Advanced Graphics and Interaction 2014: Lecture 4

AGI14 Students @ VIC

Mario Romero
2014/09/10

KTH VETENSKAP OCH KONST

VICSTHLM
VISUALISATION INTERACTION COLLABORATION

Course Schedule

Wed Sept 03 13-15	Lecture 1	Intro
Fri Sept 05 15-19	Lectures 2-3	Group Formation
Wed Sept 10 13-15	Lecture 4	Proposals
Thu Sept 11 10-12	Lecture 5	Feedback on proposals
Mon Sept 15 8-10	Lecture 6	Hello World! Demos
Thu Sept 18 10-12	Lecture 7	ForskarFredag Preparation
Wed Sept 24 14-16	Lecture 8	Demo Day!!!
Thu Sept 25 16-20	Debaser Invation	Setup 16:00 – 20:00
Fri Sept 26 8-18	Debaser Domination	ForskarFredag 2014!!!
Mon Sept 29 8-10	Lecture 9	Reflections of ForskarFredag
Wed Oct 8 13-15	Lecture 10	Agile Development → ComiCon
Mon Oct 13 8-10	Lecture 11	Agile Development 2
Wed Oct 15 13-15	Lecture 12	Aglie Development 3
Wed Oct 29 16-23	Kistamässan Invation	Setup 16:00 – 23:59
Thu Oct 30 – Sun Nov 2 9-19	Kistamässan Domination	COMICON 2014!!!
Tue Nov 4 10-12	Lecture 13	Reflections on ComiCon
Wed Nov 5 10-12	Lecture 14	New groups
Fri Nov 7 15-19	Lectures 15-16	Epson Moverio Workshop
Tue Nov 11 10-12	Lecture 17	Proposals
Tue Nov 18 10-12	Lecture 18	Feedback on proposals. Early hello world dem os
Tue Nov 25 10-12	Lecture 19	Hello world !demos
Tue Dec 2 10-12	Lecture 20	Demo Day!!!
Thu Dec 4 15-18	VIC Invation	Prepare Open House
Fri Dec 5 15-19	Open House	AGI14-VIC Open House

Agenda

- Format (starting at 13:15 sharp)
  - Presentation (10 minutes) - Template Slides.
  - Discussion (10 minutes)
  - Context Switch (1 minute)

1. Michelangelo (13:19 - 13:40)
   - Stefan
   - Johan B.
   - Oscar
2. Leonardo (13:40 - 14:00)
   - Carl
   - Anton
   - Johan S.

- Break

3. Donatello (14:15 - 14:35)
   - Søren
   - Philip
   - Daniel
   - Axel
4. Megatron (14:36 - 14:56)
   - Christoffer
   - Mattias
   - Ludwig
   - Linnea

- Next Lecture (14:57 - 15:00)
  - **Assignment 2**

Michelangelo

- Stefan
- Johan B
- Oscar

Space Survival

Stefan Etoh
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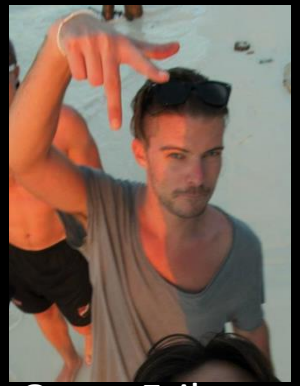

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Johan Bäckman
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Space Survival

Motivation

- Further development opportunities
- Challenge to combine multiple interactive devices
- Cool immersive experience
- Experience outer space!
- Save dollars and make space training easier and better
- Space is fun.

Goals and Challenges

- Avatar arms corresponding to physical movements
- Achieving realistic physics
- Believable graphics & an immersive world

Related Work

Title	Author	Year	Published in
Virtual Reality: Avatars in human spaceflight training	Osterlund, J. Lawrence, B.	2011	Acta Astronautica 71 (2012) 139-150
Creating Next-Gen 3D Interactive Apps With Motion Control in Unity 3D	Plemmons, D. Holz, D.	2014	SIGGRAPH 2014 Workshop
VR Simulation System for EVA Astronaut Training	Liu, Yuqing. et. al.	2010	AIAA SPACE 2010 Conference & Exposition

Control VR (Control VR)

- https://www.youtube.com/watch?v=KkPjLBxYqoQ&feature=youtu.be&t=1m10s

Spacewalk (Richard Emms)

- https://www.youtube.com/watch?v=bg7Sm6fF8vg

Chilling Space (RiftAway)

- https://www.youtube.com/watch?v=vvd9HwZfl6U

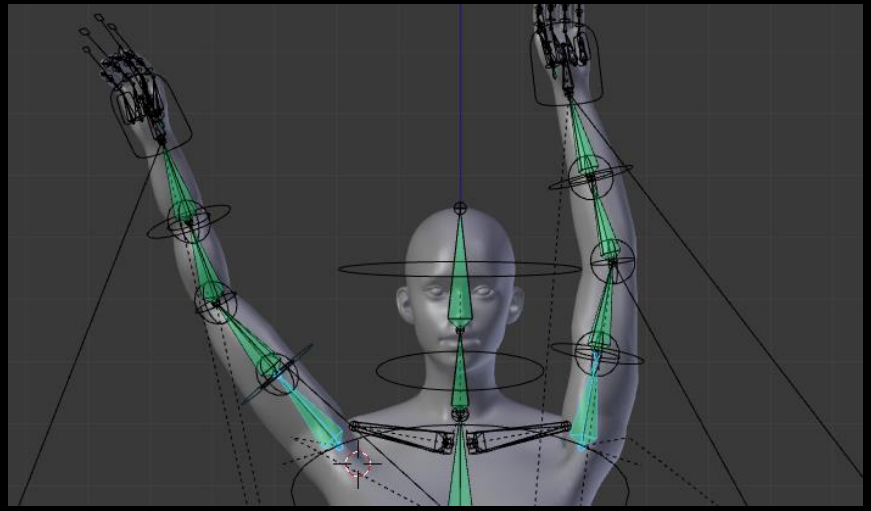
Methods and Techniques

- Wii Remotes and Nunchucks – UniWii-plugin
- Oculus Rift
- Blender
- Unity 3D (C#)

Wii Remotes & Nunchucks

Oculus Rift

Blender



Unity

Thank you!

Questions?

Stefan Etoh, IMT {etoh@kth.se}
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Mario Romero {marior@kth.se}

Leonardo

- Carl
- Anton
- Johan S

Project Proposal

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Dual Engine VR Racing

Motivation

- Why is this project interesting?
- What do we want to learn by doing this project?
- Why does the world need this project and how does it make the world a better place?

Goals and Challenges

- Goals
  - Immersive, first person view experience of VR racing at high speed
  - Rendering a huge world/track for racing around in/on
  - A fun steering method with two ”engines” (NovInt Falcons) providing *useful* haptic feedback
  - Fire particle system
- Challenges
  - Real time rendering as you race through the world/track
  - Making the haptic feedback realistic and useful
  - To not burn out the motors of the Falcon as you get caught up in the game
  - Development support for the Falcon can be hard to find

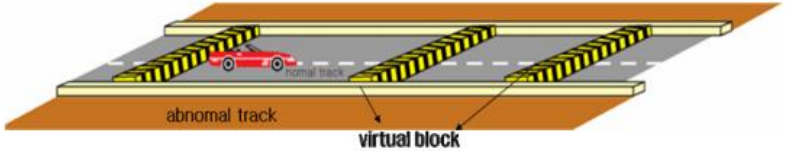
Related Work

- Interactive Racing Game with Graphic and Haptic Feedback
  - Sang-Youn Kim, Kyu-Young Kim
  - 2007
- Dust Storm
  - Tarandi, Nellåker, Bäckström
  - 2012
- Radial-G
  - Geoff Cullen
  - 2014

Interactive Racing Game with Graphic and Haptic Feedback

$$V_T(L) = \sum_{n=1} h_n [u(L - p_n) - u(L - q_n)] \quad (1)$$

Where,
u : a unit step function, and
L : the distance from starting point to the current position of a car



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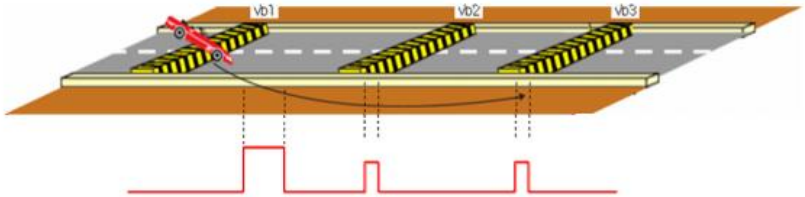


(b)

Dust Storm

Radial-G

Methods and Techniques

- General approach
- Oculus Rift and two NovInt Falcon (or Razer Hydra if not possible)
- NovInt SDK
- Connecting via FalconUnity
- Algorithms and Interaction

Oculus Rift, NovInt Falcon, Razer Hydra

NovInt SDK

- A Windows platform, C++ language
- Combine with Unity JavaScript (UnityScript)

FalconUnity

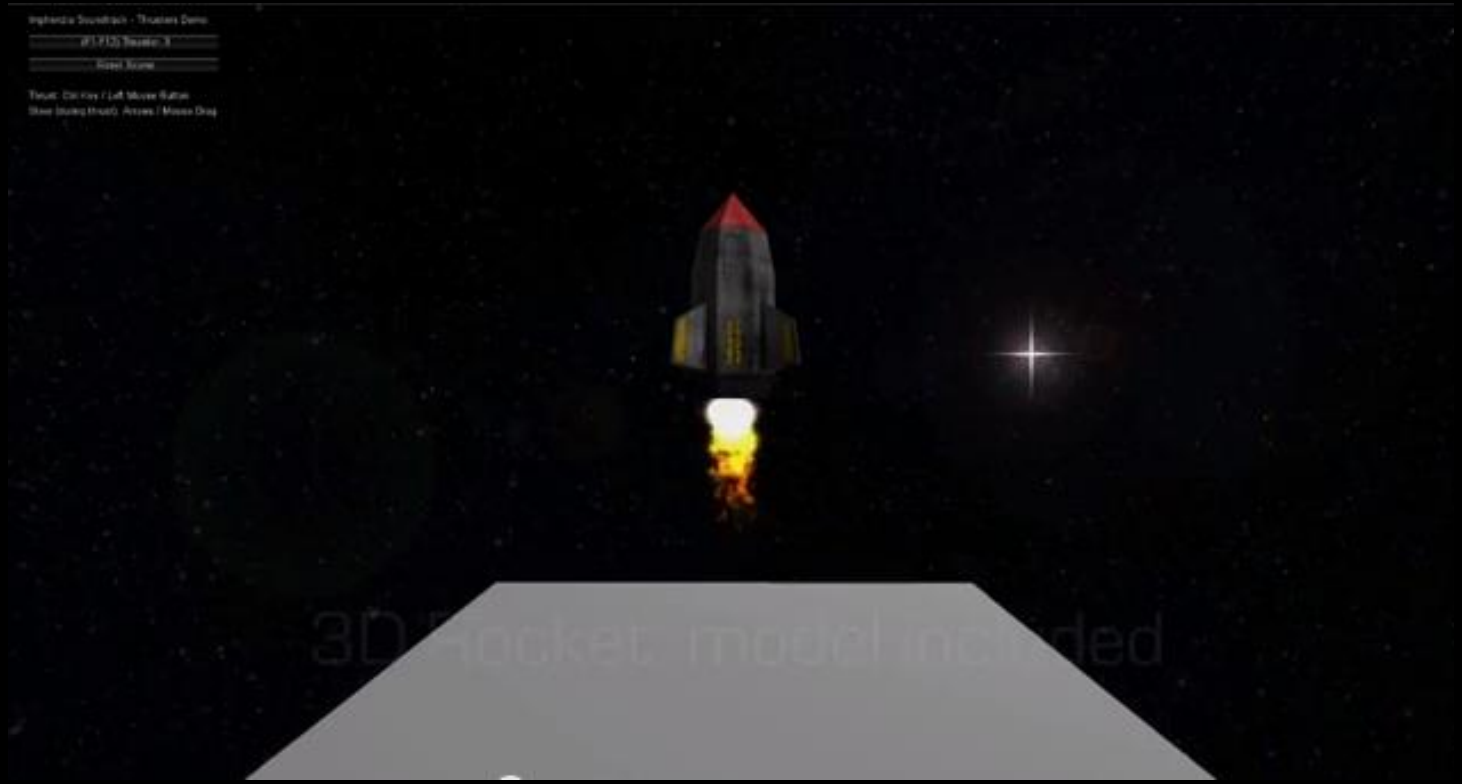
- A library that allows for easy manipulation of Unity3D objects using a NovInt Falcon.

- Video: http://www.screenr.com/baP7 for those who are interested

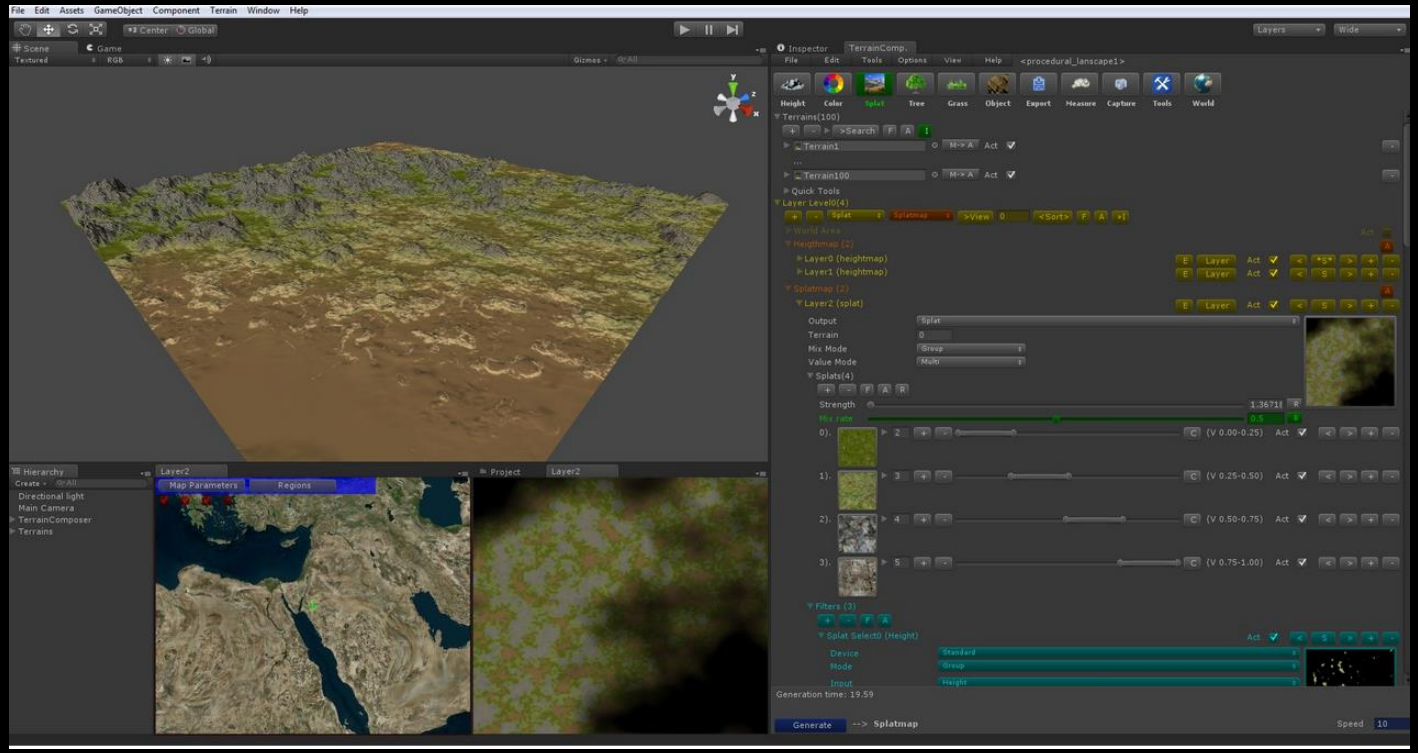
Algorithms and Interaction

- Using existing algorithms to create a huge immersive world/track, i.e. Octree rendering (real time rendering)
- Applying existing interaction methods in a new way, using two NovInt Falcons at the same time

Fire particle generator



Unity’s terrain engine



Thank you!

Questions?

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Teacher:
Mario Romero {marior@kth.se}

Donatello

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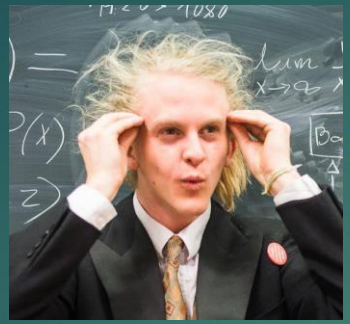

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YA3

ADVANCED GRAPHICS AND INTERACTION AGI 14

You Are a Tree

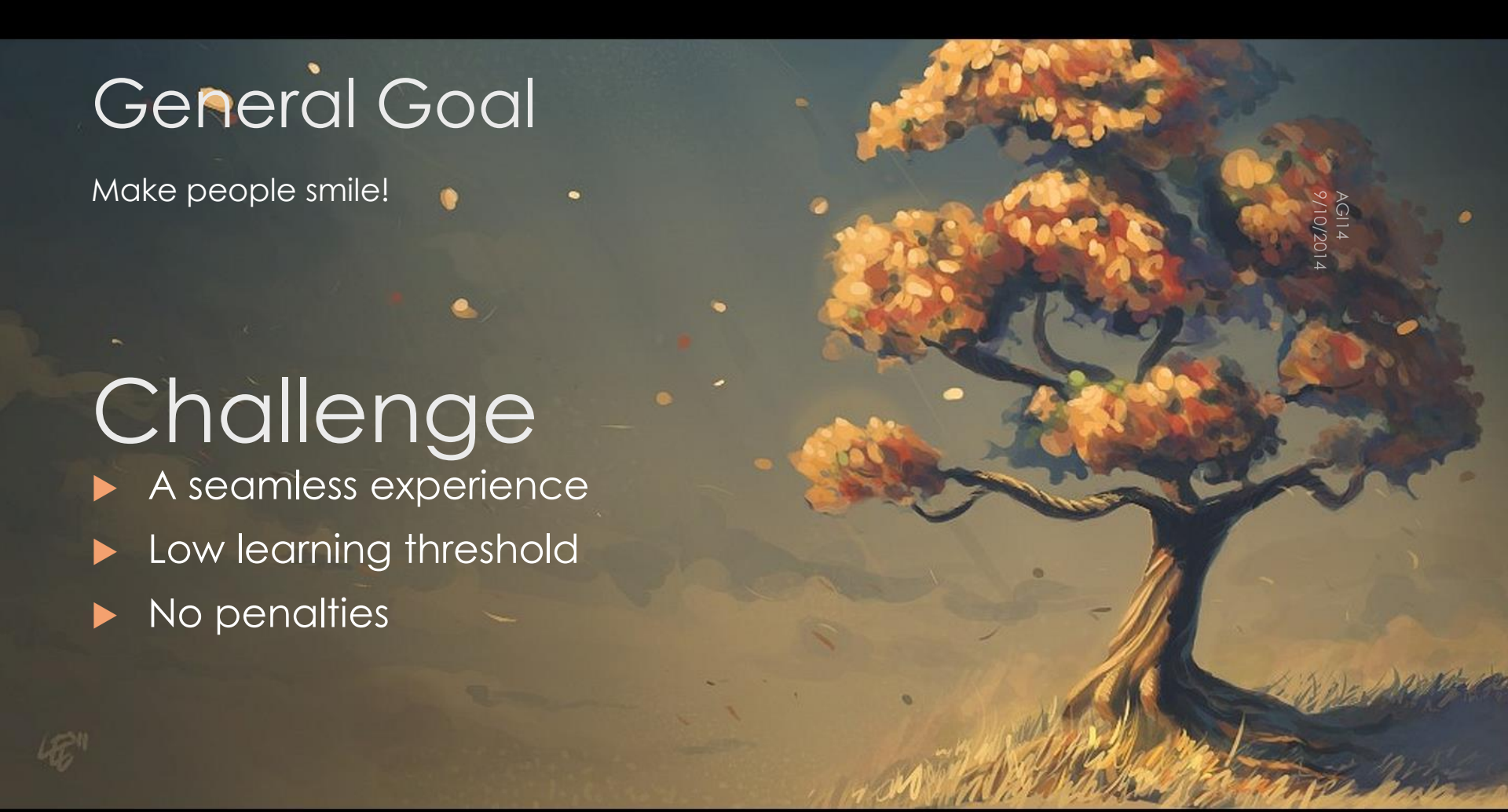
AGI14
9/10/2014

General Goal

Make people smile!

Challenge

- A seamless experience
- Low learning threshold
- No penalties



Tech Goal

Procedural generation of trees, controlled with Kinect.

Challenge

- Real-time
- Reliable gesture recognition
- **YOU** Are a Tree

Personal Goal

Provide a testbed for learning more advanced computer graphics

Challenge

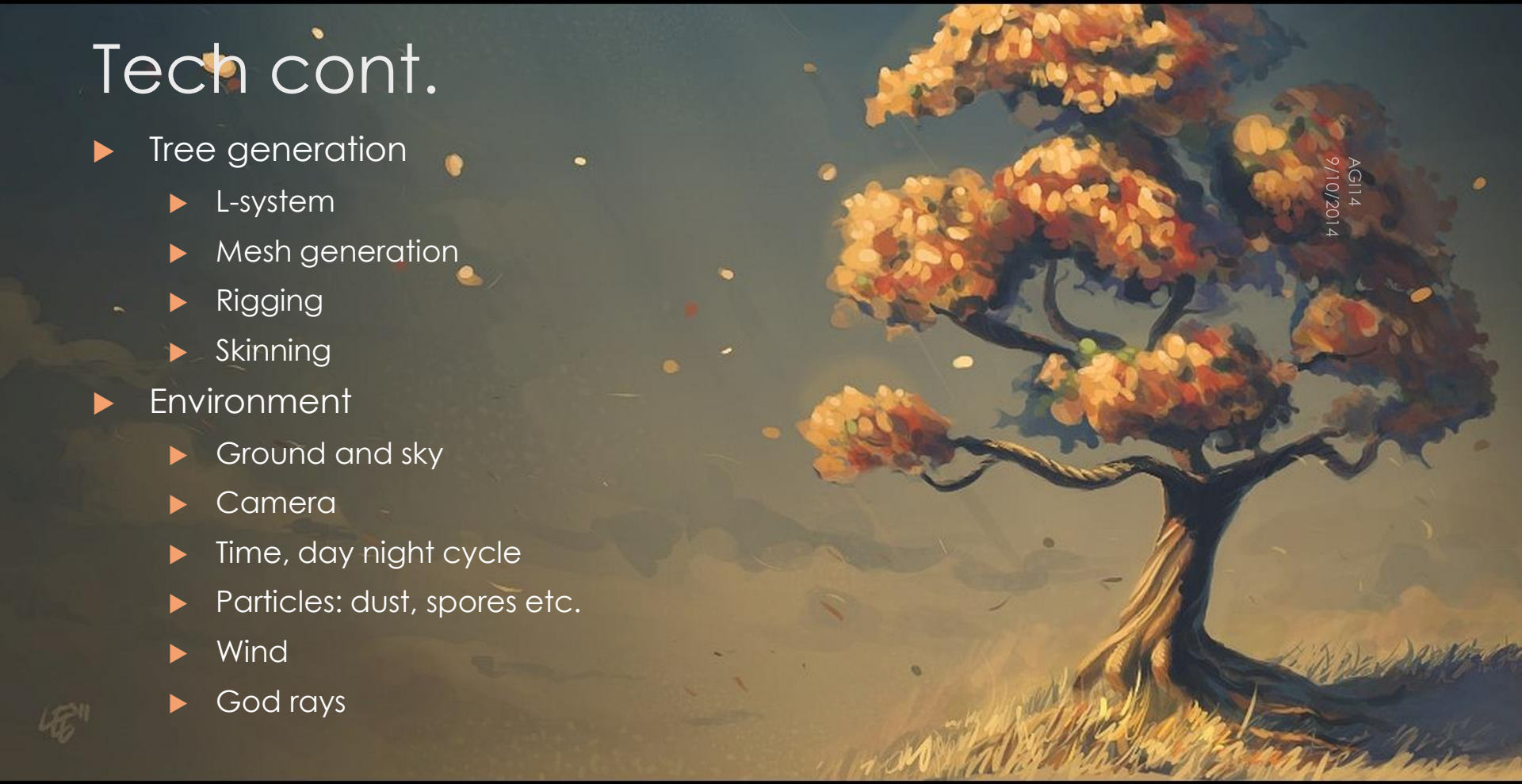
- Robust, but simple(!), interaction
- Flexible, but not too manual/complex

Tech

- Unity Pro
  - Boilerplate + Editor
  - Shaders
  - Animations
  - Sound
- Kinect SDK
  - v.1 or v.2

Tech cont.

- Tree generation
  - L-system
  - Mesh generation
  - Rigging
  - Skinning
- Environment
  - Ground and sky
  - Camera
  - Time, day night cycle
  - Particles: dust, spores etc.
  - Wind
  - God rays



Related

- TreeSketch
  http://vimeo.com/68195050

Thank you

L-Systems

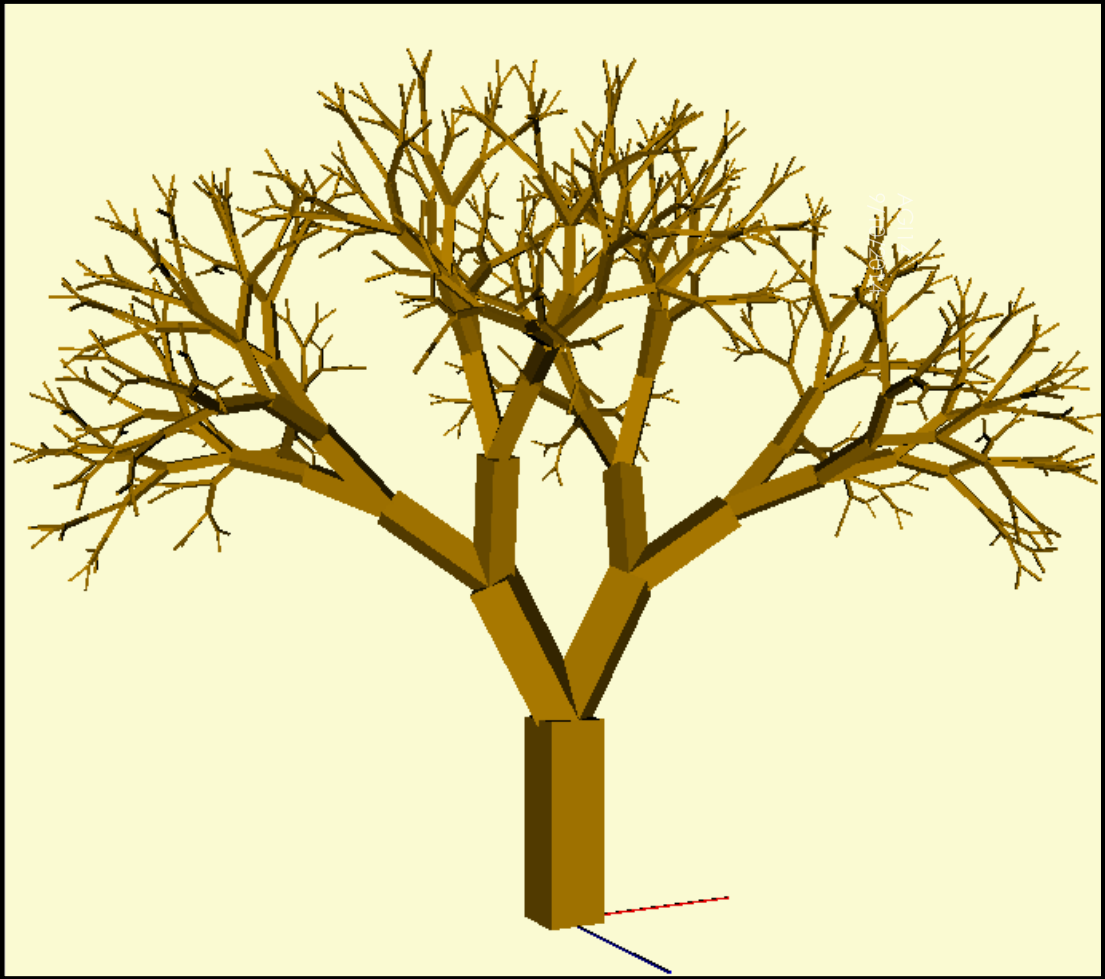
- Fractals, all the way down!

(extra slide)

First Iteration

- Simple generation from primitives
- Basic Kinect gestures
  - Spread, duck, wave?
- Single tree, single user

(extra slide)



Megatron

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- Mattias
- Ludwig
- Linnea

Project Proposal

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Project Idea

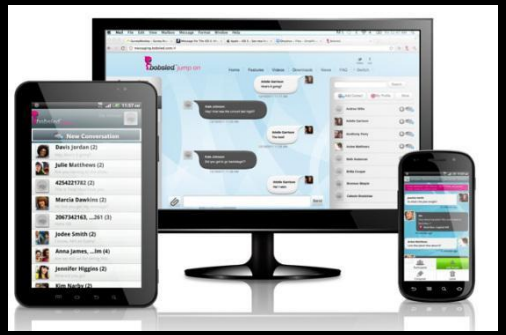
Helper, 2D view

Main Player, 3D view

Enemy, 2D view

Motivation

- Create a social and fun experience for three persons
- Learn about



Goals and Challenges

- Fun multiplayer experience
- The experience must be exciting for all parts
- Increased immersion with Oculus and Razer Hydra
- Technical constraints, access to tech, difficulty to learn
- Higher level of detail (graphics and sound)
- Priority, lack of expertise, risk of breaking the core

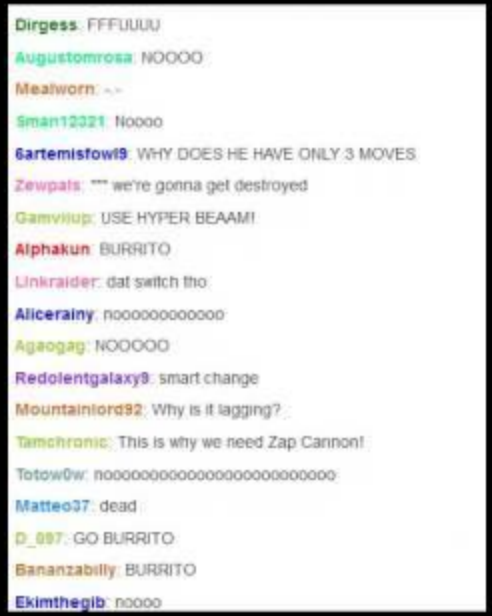
Related Work

- Uncle Roy All Around You: Implicating the City in a Location-Based Performance
  - Benford, Steve. et al. (2003)
- Designing Asymmetrical Collaborative Gameplay for Heterogeneous Device Ecosystems
  - Speck, Robert Sean. (2013)
- Experimental Evidence for Suspense as Determinant of Video Game Enjoyment
  - Klimmt, Christoph et al. (2009)

59
4:17
Luigi's
GHOST MANSION
Haunting Hijinks
Wii U
X
Y
A
B
START
SELECT
MIC
HOME
BATTERY
CONTROL
POWER

Footage from: Twitch Plays Pokemon

Recorded by: Icymate



Methods and Techniques

Methods and Techniques

Thank You for Listening!

¿Preguntas?

Assignment 2

A google scholar method

1. Search for the root
2. Search within ”cited by”
3. Search for the leaf

Thank you!

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Questions?