper, we are trying to determine its impact: how important is it to the animation community? An impactful method yields good results, performs well, is general, has few limitations and is novel (if a method has only little novelty this means that same or similar methods have been published already so it is fair to question what does this method add and whether it is sufficient to warrant an acceptance; we want to avoid too many published methods that are too similar to each other, it creates paper inflation and makes the literature search on that topic unnecessarily convoluted).

In the paper, the authors are trying to prove these points: novelty, performance, results, generality, and limitations running a number of experiments and showing a number of results. One of the jobs of the reviewer is to assess if the claims made by the authors are substantiated. Enough experiments must be run in order to convince the reader that the authors' claims are accurate. If the reviewer is not satisfied, he/she can adjust the "grade" of the paper. It is common for papers to get rejected because the claims have not been demonstrated sufficiently and convincingly.

Finally, some additional factors should be considered: presentation, reproducibility, code, and data. Presentation refers of course to how the method is explained: it should be clear and complete, but concise; verbose language is to be avoided. A good presentation also shows the contributions clearly and places the work well in its context. If the method is explained sufficiently to be reproduced easily this is a major plus. Along the same lines, if code or data are published this is a major benefit to the community so it should increase the score of the paper. In contrast, if code or data is not produced (which again it is the case for most papers due to various reasons), and the method uses a lot of parameters that are not explained well or that are changed from example to example, these are signs that the method might not be as general as it should and it might require a lot of data-dependent tweaking, which is typically undesirable.

Once a reviewer establishes the impact of a paper it makes a recommendation whether the paper should be accepted or not. No matter what the recommendation is, the reviewer should justify it thoroughly and respectfully: the authors typically put a huge amount of works in these papers, usually months and sometimes years – and such the reviewer has an obligation to be thorough and fair when he/she makes his recommendations.

If the recommendation is for an accept it can list several changes that should be made – typically minor changes that the authors should be able to do in 2-3 weeks maximum. If the recommendation is a reject, the reviewers should make a list of changes that might make the paper acceptable for a future submission. One last comment on reviewing, the impact threshold for accept/reject depends to some extent on the conference or journal submitted. High impact journals/conferences typically have a very high threshold and conversely, workshops and smaller venues expect smaller impact submissions.

Finally, in practice, a decision for a given paper is never made by only one person. Any paper in any conference or journal is typically reviewed by 3-5 independent reviewers and a final decision is made by an associate editor (for journal submission) or by the primary reviewers and/or program chairs for conferences. For some larger conferences

such as SCA, there is even a rebuttal stage where the authors can challenge the reviews pointing out misconceptions or misunderstandings that can occur in reviews. Furthermore, the reviewers have a discussion period where they can try to find a decision consensus where all reviewers agree with one decision or the other, rather than simply voting (i.e. like a jury might do when making a decision). My point is that accepting or rejecting a paper, especially in a major venue, is a task that reviewers take very seriously; this is because all these papers contain the hard work of many people on the team, especially students that put their heart and soul in their work, countless nights and they have their careers riding on the results of these submissions so we really must respect that. Another reason is also because the problems that these papers solve are very complicated and it is impossible to guarantee that you can understand all the details and all subtleties and, unless one is working on very similar problems, it is impossible to have the same insight and appreciation as the authors that worked months or even years on these papers researching the underlying hypothesis.

B) REVIEW FORMAT

Paper reviews have a relatively standard format. This standardization helps to understand both the papers as well as the reviews.

The first section of a review summarizes the problem addressed by the paper and highlight the main contributions as claimed by the authors. This is done to make sure that the reviewer understands clearly what the paper is about and what is being claimed.

The second section is discussing the strength and weaknesses of the papers, including if there are doubts about the claims by the authors.

The third section is about presentation (is it clear and concise? Does it contain all the necessary details? Does it contain errors? Is the method reproducible? Is the paper polished? Etc.

The last section presents a decision and a justification on the decision. This is usually the longest section and can rehash some of the points of previous sections. It should also directly discuss the impact, results and experiments performed.

5) PROJECT

The project in this class is designed to help you to gain hands-on expertise in your favorite topic. It is usually an implementation of a seminal paper, a popular method or favorite algorithm covered in class. Games are strongly discouraged as there are two courses dedicated for that purpose. Similarly using Unity is strongly discouraged

because it has too many features and it is ultimately very difficult for me to evaluate your work, potentially resulting in a low grade.

Otherwise, you have a lot of freedom to show-off your creativity and programming wizardry and to add a cool project to your professional portfolio: more and more people both in academia as well as the industry are more interested to see your hands-on capabilities than your grades.

The project will be done individually or in teams of 2. (COMP6311 students must do this component individually). Once you made your team you must send the instructor an e-mail with the names, IDs and e-mail of the students in the team. Deadline for the project is **December 5th, 23:59.** Project will be graded demo style on **December 6th and December 7th during class time but in the lab**. (yes, there is a make-up class on December 7th and yes there are always some problems with the booking so things might change)**. Slots will be assigned by the instructor.**

Since most of the grade is assigned during the demo, you can choose any language/OS for your project as long as you are able to do the demo in the lab (i.e. use a computer from the lab or you can bring your own computer to the lab)

A) HOW TO CHOSE A PROJECT?

Chose a topic that you like from the course and try to think of a cool demo of the topic. Think about why did you take the course? What topic inspires you? What did you find cool? A video with previous projects will be available for inspiration and feel free to approach the instructor to discuss this.

B) HOW BIG/DIFFICULT NEEDS THE PROJECT BE?

You should pick the most difficult project that you can pull off. A perfectly executed easy project might get less grades than a difficult project where some components are not finalized.

Start working early and try to be realistic on what you can accomplish.

If you use powerful libraries that do the work for you must clarify and quantify your work. What is exactly your work and what is accomplished by external libraries or code.

C) PROJECT STRUCTURE AND MILESTONES?

The project has a proposal, submitted early in the term (although there is no formal deadline for it), the deliverables (see below) and the demo.

I) PROPOSAL

The proposal describes what you will do in your project. It is 1-2 pages long and it contains a motivation for the project, a description, and a set of around 5 objectives that must be demonstrated effectively during the demo.

Here are some fictitious objectives for a SPH fluid simulation project:

1. Setting up a particle system and render each particle
2. Implement Navier-Stokes equations in an SPH framework as shown in class using explicit Newton
3. Add surface tension forces and add speed-up methods (i.e. use kd-tree library to retrieve the particles faster)
4. Collision detection and response with external geometry
5. Load/Save renderings of each frames to create videos
6. Create some nice and more complex examples

Don't forget:

- You must be able to demonstrate ALL objectives
- Leave some room for polish (i.e. don't select a very difficult set of objectives)
- Don't select too simple objectives either as you cannot change them later
- Discuss w instructor!!! (i.e. proposal is an iterative process)

II) DELIVERABLES

The following components must be submitted using EAS before the deadline:

(1) Project proposal

(2) Source code & packaged executable

The executable should run on a vanilla distribution of Windows/Linux/Mac OS (i.e. the executables should run on any lab machine with Windows and Linux, for Mac there is some flexibility)

(3) Project report

2-4 page report describing your project, what was accomplished, what was not, what was difficult, etc.

(4) Project webpage

You must submit under a folder called "web" a self-contained webpage that shows-off your project. The entry to that webpage is index.htm or index.html or another standard entry point.

(5) Project video (optional)

One or several videos that showcase your best results and increase the production value of the demo and webpage.

III) DEMO

The demos are 15min long plus a 5min switch over from one demo to the next. You must bring to the demo a printed version of the project proposal.

I suggest the following structure:

(1) Describe the problem (3min)
- Show the best results
- One member of the team

(2) Demonstrate objectives (7min)
- Provide Analysis and Insight
- All members based on their role in the team

(3) Q&A (5min)

- All members
- Everyone should know what everyone else was doing

IV) EVALUATION

The project is marked out of 30.

- 5 marks → demonstration of the objectives
- 2 marks → report / readme
- 8 marks → Presentation, Q&A
- 12 marks → Qualitative evaluation:
  - Polish (6 marks)
    - How does it look?
    - Is it minimalistic?
    - Did you go above and beyond?
  - Difficulty (6 marks)
    - Was it a difficult project?
    - Did you have to get creative to solve it?
- 3 marks (subjective – X- factor)

6) PARTICIPATION

A 3% bonus will be awarded for participation. Due to COVID-19 none of this bonus will be awarded for in-class participation, rather based on Discord questions/discussions and problem solving. This bonus is given at the discretion of the instructor.

7) FLEXIBLE DEADLINES

Due to the challenges the students face with teaching during the COVID-19 pandemic, we adopt a flexible deadline policy.

All deliverables have a soft deadline and a hard deadline. The hard deadline for all deliverable is **November 29th, 2020, 23:59**.

Although I strongly recommend submitting your deliverables before the deadline, there is no grade penalty if you submit by the hard deadline.

However, there is a catch: if you submit on time, assuming no exceptional circumstances, you will have your deliverable graded within 2 weeks from the soft deadline date. If you submit it later, it will likely be graded together with the final exam at the end of the course so you will receive no feedback.

The following procedures must be followed:

- If you decide to submit late, you must inform the instructor by e-mail before the soft deadline. Failure to do so may result in a grade of 0.
- When you submit the solution, you must inform the instructor by e-mail.
- **The hard deadline cannot be moved even for medical reasons or short term absence reasons as this is already an extension to the regular deadline.**