Advancing Project Proposals - Lecture 4

Mario Romero
2016/09/06

AGI16 Students

AGI16 Calendar: link

- Tue 30 aug 13:00-15:00
- Fri 2 sep 8:00 – 12:00
- **Tue 6 sep 13:00 – 15:00**
- Fri 9 sep 8:00 – 10:00
- Tue 13 sep 13:00 – 15:00
- Fri 16 sep 10:00-12:00
- Tue 20 sep 13:00 – 15:00
- Tue 27 sep 13:00 – 17:00
- **Fri 30 sep 8:00 – 16:00**
- Tue 4 oct 13:00 – 15:00
- Tue 11 oct 13:00 – 15:00
- Tue 1 nov 13:00 – 15:00
- **Fri 4 nov 9:00 – Sun 6 Nov 16:00**
- Tue 15 nov 13:00 – 15:00
- Fri 18 nov 8:00-12:00
- Tue 22 nov 13:00-15:00
- Tue 29 nov 13:00-15:00
- Tue 6 dec 13:00-15:00
- Tue 13 dec 13:00-15:00
- **Fri 16 dec 15:00-19:00**

Lecture 1:   Introduction
Lecture 2-3:   Forming Groups and Brainstorming
Lecture 4:   Groups formed, inspiration, and brainstorming
Lecture 5:   **Proposals**
Lecture 6:   Past projects and current technologies
Lecture 7:   **Hello World Demos**
Lecture 8:   Preparing ForskarFredag 2016
Lecture 9:   Demo and preparation towards ForskarFredag
ForskarFredag (we set up on Thursday evening)
Lecture 10:   Reflecting on ForskarFredag
Lecture 11:   Preparing for Comic Con
Lecture 12:   Preparing for Comic Con
Comic Con   (we set up on Thursday evening)
Lecture 13:   Forming groups for project 2
Lecture 14-15: Proposals Project 2
Lecture 16:   Hello World Demo Project 2
Lecture 17:   Feedback on Demos
Lecture 18:   Preparing for Open House
Lecture 19:   Demo project 2
VIC AGI16 Open House

Agenda

1. Reminder Groups and Ideas
2. Proposal Template
3. Proposal Grading Criteria
4. Assignment 2
5. Past Proposals
6. Groups discuss ideas

Remember Groups and Ideas

Group CoCAR (1)

Students

    Kevin Brundell Whittaker

    Mikael

    Ingemar Markström

    Erik Strid Markström

    Casper Renman

    Hampus Fristedt

- Idea
  - Inspired by Madsand
    - Also similar to 2Pacs and Teamtris
    - A pinch of Dangeroads
  - AR
  - Cooperate
  - 2 interfaces
    - Drive car
      - 1st person
    - Removing road obstacles
      - 3rd person
      - Recognized and integrated into the experience

Group The Chosen Ones (2)

Students

    Ludwig Sidenmark

    Emilio Lando

    Erik

    Björn Englesson

    Erasmus

- Idea
  - Inspired by Padawan 101
    - Perhaps more like Blopper
  - NEO!!!
  - VR Headset
  - Bullet time
  - Dodge 'em
  - Kinect body tracking

Group Hubris (3)

Students
- Marcus
- Staffan Sandberg
- Fredrik Berglund
- Karl Gylleus
- Karl

- Idea
  - Can't see – blind
    - Or situationally blind (?)
  - Eco localization
  - Stealth
  - Scream, but not always possible / necessary
  - VR or Oculus
    - Or cardboard or Samsung Gear
    - No cables

Group Agitators (4)

Students
- Arvid Sätterkvist
- Anton Sivertsson
- Erik
- Emil Westin
- Calle Sténson
- Rickard Bergelin

- Ideas
  - Ski jump simulator
    - Similar to Basejumper
    - Kinect
    - Oculus
    - Tactile transducer
    - How about a fan?
  - Flying an airplane
    - HTC VIVE
    - VIVE controls

Group U R God (5)

Students

    Samuel Whitefenix Ekne

    Ahmed Assal

    Martin Hedlund

    Andreas Linn

    Ewoud van der Heide

    Julia Sporre

- Idea
  - Sand box game where you are God
  - People react to your actions
    - Hand gestures
  - VR Sim city (?)
  - Context awareness
  - Projections
  - Audience!!! Other people need to see it!! Without the AR registration

Group Domino (6)

Students
  Wei Wang
  David Ringqvist
  Adria Cruz
  Lisa Schmitz
  Maria Krinaki
  Hans Hofer

- Ideas
  - From god perspective and create something
  - Cooperation game – helping your friend survive zombie apocalypse
  - Explorer
  - Virtual quiditch sit in brom

Group Pointy Stick (7)

Students
- Mathilde Caron
- Jack Shabo
- William Schröder
- Henrik
- Max LIndblad
- Haisheng Yu

- Idea
  - Gesture game
    - Wizard
    - Haptic feedback to spells
    - VR
    - Kinect

Group Have Mercy (8)

Students

    Adrian Häggvik

    Alex

    Robin Tillman

    Alan Abdlwafa

    Yinglai Xu

    Joakim Larsson

- Ideas
  - Assymetrical game
  - Two parts
  - Against each other
  - Maze game
  - Enhanced reality
  - Maze runner will have 1st person perspective
  - Gesture-based interaction
  - Kinect, or touch screen

Group monkeys with bananas (9)

Students

    Henrik

    Floris List

    Mark Kerner

    Halit Anil Dönmez

    Xu Han

    Yuchen Qiu

- Ideas
  - God!!!
  - Horror
  - Transport
  - Two player
  - Assymetric
  - Focus on visuals!
  - Vive, oculus, kinect

Group NONAME (10)

Students

    Patrik Fraj Sladljev

    Domagoj Penić

    Mikael

    Niko

- Ideas
  - Fighting game
    - Tacitile response
  - Beer pong
    - Real ball
  - Drunk driving simulator
    - VR
    - Oculus

Proposal for Project 1 Title

Cool
Photo of
Student 1

Cool
Photo of
Student 2

Cool
Photo of
Student 3

Student 1
email1@kth.se

Student 2
email2@kth.se

Student 3
email3@kth.se

Advanced Graphics and Interaction
AGI16
2016/09/09

VICSTHLM
VISUALISATION INTERACTION COLLABORATION

KTH
VETENSKAP
OCH KONST

Project 1 Title

Really cool image of your project!!

Outline

Don't put this slide in your presentation. No time. We all know what the structure will be.

- Motivation   1 minute
- Goals and Challenges   1 minute
- Related Work   1 minute
- Methods and Techniques   2 minutes
- Workload / Distribution   1 minute
- Brief Questions   2 minutes
- Context Switch   1 minute

TOTAL   9 minutes

Motivation

You have one minute to motivate the problem.

- Why is this project interesting to me?

- Why is this project interesting to you?

- What do I want to learn by doing this project?

- Why does the world need this project?

- How does this project improve the world?

Goals & Challenges

You have one minute to state the main goals and challenges.

- Goals
  - What this project accomplishes in 1st place
  - What this project accomplishes in 2nd place
  - What this project accomplishes in 3rd place

- Challenges
  - What are the obstacles to attaining goal 1
  - What are the obstacles to attaining goal 2
  - What are the obstacles to attaining goal 3

Related Work

You have one minute to present related work. You will only have time to show the two most relevant projects at this stage.

- Similar cool project number one with image
  - Author
  - Year
- Similar cool project number two with image
  - Author
  - Year

Similar Cool Project 1

- Cool video / image demonstrating similar work.
- Say what the related project was about and how it is related to your proposed project.
- Clearly state what about your project is different from this project.
- Clearly state why these difference matter.
- Only show a video or figure, no text on this slide.
- Memorize everything you will say and only say that.

Similar Cool Project 2

You have 30 seconds to show and talk about related work 2. If you will show videos, be ready to show them.

- Cool video / image demonstrating similar work.
- Say what the related project was about and how it is related to your proposed project.
- Clearly state what about your project is different from this project.
- Clearly state why these difference matter.
- Only show a video or figure, no text on this slide.
- Memorize everything you will say and only say that.

Methods & Techniques

This is the most important slide and part of your presentation. Put most of your effort making sure you have researched and tested the feasibility of this proposal. You only have two minutes to talk about this, so memorize everything you are going to say and only say that which you mean to say.

- What methods will you use in your project?
- What devices will you use?
- What libraries will you import?
- How will you connect the parts?
- Will you develop anything new that can be contributed back to the world as code or design pattern, etc?
- What interaction paradigms will you use?
- Will you design new interactions or new algorithms?
- You should talk about these methods and techniques on separate slides using as many visual and video aids as possible, keeping a close eye on your time

Individual Contributions

This is *really* important (the only means of achieving A):

An individual contribution need not be in the critical path of the entire project. If it works, great! If it doesn't integrate well, you can show it to course members, but need not include in the version to the open public!!!!

- Student 1 will do
  - A lot
  - So much
- Student 2 will do
  - A lot
  - So much
- Student 3 will do
  - A lot
  - So much

Thank you!

This is important:

PLEASE PRACTICE, PRACTICE, PRACTICE YOUR PRESENTATION. IT IS TOO SHORT TO MESS IT UP! Also, please make sure it runs in VIC. Google docs have worked well in the past.

Questions?

Student One {email1@kth.se}

Student Two {email2@kth.se}

Student Three {email3@kth.se}

Teacher {email4@kth.se}

For more information go to: www.project1.se

Grading Criteria

The proposal contributes 4% to your final grade.

Be sure to practice your proposal many times. Have a technically clear proposal. Include related work that is state of the art (2010+) research in graphics and interaction. Look for SIGGRAPH, SIGCHI, Eurographics, and other similar conferences for inspiration. State clear individual contributions to the project. Remember these need not be in the critical path of the project.

- Grade: 0
  - Not well rehearsed
  - Technically not clear
  - Related work not state of the art RESEARCH
  - No clear individual contribution

- Grade: +1
  - Well rehearsed
    - FINISHES ON TIME
  - Technically clear
  - Related work is state of the art in graphics and interaction
  - Clear individual contributions

Assignment 2

Due Tuesday 13 Sept 10:00 AM

Grading Pass/Fail

Pass: Google Doc with

- group name
- individual names
- ability to comment for me
- 6 papers with full reference and links to pdf
  - 3 on advanced graphics
  - 3 on advanced interaction
- before 10 AM on September 13.

Fail: everything else

Note: you should not read the full papers in your literature review to decide the 6 most relevant. Also, you do not need to read the papers for this assignment.

1. Together with your group members select 3 Advanced Graphics Topics and 3 Advanced Interaction topics you would like to consider including in your project

2. Do a literature review

3. Find at least two papers per topic

4. Goto 1 until satisfied with list of six papers

5. Send me ONE group list through a google doc that I can comment by Tuesday 13 Sept 10AM

   1. Full reference to paper
   2. Link to PDF

Doing a literature review

position in its life cycle, and each particle occupies a single point position in space. For effects such as fire or smoke that dissipate, each particle is given a fade out time or fixed lifetime; effects such as snowstorms or rain instead usually terminate the lifetime of the particle once it passes out of a particular field of view.

However, if the entire life cycle of each particle is rendered simultaneously, the result is **static** particles — strands of material that show the particles' overall trajectory, rather than point particles. These strands can be used to simulate hair, fur, grass, and similar materials. The strands can be controlled with the same velocity vectors, force fields, spawning rates, and deflection parameters that animated particles obey. In addition, the rendered thickness of the strands can be controlled and in some implementations may be varied along the length of the strand. Different combinations of parameters can impart stiffness, limpness, heaviness, bristliness, or any number of other properties. The strands may also use texture mapping to vary the strands' color, length, or other properties across the emitter surface.

A cube emitting 5000 animated particles, obeying a "gravitational" force in the negative Y direction.

The same cube emitter rendered using static particles, or strands.
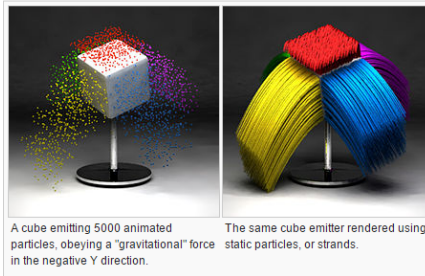
Artist-friendly particle system tools   [edit]

Particle systems can be created and modified natively in many 3D modeling and rendering packages including Cinema 4D, Lightwave, Houdini, Maya, XSI, 3D Studio Max and Blender. These editing programs allow artists to have instant feedback on how a particle system will look with properties and constraints that they specify. There is also plug-in software available that provides enhanced particle effects.

Developer-friendly particle system tools   [edit]

Particle systems code that can be included in game engines, digital content creation systems, and effects applications can be written from scratch or downloaded. Havok provides multiple particle system APIs. Their Havok FX API focuses especially on particle system effects. Ageia - now a subsidiary of Nvidia - provides a particle system and other game physics API that is used in many games, including Unreal Engine 3 games. Both GameMaker: Studio and Unity provide a two-dimensional particle system often used by indie, hobbyist, or student game developers, though it cannot be imported into other engines. Many other solutions also exist, and particle systems are frequently written from scratch if non-standard effects or behaviors are desired.

External links   [edit]

- Particle Systems: A Technique for Modeling a Class of Fuzzy Objects⧉ — William T. Reeves (ACM Transactions on Graphics, April 1983)
- The ocean spray in your face. ⧉ — Jeff Lander (Graphic Content, July 1998)
- Building an Advanced Particle System⧉ — John van der Burg (Gamasutra, June 2000)
- Particle Engine Using Triangle Strips⧉ — Jeff Molofee (NeHe)
- Designing an Extensible Particle System using C++ and Templates⧉ — Kent Lai (GameDev.net)
- repository of public 3D particle scripts in LSL Second Life format⧉ - Ferd Frederix
- GPU-Particlesystems using WebGL⧉ - Particle effects directly in the browser using WebGL for calculations.

Categories: 3D computer graphics | Computer physics engines | Virtual reality

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particle systems

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[BOOK] Quantum many-**particle systems**
JW Negele, H Orland - 1988 - tocs.ulb.tu-darmstadt.de
Redwood City, California • Menlo Park, California • Reading, Massachusetts • New York • Amsterdam
• Don Mills, Ontario • Mexico City • Sydney • Bonn • Madrid • Singapore • Tokyo • Bogota • Santiago
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[BOOK] Quantum theory of many-**particle systems**
AL Fetter, JD Walecka - 2003 - books.google.com
" Singlemindedly devoted to its job of educating potential many-**particle** theorists... deserves
to become the standard text in the field."—Physics Today" The most comprehensive textbook
yet published in its field and every postgraduate student or teacher in this field should own ...
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Quantum theory of many-**particle systems**. I. Physical interpretations by means
of density matrices, natural spin-orbitals, and convergence problems in the
method of …
PO Löwdin - Physical Review, 1955 - APS
Abstract In order to calculate the average value of a physical quantity containing also many-
particle interactions in a system of N antisymmetric particles, a set of generalized density
matrices are defined. In order to permit the investigation of the same physical situation in ...
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Particle systems—a technique for modeling a class of fuzzy objects
WT Reeves - ACM Transactions on Graphics (TOG), 1983 - dl.acm.org
Modeling phenomena such as clouds, smoke, water, and fire has proved difficult with the
existing techniques of computer image synthesis. These" fuzzy" objects do not have smooth,
well-defined, and shiny surfaces; instead their surfaces are irregular, complex, and ill ...
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[BOOK] Interacting **particle systems**
T Liggett - 2012 - books.google.com
At what point in the development of a new field should a book be written about it? This
question is seldom easy to answer. In the case of interacting **particle systems**, important
progress continues to be made at a substantial pace. A number of problems which are ...
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Traffic and related self-driven many-**particle systems**
D Helbing - Reviews of modern physics, 2001 - APS
Abstract Since the subject of traffic dynamics has captured the interest of physicists, many
surprising effects have been revealed and explained. Some of the questions now
understood are the following: Why are vehicles sometimes stopped by "phantom traffic ...
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[PDF] arxiv.org
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[BOOK] Quantum theory of many-**particle systems**
AL Fetter, JD Walecka - 2003 - books.google.com
" Singlemindedly devoted to its job of educating potential many-particle theorists… deserves
to become the standard text in the field."—Physics Today" The most comprehensive textbook
yet published in its field and every postgraduate student or teacher in this field should own ...
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of density matrices, natural spin-orbitals, and convergence problems in the
method of …
PO Löwdin - Physical Review, 1955 - APS
Abstract In order to calculate the average value of a physical quantity containing also many-
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T Liggett - 2012 - books.google.com
At what point in the development of a new field should a book be written about it? This
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Abstract Since the subject of traffic dynamics has captured the interest of physicists, many
surprising effects have been revealed and explained. Some of the questions now
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Particle Systems—A Technique for Modeling a Class of Fuzzy Objects

WILLIAM T. REEVES
Lucasfilm Ltd

This paper introduces particle systems—a method for modeling fuzzy objects such as fire, clouds, and water. Particle systems model an object as a cloud of primitive particles that define its volume. Over a period of time, particles are generated into the system, move and change form within the system, and die from the system. The resulting model is able to represent motion, changes of form, and dynamics that are not possible with classical surface-based representations. The particles can easily be motion blurred, and therefore do not exhibit temporal aliasing or strobing. Stochastic processes are used to generate and control the many particles within a particle system. The application of particle systems to the wall of fire element from the Genesis Demo sequence of the film *Star Trek II: The Wrath of Khan* [10] is presented.

1. INTRODUCTION

Modeling phenomena such as clouds, smoke, water, and fire has proved difficult with the existing techniques of computer image synthesis. These "fuzzy" objects do not have smooth, well-defined, and shiny surfaces; instead their surfaces are irregular, complex, and ill defined. We are interested in their dynamic and fluid changes in shape and appearance. They are not rigid objects nor can their motions be described by the simple affine transformations that are common in computer graphics.

This paper presents a method for the modeling of fuzzy objects that we call particle systems. The representation of particle systems differs in three basic ways from representations normally used in image synthesis. First, an object is represented not by a set of primitive surface elements, such as polygons or patches, that define its boundary, but as clouds of primitive particles that define its volume. Second, a particle system is not a static entity. Its particles change form and move with the passage of time. New particles are "born" and old

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All citations

Particle systems—a technique for modeling a class of fuzzy objects
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Animating explosions   [PDF] ethz.ch
GD Yngve, JF O'Brien, JK Hodgins - ... of the 27th annual conference on ..., 2000 - dl.acm.org   Online@KTH Biblioteket
Abstract In this paper, we introduce techniques for animating **explosions** and their effects.
The primary effect of an explosion is a disturbance that causes a shock wave to propagate
through the surrounding medium. The disturbance determines the behavior of nearly all ...
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Animating suspended particle explosions   [PDF] uic.edu
BE Feldman, JF O'brien, O Arikan - ACM Transactions on Graphics (TOG), 2003 - dl.acm.org   Online@KTH Biblioteket
Abstract This paper describes a method for animating suspended particle **explosions**.
Rather than modeling the numerically troublesome, and largely invisible blast wave, the
method uses a relatively stable incompressible fluid model to account for the motion of air ...
Cited by 184   Related articles   All 20 versions   Web of Science: 46   Cite   Save

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Spherical billboards and their application to rendering explosions   [PDF] researchgate.net
T Umenhoffer, L Szirmay-Kalos, G Szijártó - Proceedings of Graphics ..., 2006 - dl.acm.org
Abstract This paper proposes an improved billboard rendering method that splats particles
as aligned quadrilaterals similarly to previous techniques, but takes into account the
spherical geometry of the particles during fragment processing. The new method can ...
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Animating real-time explosions   Online@KTH Biblioteket
C Martins, J Buchanan... - The Journal of ..., 2002 - Wiley Online Library
Abstract Any sufficiently powerful explosion in air creates an expanding blast wave that
propagates outwards from the source. The paper explores the physically based simulation of
a blast wave impact on surrounding objects. The emphasis is on simplifying the ...
Cited by 9   Related articles   All 3 versions   Web of Science: 2   Cite   Save

[CITATION] **Rendering explosions**
F Uhl, J Blanc-Talon - SIMULATION SERIES, 1997 - SCS SOCIETY FOR COMPUTER ...
Cited by 6   Related articles   Cite   Save

Animating physically based explosions in real-time
LA Ek, R Vistnes, OE Gundersen - ... of the 5th international conference on ..., 2007 - dl.acm.org
Abstract We present a framework for real-time animation of **explosions** that runs completely
on the GPU. The simulation allows for arbitrary internal boundaries and is governed by a
combustion process, a Stable Fluid solver, which includes thermal expansion, and ...
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All citations   **Particle systems—a technique for modeling a class of fuzzy objects**
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My library   Depicting **fire** and other gaseous phenomena using diffusion processes   [PDF] naturewizard.at
                        J Stam, E Fiume - Proceedings of the 22nd annual conference on ..., 1995 - dl.acm.org   Online@KTH Biblioteket
Any time   Abstract Developing a visually convincing model of **fire**, smoke, and other gaseous
Since 2016   phenomena is among the most difficult and attractive problems in computer graphics. We
Since 2015   have created new methods of animating a wide range of gaseous phenomena, including ...
Since 2012   Cited by 459   Related articles   All 25 versions   Cite   Save
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                        Simulating **fire** with texture splats   [PDF] psu.edu
Sort by relevance   X Wei, W Li, K Mueller, A Kaufman - ... of the conference on Visualization'02, 2002 - dl.acm.org
Sort by date   Abstract We propose the use of textured splats as the basic display primitives for an open
                        surface **fire** model. The high-detail textures help to achieve a smooth boundary of the **fire**
☑ include citations   and gain the small-scale turbulence appearance. We utilize the Lattice Boltzmann Model (...
                        Cited by 113   Related articles   All 19 versions   Cite   Save
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                        [PDF] Realistic and controllable **fire** simulation   [PDF] researchgate.net
                        P Beaudoin, S Paquet, P Poulin - Graphics Interface, 2001 - researchgate.net
                        Abstract We introduce a set of techniques that are used together to produce realistic-looking
                        animations of burning objects. These include a new method for simulating spreading on
                        polygonal meshes. A key component of our approach consists in using individual flames ...
                        Cited by 106   Related articles   All 12 versions   Cite   Save   More

                        Directable, high-resolution simulation of **fire** on the GPU   [PDF] korea.ac.kr
                        C Horvath, W Geiger - ACM Transactions on Graphics (TOG), 2009 - dl.acm.org   Online@KTH Biblioteket
                        Abstract The simulation of believable, photorealistic **fire** is difficult because **fire** is highly
                        detailed, fast-moving, and turbulent. Traditional gridbased simulation models require large
                        grids and long simulation times to capture even the coarsest levels of detail. In this paper, ...
                        Cited by 77   Related articles   All 7 versions   Web of Science: 18   Cite   Save

                        Meshes on **fire**   [PDF] psu.edu
                        H Lee, L Kim, M Meyer, M Desbrun - Computer Animation and Simulation ..., 2001 - Springer   Online@KTH Biblioteket
                        Abstract We present a new method for the animation of **fire** on polyhedral surfaces. Using
                        the notion of discrete straightest geodesics, we evolve **fire** fronts directly on the surface of
                        arbitrarily complex objects. Animator control and motion complexity is achieved by driving ...
                        Cited by 62   Related articles   All 15 versions   Cite   Save

                        Interactive simulation of **fire**   [PDF] tamu.edu
                        Z Melek, J Keyser - Computer Graphics and Applications, 2002. ..., 2002 - ieeexplore.ieee.org
                        Abstract In this paper we describe a fast and interactive model to simulate and control the
                        fire phenomenon. We use a modified interactive fluid dynamics solver to describe the motion

A Geometric Control of Fire Motion Editing

Xiaobing Feng
*Virtual Reality Lab, Institute of
Computing Technology,
Chinese Academy of Sciences.
University of Chinese Academy of Sciences*
E-mail:fengxiaobing@ict.ac.cn

Dengming Zhu
*Virtual Reality Lab, Institute of
Computing Technology,
Chinese Academy of Sciences*
E-mail:mdzhu@ict.ac.cn

Zhaoqi Wang
*Virtual Reality Lab, Institute of
Computing Technology,
Chinese Academy of Sciences*
E-mail:zqwang@ict.ac.cn

Abstract—**In this paper, we present a control technique to editing the fire motion with the geometry goal shape, which is designed without connection to physical parameters and physical equation solving. To fulfill this, controlling elements are extracted from the input curves conveying the target shape of fire animation. Then a force field is obtained according to these controlling elements, which would drive the fire towards the target shape. Moreover, to optimize the particles' position, a geometric topology model is proposed to maintain the visual details while generating the fire motion under the external force field frame by frame. Experimental results show that our method can generate desirable fire shape under simple interaction.**

Index Terms—**Fire animation, Motion control, Data-driven.**

1. Introduction

Fire animation is widely used in various areas, such as entertainment, visual simulation and games. For example, flames spreading on the house, fire man flying in the air are common in the movies. In these applications, the fire controlling is very useful to produce fire sequences to meet needed to appear in different situations. So how to reuse the precomputed data to reduce the computational cost is another goal in this paper.

To overcome these problems, an intuitive control approach to produce realistic fire animation efficiently is presented in this paper. Based on the precomputed simulation data, we combine the geometric constraints with the fire evolving rules to create various fire animations.

Early work about fluid control focused on the parameters and didnt allow to define the target shape directly. High level control methods are also provided for the artists to control the fluid motion. a radial basis function in [1] and B-Spline curve in [2] are introduced to deform fire animation and make the fire collide with object. [3] deform the 2D flow fields via preserving the divergence-free condition. In this paper, we provide a more convenient and flexible method to control the fire motion with simple geometric model. Curve paths and 3D mesh are both allowed to define the fire shape. In this way,a drawing board or mouse could be used as a design tool to give the burning path of flame. 3D mesh model in Autodesk Maya is another format. All these geometric constraints are represented by the uniform descriptor. Then Key elements extracted from these controlling conditions are

Figure 6. Fire deformation of windmill.

Figure 7. Fire deformation of teapot.

Figure 8. Fire deformation of lamp.

9. Conclusion

In this paper, a method is developed to controlling the fire on complete visual appearance and behavior. An easy and intuitive approach to control the fire animation through a

Acknowledgment

References

Proposal for Project 1 Title

Erik Dahlström
edahls@kth.se

Simon Fransson
simonfra@kth.se

Johan Huusmann
johanhuu@kth.se

Erik Dackelid
erikdj@kth.se

Rasmus Ansin

Advanced Graphics and Interaction
AGI15
2015-09-07

VIC STHLM
VISUALISATION INTERACTION COLLABORATION

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Blopper

Motivation

- The Oculus/VR is state of the art in gaming
- Combining all our different technologies will be a fun challenge
- Seeing how people interact and cope with a 360 degree VR game is interesting
- Popping balloons is extremely fun

Goals and Challenges

- **Goals**
  - Move an IRL object in a 360 degree 3D VR world
  - Wireless playability (except for carried devices)
  - Sufficient visuals for a nice user experience
- **Challenges**
  - Tracking the sword in 3D space with low enough delay
  - Sending webcam data to player (carried devices)
  - Creating efficient models and effects

Related Work (maybe a Table?)

- Fruit Ninja Kinect
  - Halfbrick & Microsoft Studios, 2011
- Wiimote 6DOF Position Tracking
- Oculus rift + Razer hydra, Half life 2
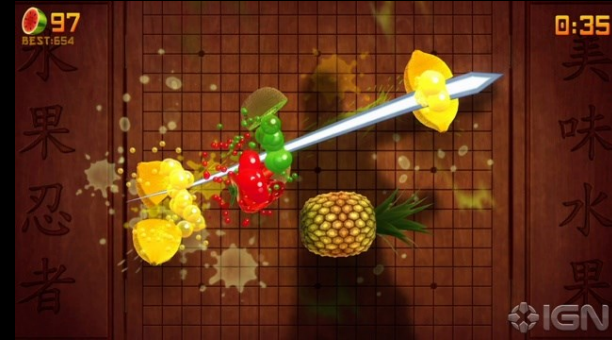
Fruit Ninja Kinect - With a Sword!

HL2 with Oculus Rift and Razer Hydra
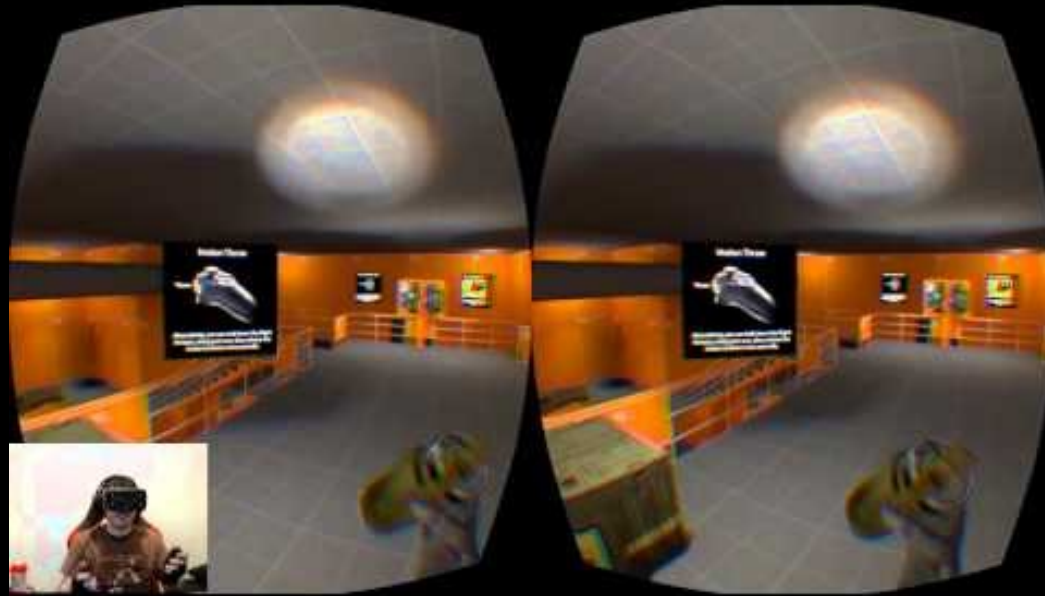
Wiimote 6DOF Position Tracking

Methods and Techniques

- Multiple webcams searching for light on a sword
- Unity 3D
- Server computer and client computer with socket connection VS. WHDI
- Oculus Rift
- Algebra to make sure VR world and real world is aligned

Thank you!

Questions?

Erik Dahlström
edahls@kth.se

Simon Fransson
simonfra@kth.se

Rasmus Ansin
ransin@kth.se

Johan Huusmann
johanhuu@kth.se

Erik Dackelid
Johansson
erikdj@kth.se

Teacher:
Mario Romero
marior@kth.se

Comments on Blopper

- I am interested in the physics of your ballons.
  - How do they float and fall?
  - How do they blow up?
  - What does that look like?
- I am concerned about the feasibility and safety of 360 degrees of game play
- Wireless tech has limitations
- Building your own mocap portable studio may be too challenging
- I am interested in the special effects FX of your sword swings
- Sound and haptics?
- Razer hydra?
- I am concerned about the physical space you require
- You need more papers on the graphic elements you intend to develop
- Why use an oculus. Has cables and can't see the

world (including yourself). How about some see-through HUD – Epson Moverios?
- Will you use infrared markers?
- How about attaching a wii mote to the sword?
- What happens when you miss a ballon?
- You could use a backpack for carrying part of the equipment if you need to.
- You could force a pivot foot to restrain movement and constrain the engineering problem of you interaction infrastructure.
- I am concerned about multiple calibrations per installation. Needs more robustness.
- I know you are exploring google cardboard. Still, you can't see the world.
- Have you though about the TI Sensor Tag?

Grading proposal

- Well rehearsed
  - FINISHES ON TIME
- Technically clear
- Related work is state of the art in graphics and interaction
- Clear individual contributions

Group 2

Student

- Douglas
- Emilie
- Mårten
- Adrian
- Victor

Idea (merged from both groups)

- Teamtris

Teamtris

Who are we?

Douglas Carlsson (douglasc@kth.se)
Adrian Blanco (adblan@kth.se)
Victor Hung (vhung@kth.se)
Emilie Le Moël (emilielm@kth.se)
Mårten Norman (martenno@kth.se)

Motivation

Goals and challenges

1. Gather people and have them collaborate with each other
      Challenge : making it work even for people that don't know each other

2. Develop a fun and addictive game based on cooperation
      Challenge : adding something new to Tetris

3. Design mind-blowing graphics
      Challenge : creating impressive visuals from a simple base

Related works

2Pacs (2014) - KTH
Tetris with Kinect (2011) - University of Twente
Lumines (2004) - Q Entertainment

2Pacs
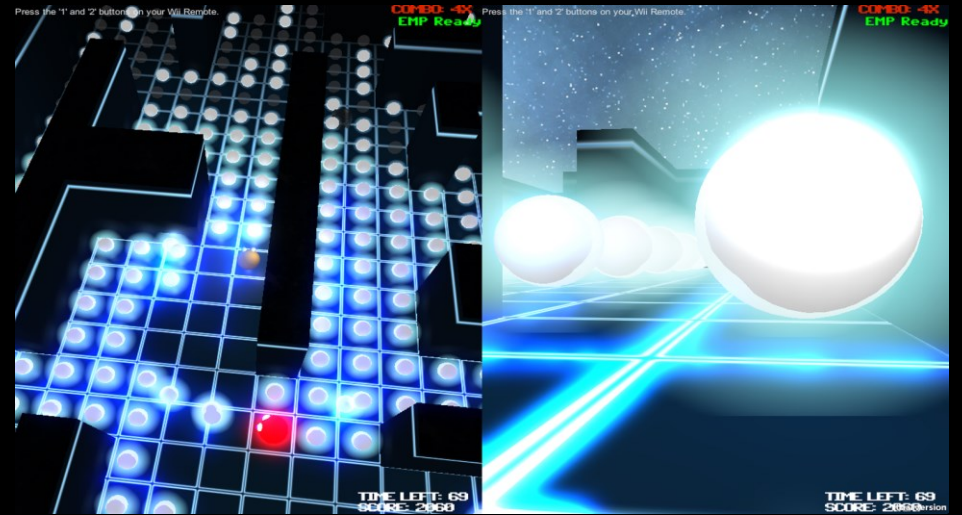
Tetris
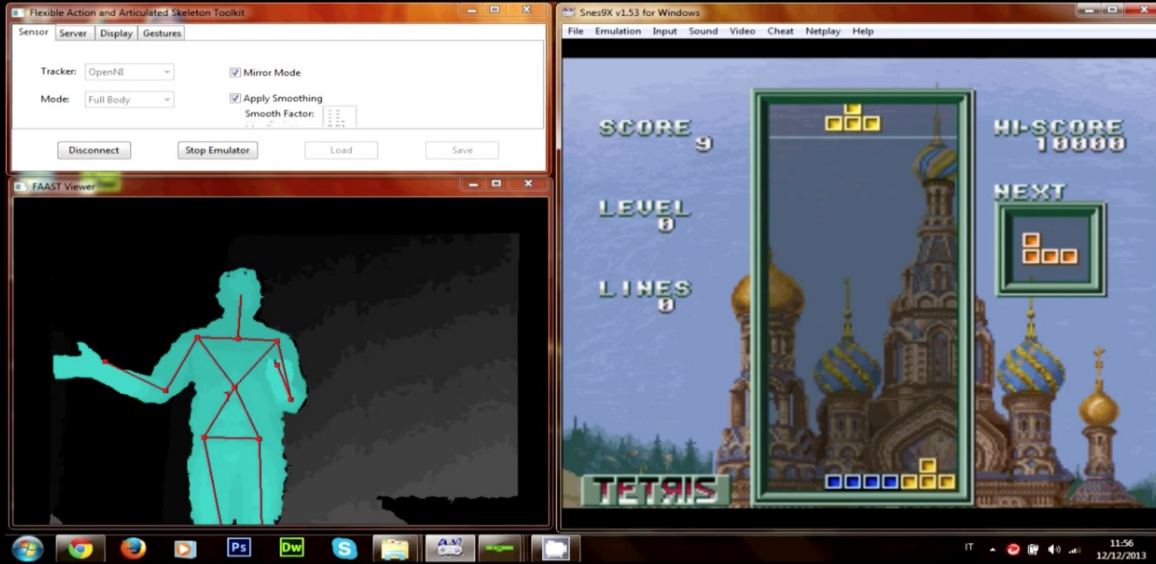
Lumines
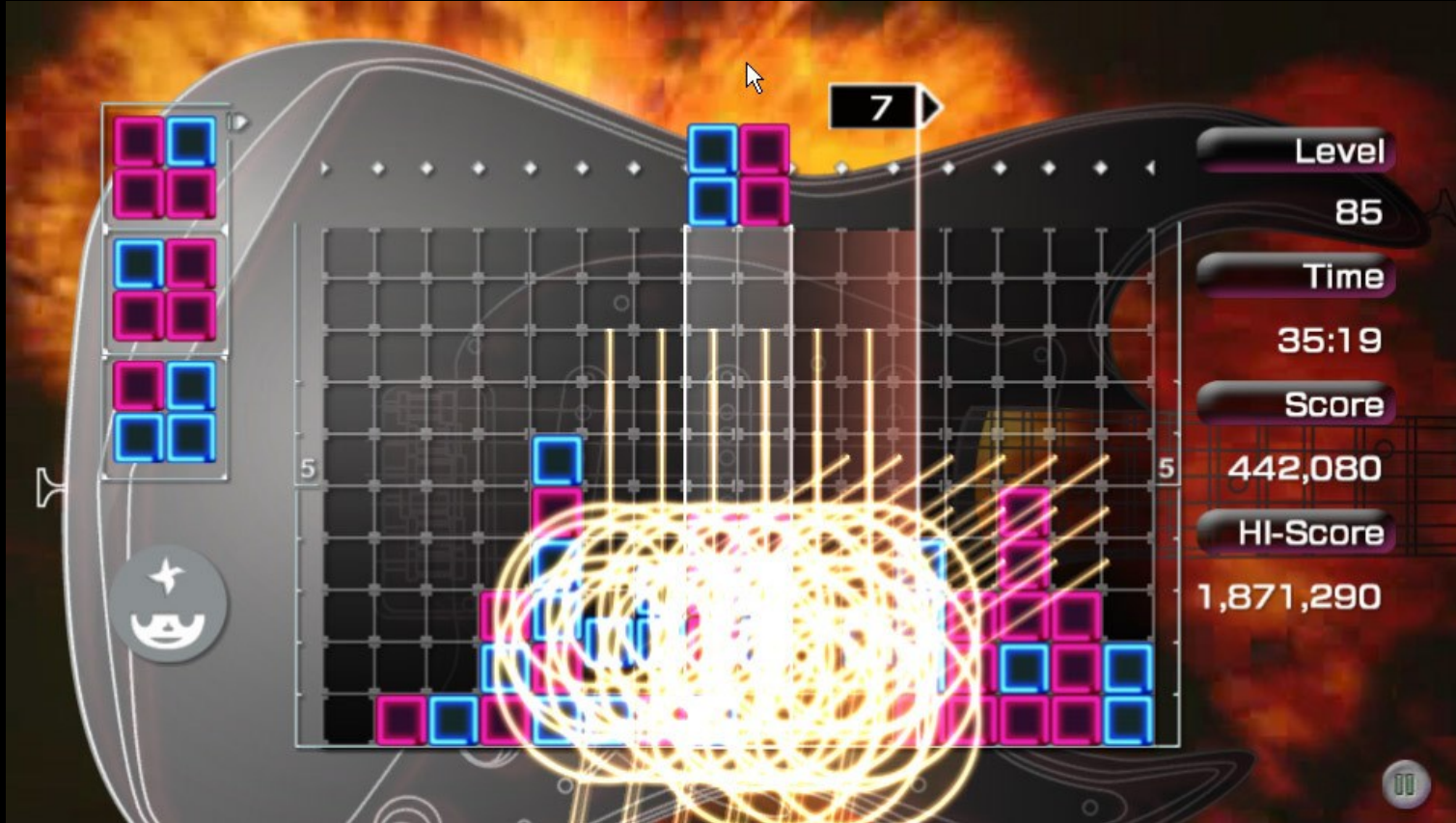
Interactions

Two players share control of the falling pieces
One player controls movement, the other rotation
Some movements will require teamwork to execute
Teams of two can compete simultaneously in a multiplayer mode
Important to deliver intuitive interactions

Technical specifications

Graphics - Shaders

Many shader possibilities for eye-candy
- Noise
- Scanlines
- Distortion
- Fading
- Bloom
- Pixel displacement

Games + Retro + The 80s = ♥

Graphics

Orthographic projection makes 3D appear as 2D

Possible to make only one axis visible at all times

Perspective Projection   Orthographic Projection
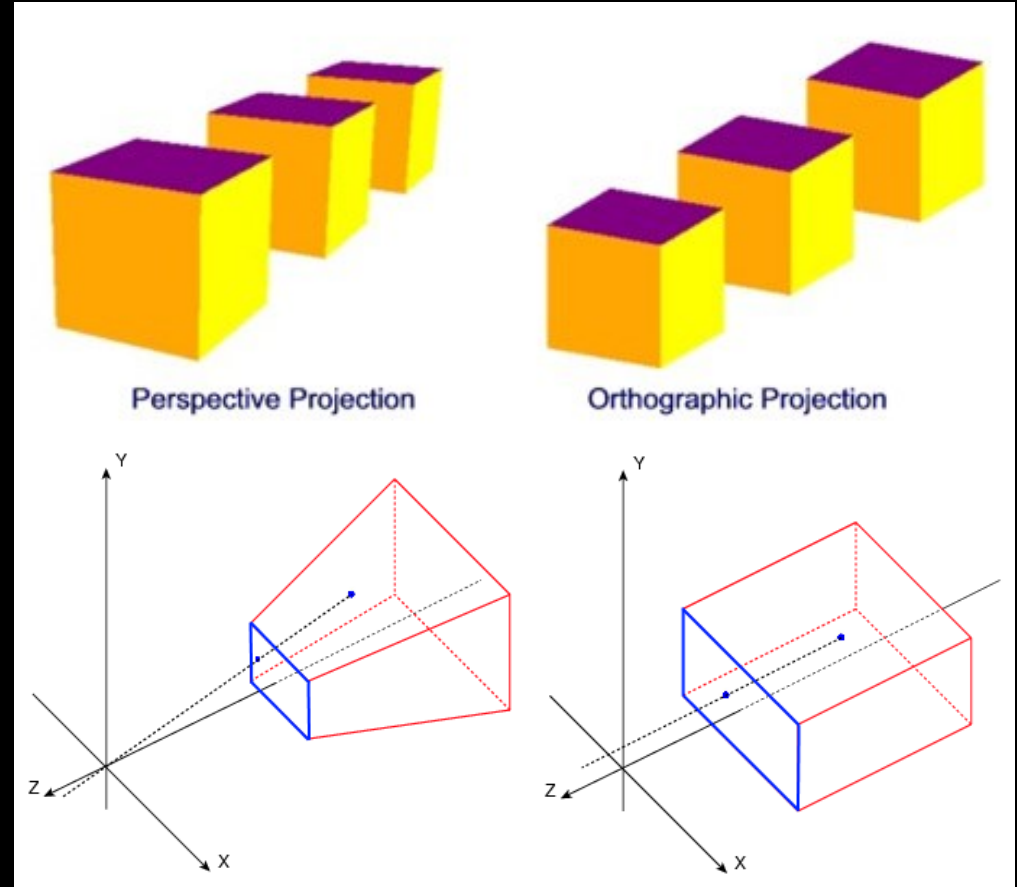
Risk assessment

- Team is new.

- Need to get a working game in short time
  - Use Unity to get on high level fast
  - Selected Tetris, that is simple and well known, but still room for nice graphics and effects if time permits

- The ideal controller interface is very advanced.
  - Start with just keyboard control, then add complexity and features if time allows

Prototype Demonstration

Any questions?

Comments on Teamtris

- I like the asymetric collaborative game aspect.
- As I said in class, I would really like you to explore constructive geometries to copy patterns presented by the game challenge. You move forward by building more complex geometries in a time limit, for example.
- I like the retro idea throgh shaders.
- Have you thought about different views/capabilities for different players?

Grading proposal

- Well rehearsed
  - FINISHES ON TIME
- Technically clear
- Related work is state of the art in graphics and interaction
- Clear individual contributions

Group 3

Students

- Johan
- Niclas
- Daniel
- Johan
- Anton

Project idea

- Multiplayer AR game

Augmented Reality
MULTIPLAYER GAMING

AGI16 - L4

Team members

Niclas Ericsson
nerics@kth.se

Daniel Lindström
danielin@kth.se

Anton Eldh
aeldh@kth.se

Johan Kasperi
kasperi@kth.se

Johan Kitti
johanks@kth.se

Advanced Graphics and Interaction
AGI15
2015/09/07

Using smartphones for augmented reality multiplayer gaming.

Motivation

- Everybody has a smartphone.
- You don't need any extra hardware.
- AR through the smartphone is really cool.

- Building a multiplayer game.

- Learn Unity and especially networking with Unity.

- Learn AR.

Goals and Challenges

- Goals
  - To make a fun and interesting multiplayer game in augmented reality.
- Challenges
  - Make the AR work on multiple devices.
  - Make the input work without too much latency.
  - Make the gameplay feel meaningful and fun.

AR Defender 2 -
Tower Defense Game

Ball Resurrection

Swordy

Methods and Techniques

Methods and Techniques

- The devices will be a server, multiple smartphones, a router with wireless support and a table with a texture.

   •Augmented Reality (AR) through the smartphones camera.

- User input will be through the touchscreen of the smartphone.

- The parts will be connected with websockets.

Thank you!

Questions?
Johan Kasperi {kasperi@kth.se}
Niclas Ericsson {nerics@kth.se}
Anton Eldh {aeldh@kth.se}
Daniel Lindström {danielin@kth.se}
Johan Kitti Söderberg {johanks@kth.se}
Teacher - Mario Romero

Group Members

- Johan Kasperi (Interactive Media Technology, 2016, develop something cool)
- Daniel Lindström (Interactive Media Technology, 2016, have the freedom to choose my projects myself)
- Johan Kitti Söderberg (Computer Science, 2016, develop something cool)
- Niclas Ericsson (Human-Computer Interaction, 2016, develop something cool)
- Anton Eldh (Simulation Technology and Virtual Design, 2016, develop something cooler)

Individual Contributions

- Backend Team (networking, server)
  - Daniel Lindström
  - Johan Kasperi
- Game Engine Team (game dev, AR, design)
  - Anton Eldh
  - Niclas Ericsson
  - Johan Kitti Söderberg

Comments for Group 3

1. You need a name
2. I really like your idea of smartphones for AR
3. Google tango
4. You need to improve your literature review
5. Start with AR at Georgia Tech with stuff like the zombie game I showed in class – arhrrrr
6. I really like the idea of combining this with a dynamic surface (microsoft surface or **samsung pixelsense** in studio) and physical objects – make sure you play zap the bugs!
7. The multiplayer aspect of your project is peripheral, but if you can get it to work quickly, it will make a huge difference
8. One thing I really don't like from the videos you showed is that people are only fixated on the screens. Can you figure out a way to allow/force them to look at each other?
9. You need to think more about the graphics in your game. Think about special effects, for example, FX.
10. Great work!

Grading proposal

- Well rehearsed
  - FINISHES ON TIME
- Technically clear
- Related work is state of the art in graphics and interaction
- Clear individual contributions

Group 4

Students

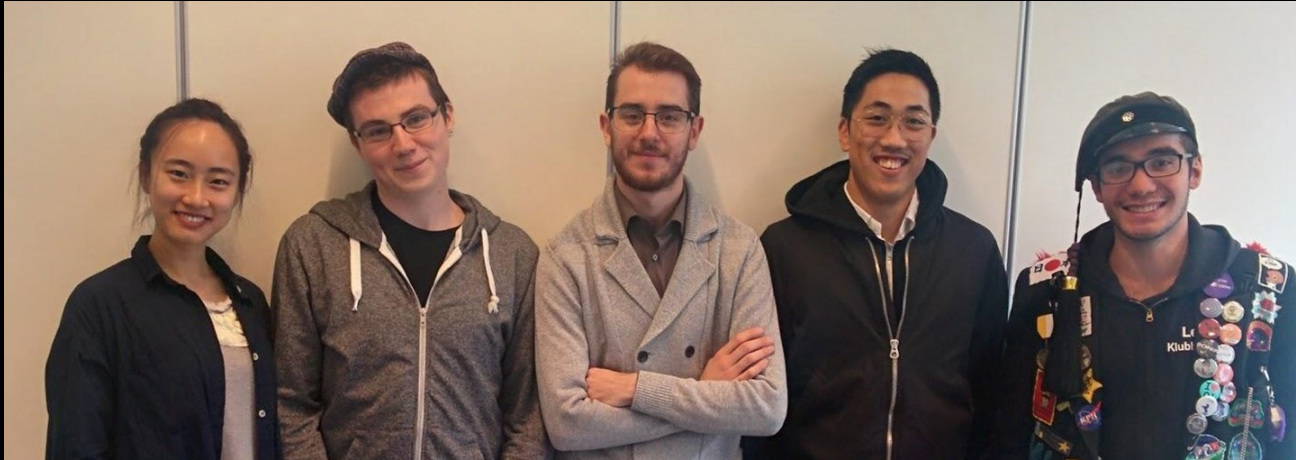- Viktor
- Vincent
- Lennart
- Huiting
- Mikael

Project idea

- Virtual reality fighting game

- Sandbox turns into real-time strategy game

Proposal for **Mad**Sand

Huiting	Mikael	Viktor	Vincent	Lennart
huitingw@kth.se	mikaele3@kth.se	valderin@kth.se	vwong@kth.se	lenjons@kth.se

Advanced Graphics and Interaction
AGI15
2015/09/07

Motivation

- Fun! Combine nostalgia with new technologies
- Return to your childhood by taking the sandbox to a whole new level

- Learn about combining the physical world with the digital

- Make it easier for people to create 3D objects/maps

Goals and Challenges

- Goals
  - Create an interactive sandbox based on AR
  - Create a fun and immersive multiplayer game
- Challenges
  - Attain depth data from the sandbox
  - Make the digital world update in real time
  - Find a game balance

Related Work

- Augmented Reality Sandbox
  - Oliver Kreylos (2015)
  - http://idav.ucdavis.edu/~okreylos/ResDev/SARndbox/

- Project Mimicry

  - developed by Monobando (2011)
  - http://mimicry.monobanda.nl/
- Animal Crossing - Sweet day from Nintendo Land
  - Nintendo
  - released 30 november 2012 (EU)

Augmented Reality Sandbox

Project Mimicry

Setup

Computer

Projector

Kinect

Screen(s)

Game
Controllers
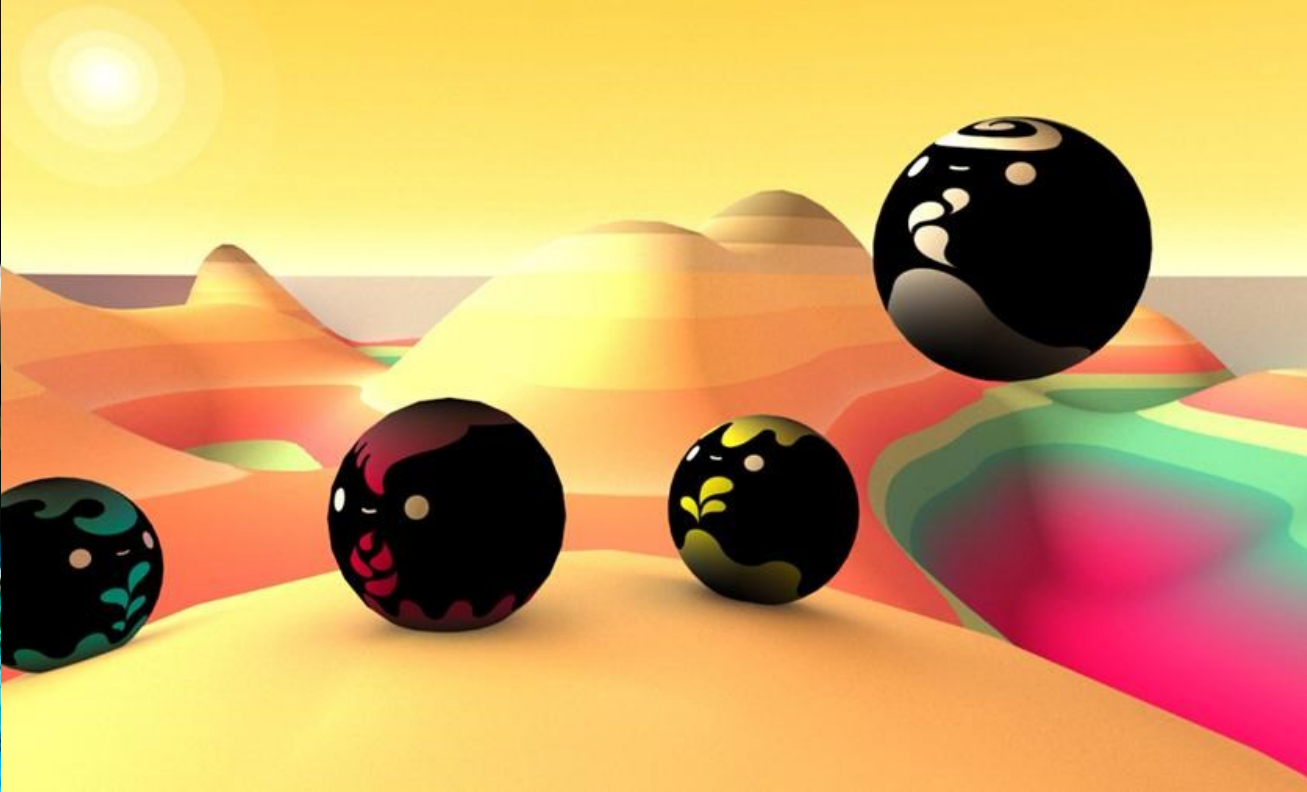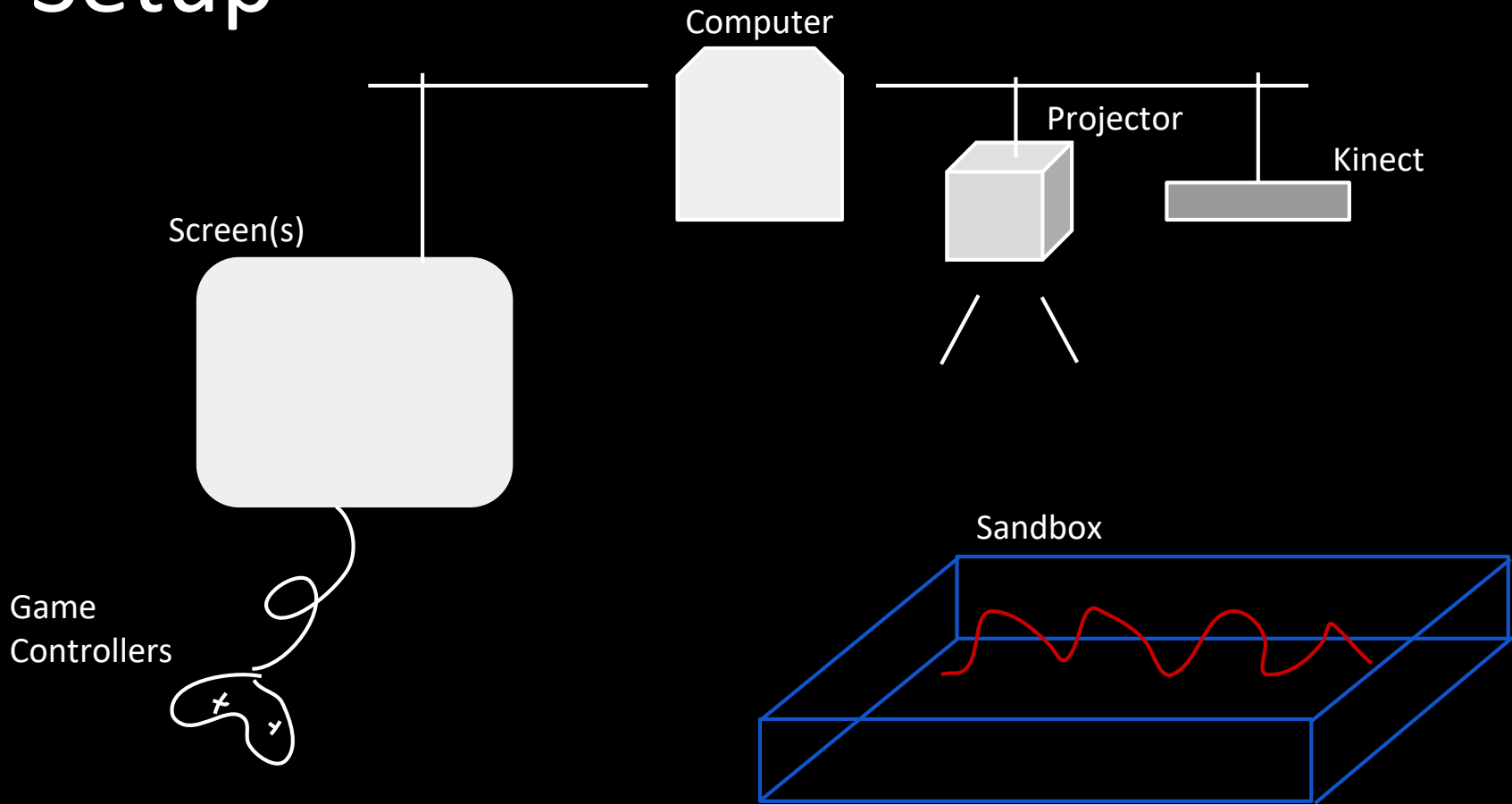
Sandbox

Method
Augmented reality: projection on the sand

Computer

Projector
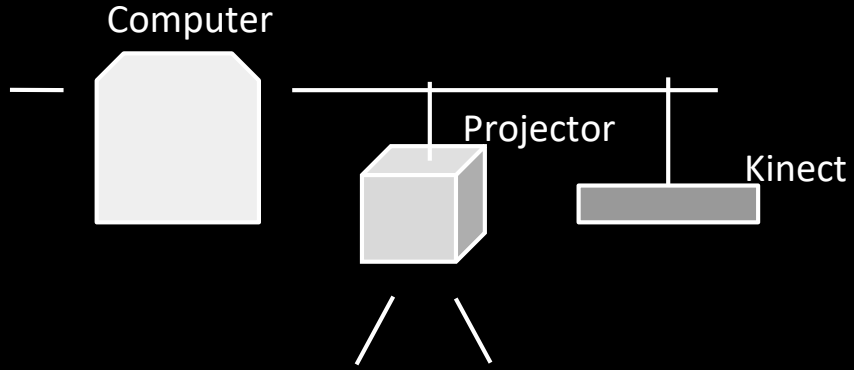
Kinect

Sandbox

> Game state projected onto the sand

> Computer vision: depth map from Kinect
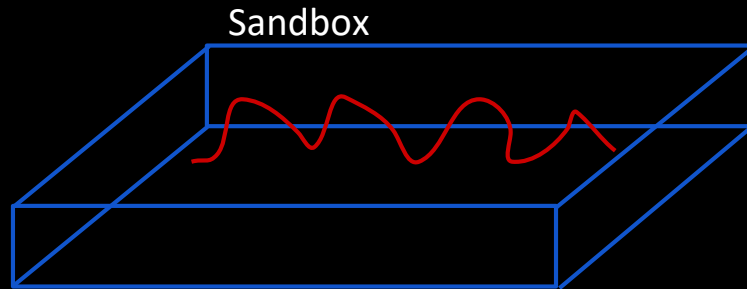
Method
Procedural generation: digital world

Computer

> Digital world procedurally
generated based on the sandbox

> Game physics: gravity, speed,
acceleration

Screen(s)

Game
Controllers

Software

Unity

Controller input

Depth data

Computer

Xbox
Controllers

Kinect

Screen data

Projector data

Screen(s)

Projector
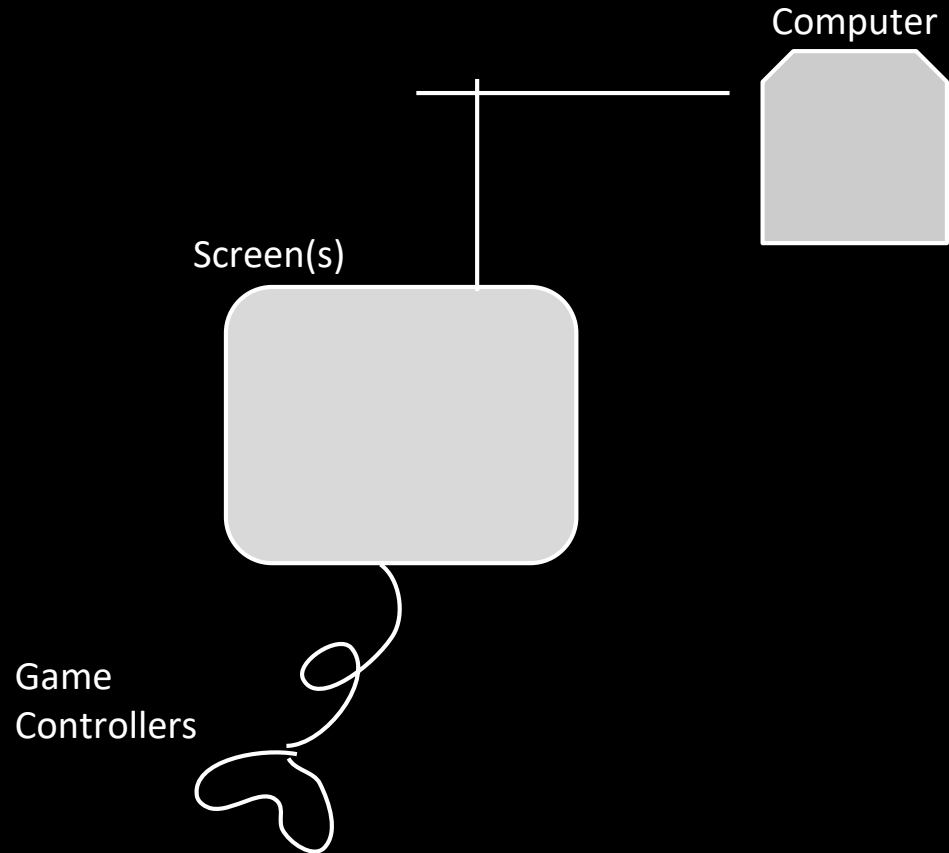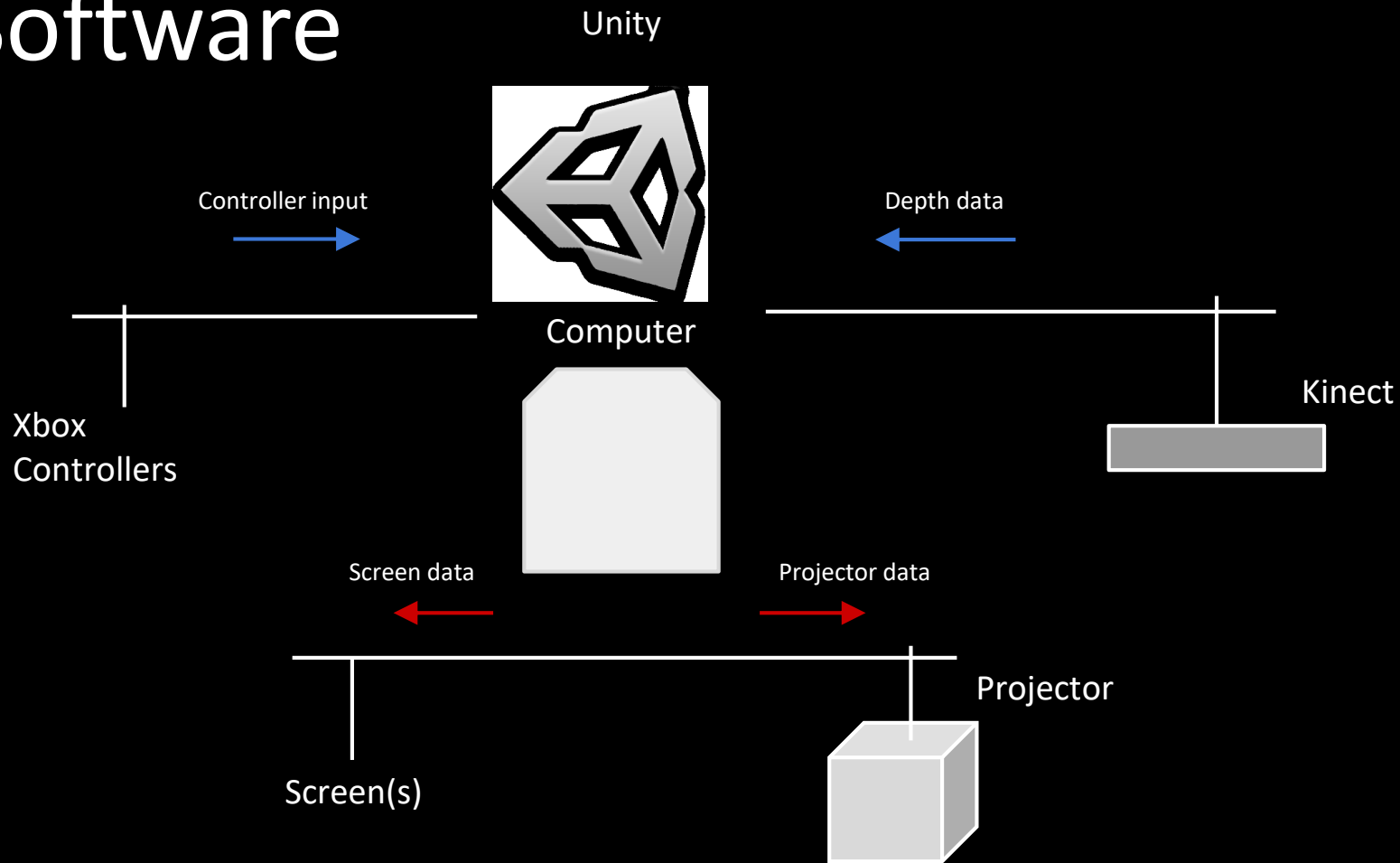
Thank you!

Questions?

Mikael mikaele3@kth.se   Huiting huitingw@kth.se

Viktor valderin@kth.se   Vincent vwong@kth.se

Lennart lenjons@kth.se

Teacher: Mario marior@kth.se

In case they ask

EXTRA SLIDES

Load Balancing

- We have tried to split the work ahead into groups, and assigning people according to what they want to learn! Of course this is not laid in stone, and we will help each other or change as we need.

Get Depth data into Unity:
Lennart, Vincent

Project AR on Sand:
Lennart, Viktor

Procedurally Generate World:
Huiting, Mikael

Game models, animation:
Vincent, Huiting

Game engine programming:
Mikael, Viktor

The plan ahead

- First: get to know Kinect, interface it with unity to be able to get the depth data.
- Get to know Unity
- Find which libraries we want to use.
- Get physical devices, such as the box, sand etc.

Our Planning document can be found here:
https://docs.google.com/spreadsheets/d/11LWqKTLMnB0z1o1jNYFVbscN_4J2fwE1u0p2zwFkK88/edit?usp=sharing
Notice that there are two sheets, one for tasks and one for the general schedule

Proposal Feedback

- Sand - What kind of sand? Not too messy
- Why sand? - Are there other materials/techniques
- Other physical objects into the sand as extension.
- Hiroshi Ishii MIT tangible interfaces as inspiration
- Think about the point of the game/ gamedesign
- Google has Sandbox related patent?

Comments on Proposal

1. It is a great idea to create a physical interaction device (tangible media) and use sand as a high definition phycon with intrinsic tangible feedback. You need to take it a few steps further.

2. Can you combine it with other phycons?

3. Be careful with getting stuck with the game play

4. Thinking about your proposal, I concluded it is a tower defence game where the defender modifies the terrain. The balnancing is hard!

5. Have you thought about casting shadows from the projectors on the interactive surface? Do some research on multiple redundant projection

6. What about the physics of your interaction?

7. Yes, the sand could get really messy!

8. Great work!

9. Johan
   1. Lemming style game!

Updates 2015/09/10

Not Doing

- Oculus
- Skeleton
- Hand

Done and going to do

- Connected kinect with unity
- Depth data on rough terrain is wip – 10%
- Simple car game in unity
- Created some models
  - Maya
- Carpentry on the weekend
- Projection!

Grading proposal

- Well rehearsed
  - FINISHES ON TIME
- Technically clear
- Related work is state of the art in graphics and interaction
- Clear individual contributions

Group 5

Students

- Maxime

- Max

- Robert

- Omid

Project idea

- Oculus rift

- Wii remote

- Space shooter

Project proposal

Omid Ghorreshi
omidgh@kth.se

Max Turpeinen
maxtu@kth.se

Maxime Hulliger
hulliger@kth.se

Robert Amino
amino@kth.se

Advanced Graphics and Interaction
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2015/09/07

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Motivation

- Experience the VR immersion
- Learn new development and graphics methods
- Extend portfolio by completing a great project
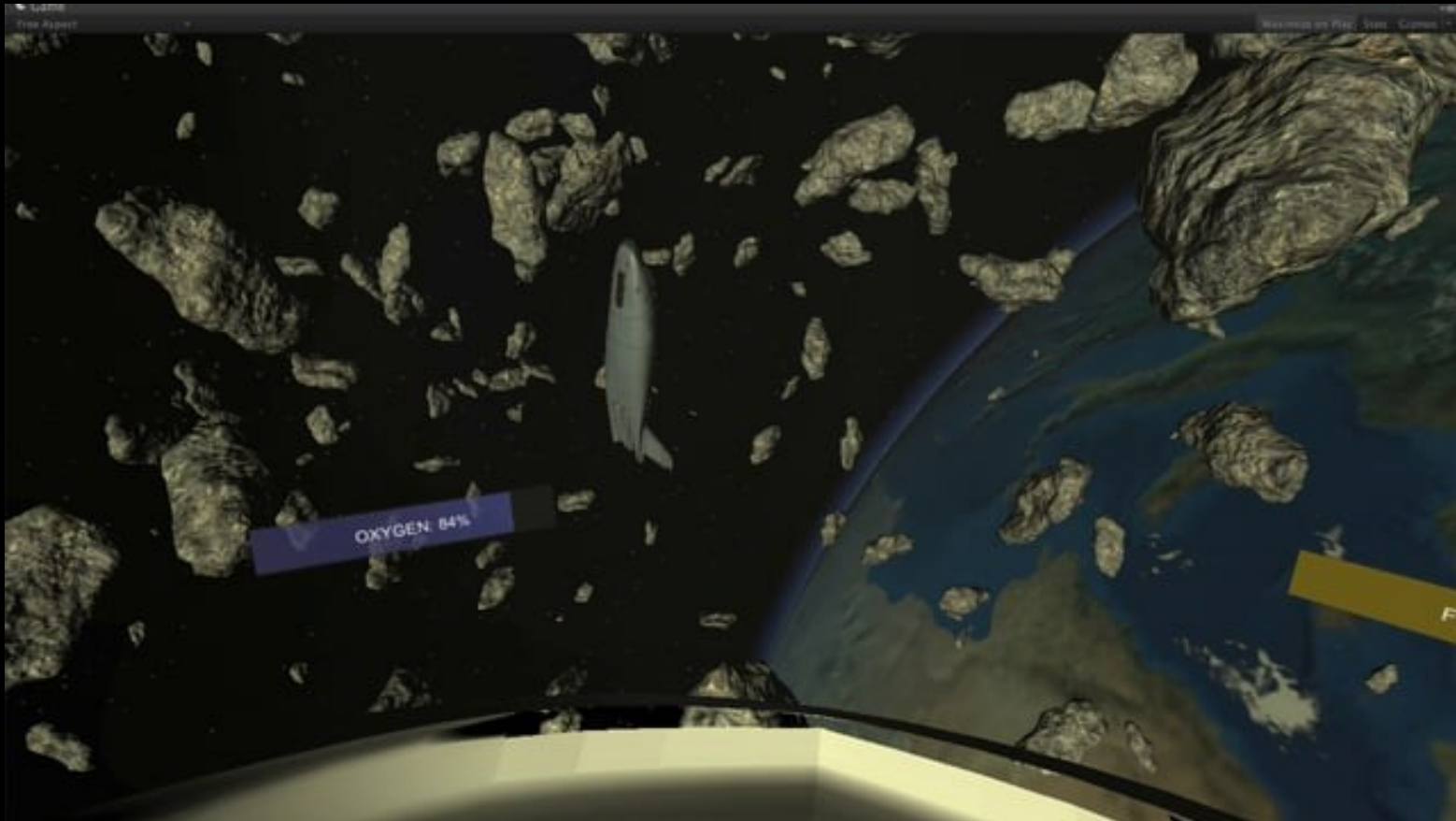- Save lives in case of alien moon invasion
- For fun !

Goals and Challenges

- Goals
  - Realistic shooting animation
  - Immersive environment
  - Fun to play (running)
- Challenges
  - Wii remote controls
  - hand movement coherent
  - workload balance as we walk in the unknown

Related Work

- **Thrust yourself**
  - Stefan Etoh, Oscar Friberg, Johan Bäckman
  - 2014 in AGI14
- **Half-Life 2 (with the Oculus Rift and Virtuix Omni)**
  - Valve
  - 2004
- **Wii Fit Plus : Jogging**
  - Nintendo
  - 2009

Thrust Yourself

AGI15

Half-Life 2
(with the Oculus Rift and Virtuix Omni)

- https://youtu.be/dP48cLFeBms?t=3m25s

Wii Fit Plus : Jogging

- https://youtu.be/Tt0sPxIqydg?t=1m29s

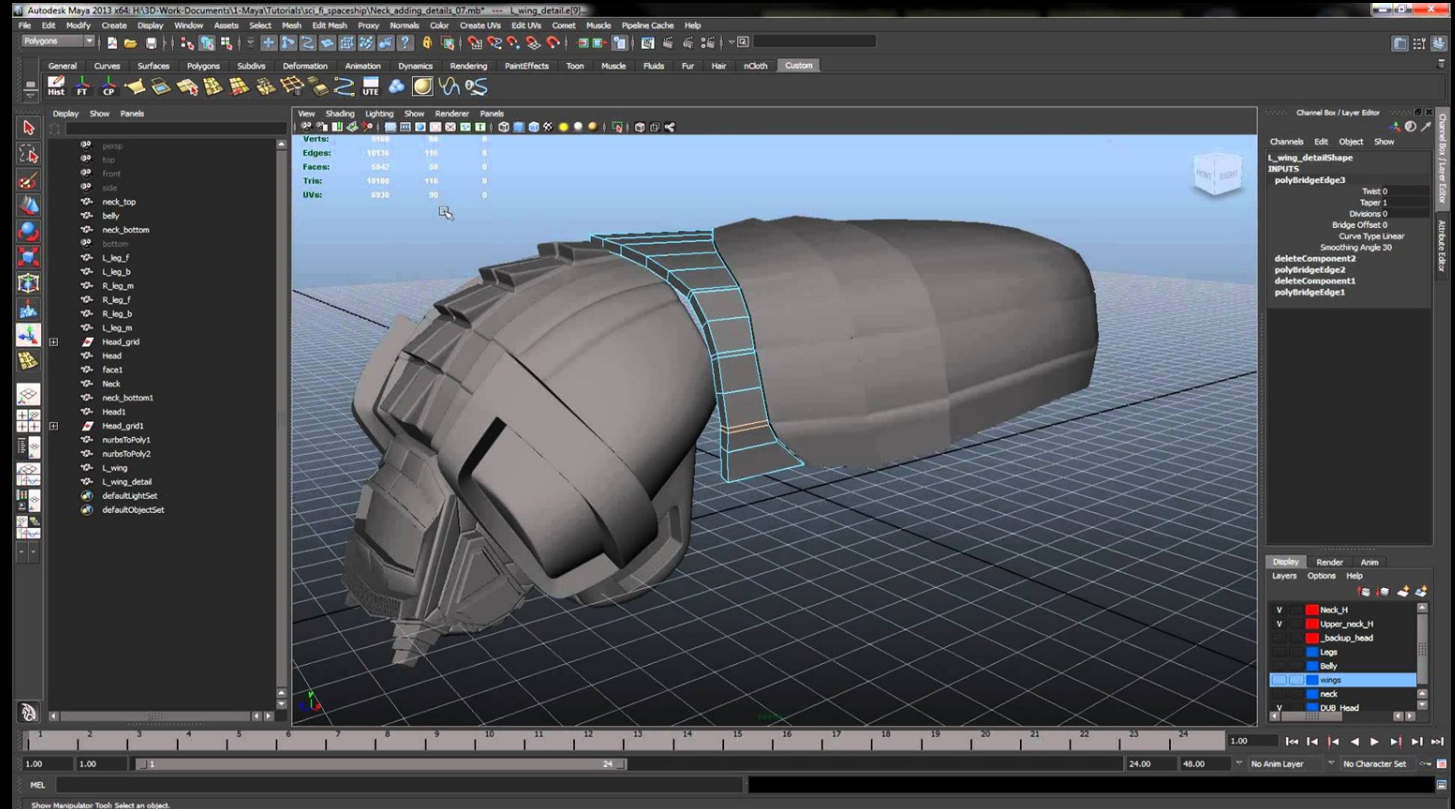# Methods and Techniques

- Wii remote and Nunchuk
- Oculus Rift
- Maya
- Unity (C#)

Wii remote and Nunchuk

Maya

Unity

Thank you!

Questions?

Omid Ghorreshi {omidgh@kth.se}

Maxime Hulliger {hulliger@kth.se}

Max Turpeinen {maxtu@kth.se}

Robert Amino {amino@kth.se}

Teacher : Mario Romero {marior@kth.se}

Feedback

- WE NEED TO CHOOSE IF WE WANT THE GAME MORE IMMERSIVE (OCULUS RIFT) OR MORE PHYSICAL (WII REMOTE).
- SHOULD THE PLAYER SIT OR STAND UP ?
- USE SAMSUNG SAMSUNG GEAR INSTREAD OF OCULUS RIFT FOR MORE MOVMENT FREEDOM.
- HYDRA RAZER INSTEAD OF WII REMOTE ?
- WEAPON INDEPENDANT FROM THE VIEW ?

Omid Ghorreshi

- Majors : computer science, mathematics
- Graduation year : September 2016 (Master)
- Career goal : project manager in computer graphics projects in a big company

Maxime Hulliger

- Majors : Computer science
- Graduation year : 2016
- Career goal : Software development

Max Turpeinen

- Majors : computer science
- Graduation year : 2018
- Career goal : Work for a company, involving computers.

Robert Amino

- Majors : computer science
- Graduation year : 2016
- Career goal : Work in a tech company.

Individual Contributions

- ## Maxime will do
  - Game mechanism
  - Oculus rift integration
- ## Omid will do
  - Wii remote integration

- ## Max will do
  - The animations - bones/body
  - Model for the characters
  - The space station
- ## Robert will do
  - The environment
  - The space ship

Comments on Proposal

1. Try the Oculus with VR Roler coaster (Henrik)
2. Try zap the bugs
3. I am interested in the physics on the moon's surface
4. Be careful not to treat VR like a screen. Immersion and interaction is paramount!
5. Be careful with the physical safety of players.
6. Don't loose focus of your learning objectives by getting stuck with game mechanics
7. Great work!
8. Comments from Gregorio
   1. You could use coarse rubber sand! They use that at the historiska museum to make children play! It doesn't make too much of a mess and it is not a problem if some one spills some water on it.
   2. You need a very fast response between the interaction on the sand and the computer. If the delay is too big the interaction to stop the cars could be too slow to stop them.

Grading proposal

- Well rehearsed
  - FINISHES ON TIME
- Technically clear
- Related work is state of the art in graphics and interaction
- Clear individual contributions

Group 6

Students
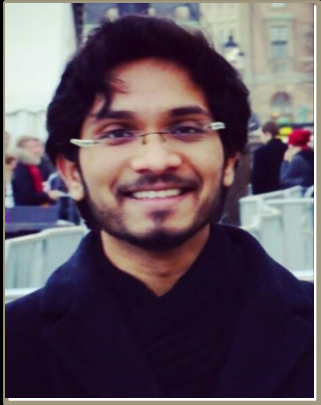
- Viktor
- Stefan
- Prasanth
- Robin
- Anton

Project idea

- Light saber

JEDI
ACADEMY

134

Proposal for "Jedi Academy"
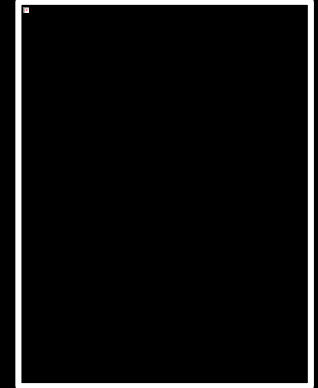

Prasanth Korada
korada@kth.se

Cool
Photo of
Student 2

Viktor Leandersson
vlea@kth.se

Cool
Photo of
Student 3

Robin Palmberg
robinpa@kth.se

Anton Erholt
aerholt@kth.se

Stefan Seibert
sseibert@kth.se

Advanced Graphics and Interaction
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2015/09/07

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Motivation

- Crowd pulling game experience with research value.
- Testing the limits of complete immersion.
- Learn integrating VR-Input- game play- anything and everything we can.
- World needs better gamers and gamers need better immersion.
- World needs more trained Jedis.

Goals and Challenges

- **Goals**
  - VR room with a laser sword that is moved by a input device
  - Game where the user can "train" by fighting against a shooting ball
  - Full experience with sound and tactile feedback fighting several Stormtroopers
- **Challenges**
  - Choosing working hardware and connecting everything correctly
  - Tracking works correctly and being able to create a believable graphics quality
  - Finish the assets for the stormtroopers and the "defense algorithm"
  - Staying aware of when to limit ourselves in terms of time-and-effort constraints

Related Work

- Jedi Trainer

  - Lostvectors.com

  - 2005

- A Dose of Reality: Overcoming Usability Challenges in VR Head-Mounted Displays
  - McGill, Boland, Murray-Smith, Brewster

  - 2015, CHI'15, Proceedings of the 33rd Annual Conference on Human Factors in Computing Systems

- Sixsense STEM Controller Demo @ GDC 2015

  - Sixsense

  - 2015

- Monster Shroud

  - Choi, Malia, Pleshakov, Garncarz, Vu, Kosowski, Estes

  - 2013, http://www.gamecreation.org/game/monster-shroud

Jedi Trainer 2.3

Jedi Trainer

Use your sword to deflect enemy lasers into floating orb droids. Avoid from having the lasers hit your handle and see how long you can last! Use practice mode to configure what types of enemies you want to fight against and how quickly they respawn.
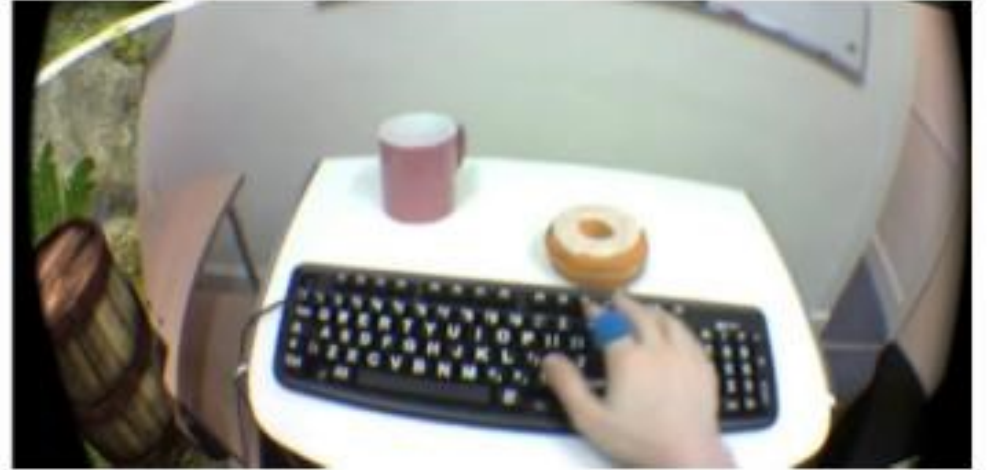
score: 0   ⬤ high score: 0   hit points: 10   help ⬤ ⬤ ⬤ ⬤ ⬤ ⬤
kills: 0   **scoring on**   options   5.348
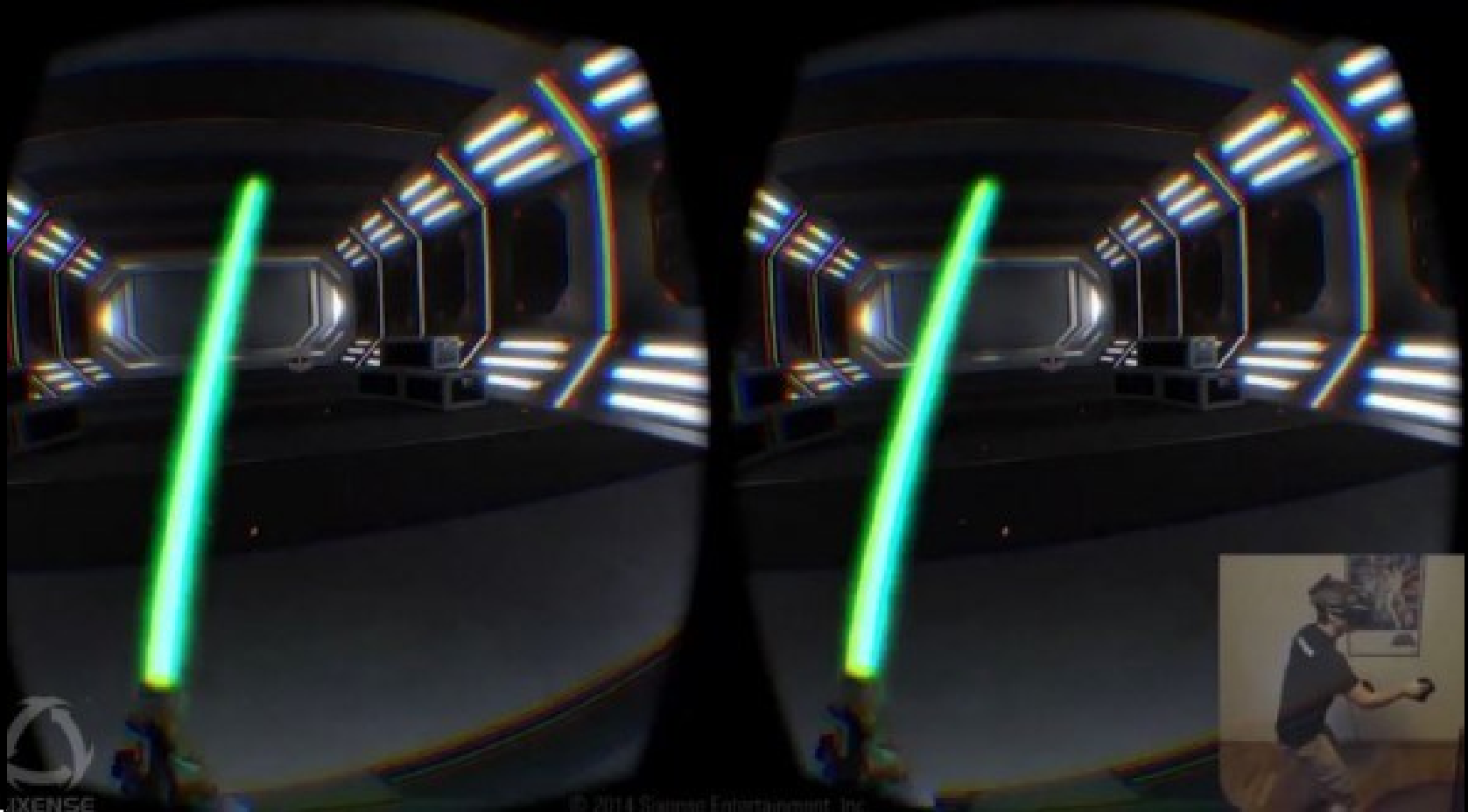
A Dose Of Reality

McGill, Boland, Murray-Smith, Brewster, CHI 15

STEM Controller Demo

Monster Shroud

Methods and Techniques

- Engine / Framework: Unity Engine

- Output Device: Oculus Rift Headset

- Input Devices: Wii Motion Plus and Kinect optionally

- Sounds: Selfmade or partially from Sound Libraries

- 3D Assets: Created by our own and also 3D Libraries (Stormtroopers?)

- Libaries: UniWii maybe for connecting the Wii Devices

- Tools: Github for Code Hosting / Freedcamp for Project Management

- The whole setup could be published as public github repo for people who want to build successors

- Interaction Paradigm: Virtual Reality

- Two Algorithmic Questions: Random Fight Behaviour of the Ball and Reflecting Rays from Troopers

Methods and Techniques

Thank you!

Questions?
Prasanth Korada {korada@kth.se}
Viktor Leandersson {vlea@kth.se}

Stefan Seibert {sseibert@kth.se}
http://nada.kth.se/~aerholt/yedi-academy/

"NO!
Try not!
DO or DO NOT,
There is no try."

ronalvesteffer.com
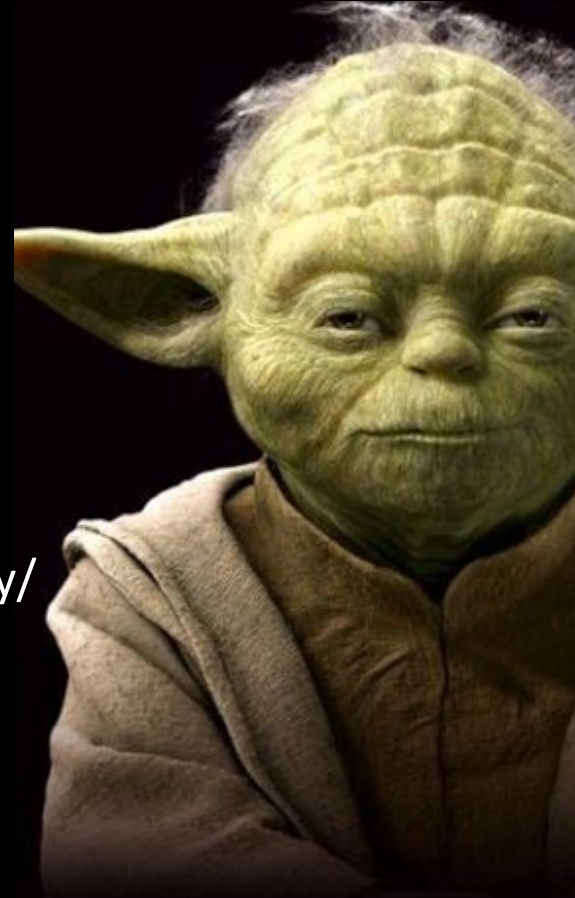
Group Members

- Prasanth Korada

  – Major in Electronics from India and presently pursuing my Masters in System Control and Robotics

  – I want to make a cool blend of Robotics and Gaming to make a complete experience.

  – I am presently working as an International Student blogger for KTH (www.kth.se/blogs/prasanth)

  – Oh wait, I am also an Art freak!

Group Members

- Anton Erholt
  - Computer Science student from KTH, took a semester abroad in France last year
  - Pursuing a Master's degree in Computer Science, expected completion: June 2016
  - I am going to be a kind hacker when I grow up.

Group Members

- Stefan Seibert
    - Exchange Student from Stuttgart, Germany
    - Bachelor Thesis March 2015 about editing virtual objects in a film environment directly on set.
    - Therefore focus on: computer graphic and computer vision
    - Doing a Master in Computer Science and Media, expected to graduate in 2017
    - Would like to work in R&D
    - www.stefanseibert.com

Group Members

- Robin Palmberg
    - Media Technology student from KTH
    - Taking the
    - I would like to work with using media technology as a way of helping people in need in their everyday life

Individual Contributions

- will do
  - Modelling and lighting art
  - Motion capture of the player
- will do
  - Gameplay and graphics help
  - Help with the HCI environment
- will do
  - Networking and system administration
  - Web page(s), since I <3 JS

- Robin Palmberg will do
  - HCI-programming, getting the Wii remotes and Kinect to work as planned
  - Help with modelling
- Stefan Seibert will do
  - CG Programming
  - Rendering / Game Loop / etc.
  - Try to help where he can

Comments and Suggestions

- Make use of muscle-propelled force feedback to interact better with the virtual sword

  Blindfold the user in some way to "feel" where the rays are shooting at him.

  Change project name to something like "padawan 101", to avoid fight with Disney Lawyers.

  Use maybe GEAR VR or some other mobile phone based system to be wireless.

  Keep the time in mind and where you can come towards.

Comments to Proposal

1. I really like the ideas in your proposal and want to see the realized.

2. Prioritize and focus.

3. The force may be muscle-activated force feedback. That will make me sooooo happy! Can you read the paper and replicate it? I can contact the authors if that may help.

4. Focus on the graphics special effects FX as well. Lasers, floating balls, flashing and exploding light sabers, etc!

5. If you can, but a toy light saber.

6. Padawan 101 will not get you off the hook from Disney lawyers, but at least there is only fan fiction using that name, not an actual existing game!

7. Great work!

Grading proposal

- Well rehearsed
  - FINISHES ON TIME
- Technically clear
- Related work is state of the art in graphics and interaction
- Clear individual contributions

Questions?

AGI16 - L4