Projects and Essay Information

COMP 30025J

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Before we discuss the paper lets talk about essay and projects

- This paper discusses all the different types of applications that exist in the AR space and it's a good document to lead us into talking about the essay and project on this course.
- The essay will help you explore one aspect of the mixed reality continuum
- The essay will hopefully lead you naturally to then choose a project in that area of project in the Mixed Reality continuum
- The Essay and Project can be fully VR or a AR project or some where in between.
- If for some reason during your work on your essay you decide to do a different project that is perfectly allowed and it will not effect your grade.
- Essays will be due end of Week 8

Essay Choice

Reading Krevelan and Poelman paper , you can see the AR space is huge and adding VR applications into the mix and your choices could be limitless.
So to aid you I have picked a list of topics for your essay area.
The essay should be approximately 2000 to 3000 words long.
It will include references, using the Harvard style e.g for one of my papers
(Campbell et al 2014) and then at the end a reference
Why, When and How to use Augmented Reality agents (AuRAs) A G Campbell, J W Stafford, T Holz, GMP O'Hare Virtual Reality 18 (2), 139-159

Essay & project topics

3D Reconstruction
3D Photogrammetry
VR game engines
VR first person games
AR / VR third person games
VR Immersive applications
HCI issues in VR/AR
3D Printing
Educational VR/AR applications
Medical VR/AR applications
Industrial VR/AR applications
Exploring novel VR experiences

Tourist VR/AR applications
Novel Interface design in VR/AR
AR navigation applications
VR/AR Personal Assistance applications
VR/AR entertainment
VR/AR office applications
VR Architecture applications
VR/AR emergency applications
VR/AR Marketing/ Advertising

Any VR/AR topic can be treated as just VR or AR or Combined

Researching for your Essay / Project

- The Internet is your friend , I expect at least 15 references from papers outside of the course.
- References to websites are allowed but do not count towards the 15.
- For example ID software when discussing the game engine ID 6 used in games like Doom(2016)

http://academic.research.microsoft.com/

Academia.edu

http://ieeexplore.ieee.org/

http://dl.acm.org/

https://www.scopus.com

Project

- The project and essay start at the same time. From this week you will have studio time .
- Logically you essay should connect in with your project but its not mandatory.
- This time is for working on both the essay and the project.
- The first lab demo two projects (2015 / 2017)
- I will demo more later on

Project Interviews and submission

- Deadline for Project submission will end of Week 13.
- Interviews for the project will take place on Week 14 but complete by 5th Sept
- I leave this year on the 8th Sept.
- You will have 5 minutes to display your project and then I will ask questions for 5 minutes to ask how you made your project and what did you learn.
- It will be similar to your interview for Mobile Computing

Project Interviews and submission

- Like any project if you plagiarise from the internet or each other, you will be given 0 and the student you plagiarised will be given 0.
- To avoid this always reference any material / library that you use.
- I will be reviewing the project each week during studio time from Week 10 so there should not be any surprises.

Project and Essay Grading

Both the Essay and Project will be graded in three parts , all three parts are graded equally

- Research done to create the project / References
- Structure / Design of Project / Essay Structure
- How well does it address or illustrate the topic chosen.

Project and Essay Grading

Remember you can A+ on a VR project just based on last years graphics project if it explores a topic and integrates in research that you found during your research into your essay.
This project is designed to demonstrate what can you create as a software engineering single handily after several years of studying these topics.
This application can be shown to future employers / graduate programs to demonstrate your capabilities.

Installed / Suggested Software for your project

- I have installed several pieces of software to make your project easier.
- You may use any software to complete your project.
- Just remember to reference it
- The first thing you need to decide though is your projects mostly VR based or AR based .
- **I will not be directly teaching how to use any 3D programs.**
- **You are 4th year students and at this stage you should be able to look up online any tutorials, you may need.**
- I will attending all studio times though, so I will do my best to advise you and will help with bugs that come up.

AR tools

- If it is AR based , you will need to use 3D library /Framework that works with your mobile phone.
- Easiest to use is **Vuforia** and the most accurate is ARtoolkit
- **ARCORE** for android and **ARKit** for IOS are also great choices.
- ARtoolkit requires you to code in **OpenGL ES 1.0** similar to the OpenGL 1.2- 2.0 that you coded with last year.
- Other frameworks would be Aurasma or Wikitude.
- You can use ARToolkit with UNITY3D with an Android plugin which I have also left on the D drive but this can be difficult
- Vuforia should be your first choice and then ARcore but its all in your hands now.
- There is many more frameworks out there and I would suggest taking at least two Studio classes just to download and test different ones out to find one that suits your project.

VR tools

- If it is VR based , you can an application using your graphics project from last year as a basis.
- You can use multiple 3D game development kits such as **UNITY 3D** which I have installed on the lab machines .
- Alternatives such as the **UNREAL engine** can be used or any 3D games engine that suits your project.
- You can write you VR project directly in code using **OpenGL** or Vulcan or WebGL.
- If so I'd recommend using the **Lightweight Java Game Library**.
- Towards the end of the course , two end labs will have a VIVE will be available to test the project if you have development STEAMVR

Tools for both VR / AR projects

- **VisualSFM**
  Convert multiple photo graphs of an object into a 3D model

- **Blender**
  Program to create your own 3D models from scratch

- **Meshlab**
  Program to clean up generated 3D models or perform filters on your own 3D models

I'll set up a forum on your VR/AR course page for more suggestions

Good Luck

I expect you will be taking a minimum of 5 hours a week for your project and your essay. That's three times studio time allotted so much of that work must be done independently.