Advanced Graphics and Interaction 2015: Lecture 7

We are on the 3rd Floor Stage

Set up:
Thursday, September 24
17:00 - 20:00

Present:
Friday, September 25
9:00 - 15:00

Mario's mobile: 076 258 1802

Mario Romero 2014/09/17
AGI15 Calendar:

- Mon 31 aug 15:00-17:00
- Tue 1 sep 13:00-17:00
- Mon 7 sep 15:00-17:00
- Thu 10 sep 10:00-12:00
- Mon 14 sep 15:00-17:00
- Thu 17 sep 10:00-12:00
- Tue 22 sep 10:00-12:00
- Fri 25 sep 8:00-16:00
- Mon 28 sep 15:00-17:00
- Mon 5 oct 15:00-17:00
- Mon 12 oct 15:00-17:00
- Fri 30 oct 9:00 – Sun 1 Nov 16:00
- Mon 2 nov 15:00-17:00
- Tue 3 nov 13:00-17:00
- Tue 10 nov 10:00-12:00
- Tue 17 nov 10:00-12:00
- Tue 24 nov 10:00-12:00
- Tue 1 dec 10:00-12:00
- Fri 4 dec 15:00-19:00

Lecture 1 – Introduction
Lecture 2-3: Forming Groups and Brainstorming
Lecture 4: Proposals
Lecture 5: Discussion based on Proposals
Lecture 6: Hello World Demos
Lecture 7: Discussion based on the Hello World Demos
Lecture 8: Preparing ForskarFredag 2015
Lecture 9: Reflecting on ForskarFredag
Lecture 10: Agile Development 1 towards Comic Con - Gamex 2015
Lecture 11: Agile Development 2 towards Comic Con - Gamex 2015
Lecture 12: Reflecting on Comic Con Gamex
Lecture 13-14: Forming new groups and brainstorming project 2
Lecture 15: Proposals Project 2
Lecture 16: Hello World Demos for Project 2
Lecture 17: Agile Development 1 for Open House
Lecture 18: Agile Development 2 for Open House
Please vote now!
http://www.cawards.se/rosta/
Agenda

1. Preparing ForskarFredag
2. Update from projects
3. Demos next lecture
4. Discussion
We are on the 3rd Floor
Stage

Set up:
Thursday, September 24
17:00 - 20:00

Present:
Friday, September 25
9:00 - 15:00

Mario's mobile:
076 258 1802
Debaser in Medborgarplatsen
Debaser 3rd floor stage
Debaser 3rd floor stage
ForskarFredag 2012
ForskarFredag 2012
ForskarFredag 2013
ForskarFredag 2014
Debaser 3rd Floor

Mattecentrum
1 fallbord 180
2 stol
1 el trådlös

Utvärdering och garderob VH
2 fallbord 180
1 fallbord 120
2 stol
1 vikvägg
3 el

Forskarhörna
1 fallbord 120
6 stolar

Calvin Young (KTH)
1 fallbord 180
1 fallbord 120
7 stol
2 vikvägg
8 el

Röda Korsats högskola
1 ståbord
3 stol
1 vikvägg
4 el trådlös

VH, Tekniklyftet 3D
3 fallbord 120
3 stolar
12 el

Nobelmuséet
1 fallbord 180
1 ståbord
2 stol
1 vikvägg
trådlös

Naturhistoriska m.
1 fallbord 120
1 ståbord
2 stol
1 vikvägg
2 el trådlös

UTSTÄLLNING
PLAN 3

N. Zary, KI
1 fallbord 180
4 stol
5 el
1 vikvägg

Patricia De Palma (KTH)
1 fallbord 120
3 stol
1 vikvägg

Miliöförknings (SLI)
1 vikvägg

Isaac Skog (KTH)
1 fallbord 120
1 vikvägg

Mattsepå

B. Thureress (KTH)
1 fallbord 180
6 ståbord
10 stol
28 el (gärna 7 med 4 var)
8 vikväggar
trådlös (10 anslutningar)

TOTALT:
10 fallbord 180
15 fallbord 120
10 ståbord

Plan 3

Trappa

AVSPÄRRAT
Debaser 3rd floor stage

Teamtris
Shmooning
Blooper
MadSand
M-PAR
Padawan
Teamtris

• Done
  – Tetris
  – Trees

• Going to do
  – Sound
  – Explore
    • Removing trees
    • Make it unlike tetris

• Not doing
  – Constructive Geometry

• 3D building
• Multiview 3D puzzle
• Limited rotations and translations to view plane
Teamtris Updates 17/9

• Done
  – Now in 3D
  – Orthogonal rotations and translations

• Doing
  – 3D puzzle
  – Template to copy

• Not Doing
  – Tetris tangram team
  – Connect second wii

  – Good old fashion tetris
  – tree
Shmooning

- Done
  - Explored
    - Leap Motion
  - Wii mote control
  - Interactive (rough) graphics

- Going to do
  - Game play
  - Models for aliens
  - FX
  - Explore
    - Kalman Filtering

- Not doing
  - Leap Motion
  - ?

- Octree Rending
- Moiré Patterns
- Anti-Aliasing
- Bump Mapping
- Register and coordinate hands and eyes
- Scott Saponas’ air guitar hero (?)
Shmooning Updates 17/9

• Done
  – Alien model
  – Wii sensor bar
  – Small IR LED sensor
  – Working at a short distance

• Doing
  – Visual animation of alien

• Not Doing
  – AI – state machine automaton
  – Space station
  – Enemy space ship
  – Filtering tremors out
  – Leap motion?

• Not Doing
  – Leap motion?
Blooper

• Done
  – Kinect
  – sockets
• Going to do
  – Explore computing centroid of a blob
• Not doing
  – No multi cam
Blooper Updates 17/9

• Done
  – 3D models of weapon
  – Stage 3D model

• Doing
  – Enhancing tracking
  – Filtering

• Not Doing
  – Sending data to player
  – 2D navigation
  – Server robustness
  – mallot
MadSand

- Done
  - Wooden Structure prototype
  - Kinect tracking
  - Simple graphics
  - Simple interaction
- Going to do
  - *Simple* game mechanics
  - Sand
  - Hidden objects
  - Explore
    - Haptics for hidden objects
- Not doing
  - Projection
- Not doing
  - Projecting on non-flat surfaces (image warping)
  - Phong illumination
  - Bump mapping
  - Octree rendering
  - Anti-aliasing
  - Projection
  - ?
MadSand Updates 17/9

• Done
  – Character and camera controller

• Doing
  – Smoothing and filtering depth data from kinect
  – Models
  – How to connect projector
  – Treasures

• Not Doing
  – Score board counter
  – Terrain topology
  – Considering type of sand
    • Regular landscaping
    • Moon sand baking
    • Ti sensor tag for treasure hunt

• Not Doing
  – ...

2014/09/17
Multiplayer AR game
Multiplayer AR game

- Done
  - Wireless Client/Server
  - Simple graphics
  - Simple image registration
  - Multi-perspective AR
  - Vuforia
  - Simple physics

- Going to do
  - Audience view

- Not doing
  - Game play
  - Registration consistency
  - Filtering and smoothing
  - Explore social dimensions of AR in context (bar, etc.)

- Going to do
  - Audience view
Multiplayer AR Updates 17/9

• Done
  – Multiplayer network alive
  – Model texture animation of character
  – Small test of google cardboard with AR
  – AR

• Doing
  – Print better images for stability
  – Run around and brawl
  – Game play
  – Models for small cards
  – Models for world
  – sound

• Not Doing
  – No rolling balls
Padawan 101
Padawan 101

• Done
  – Models
    • Light saber
    • Sphere
  – Wii signal
  – Volumetric shaders

• Going to do
  – Interaction wall
  – Audience visual
  – FX

• Not doing
  – Blind fold
Padawan 101 Updates 17/9

• Done
  – Figured out laser shooting
  – Volumetric shading
  – Lightsaber is a volumetric line with self illumination

• Doing
  – Reflections and refractions from objects in your world

• Not Doing
  – Bump mapping
  – Wii mess!!
    • Windows vs mac drivers
    • 😞
  – Score board

• Not Doing
  – Feedback haptic perhaps latter
Next Tuesday

• Demo warm up for ForskarFredag
Demo: Purpose

- Practice for ForskarFredag
- Demonstrate state of projects
- Interact with each other’s projects
- Discuss
- Improve
- BUT...
  - Train to:
    - Present in 60 seconds to six-year-olds
    - Observe and gather formative evaluation quantitative and qualitative data in the field
    - Ellicit constructive criticism
Demo: Structure

• Technical Presentation 05:00
• Interactive Demo 08:00
  – Hands-on
  – Non team members
  – As many as possible
  – Discussion going on
• Context Switch 02:00
Demo: Roles

• At least:
  – One presenter
    • Present script only
    • Answer questions
  – One observer
    • Take notes
    • DO NOT TALK
  – One inquirer
    • Ask clarifying questions
    • Do not ask leading questions
Demo: Presentation on Poster

- One slide
- 2, 3 or 4 columns
  - Motivation and Goals
  - Methods
  - Results
- Few words many images
- Link to how to do and present posters
Multi-Flash 3D Photography: Capturing the Shape and Appearance of 3D Objects

A new approach for reconstructing 3D objects using shadows cast by depth discontinuities, as detected by a multi-flash camera. Unlike existing stereo vision algorithms, this method works even with plain surfaces, including unpainted ceramics and architecture.

**Data Capture:** A turntable and a digital camera are used to acquire data from 670 viewpoints. For each viewpoint, we capture a set of images using illumination from four different flashes. Future embodiments will include a small, inexpensive handheld multi-flash camera.

**Recovering a Smooth Surface**

The reconstructed point cloud can possess errors, including gaps and noise. To minimize these effects, we find an implicit surface which interpolates the 3D points. This method can be applied to any 3D point cloud, including those generated by laser scanners.

**Photometric Reconstruction**

Using the implicit surface, we can determine which points are visible from each viewpoint. To model the material properties of the surface, we fit a per-point Phong BRDF model to the set of visible reflectance observations (using a total of 67 viewpoints):

\[
I_\lambda = k_{d\lambda} + k_{d\lambda} n \cdot l + k_{s\lambda} (r \cdot v)^n
\]

Ambient Diffuse Specular

**Multi-Flash Turntable Sequence Images**

**Phong (Specular)**

**3D Point Cloud**

**Implicit Surface**

**Phong (Diffuse)**

**Estimated Phong Appearance Model**
Using Flow-Visualization for Studying Sub-Molecular Motions

Introduction

Fluctuations of molecular structures is important for understanding biological processes. The ability to observe and control molecular motions can be achieved using various techniques such as X-ray crystallography, cryo-electron microscopy, and far-field optical techniques. In this paper, we focus on the use of flow-visualization methods to study the motions of small molecules in dynamic environments.

Flow-visualization methods are well suited for investigating structural changes because they provide a natural visualization of the motions of molecules in fluid flow. This approach allows for the study of both transient and equilibrium states of molecules in complex environments.

Background and Rationale

Many biological processes involve membrane-bound molecules, which are dynamic in nature. The use of flow-visualization techniques allows for the study of these motions in real-time.

Methods

We used a combination of flow-visualization techniques and molecular dynamics simulations to study the motions of small molecules in a shear flow field. The simulations were performed using a high-performance computing cluster.

Results

Our results show that the motions of small molecules can be significantly affected by the flow field. The dynamic behavior of these molecules can be observed in real-time using flow-visualization techniques.

Conclusion

Flow-visualization methods are a powerful tool for studying the dynamics of small molecules in complex environments. Further studies are needed to fully understand the role of these motions in biological processes.

References


Acknowledgments

This work was supported by the National Science Foundation under Grant No. NSF-DMS-1216697.

Authors

D. S. Smith, J. M. Marathe, and A. V. Tomov

Institution

Department of Chemistry, University of California, Berkeley, CA 94720, USA
Introduction

Voice is one of the most natural means of expression, we always appreciate our vocal interaction as game interface, so I was very excited to see this innovation. Incorporating visualization technique, Celestia uses voice input based on pitch detection as a primary controller and provides insight into innovation of vocal interaction.

Design

The initial idea came to us as a scenario of someone playing a game using only her voice. She is charmed with the mysterious Celestial environment which merges visual and vocal elements seamlessly.

We started with the story of a newborn star that was born. However, comets and nebula might hurt it in its journey. Fortunately, our voice can help it gain more power by absorbing smaller planets.

Game Play

The purpose is to guide a newborn star through the universe with melody. The user's voice can influence the star to absorb smaller planets and survive encounters with comets and nebula. Every element of the schematic environment is tied to the background music, the connection is the music, visualization with three different colors, leading to high, mid and bass range of the soundtrack in real-time.

Approach

By using Fast Fourier Transformation algorithm and voice spectra analyzer, we precisely selected 3 pitches as controllers, because they are in the least detection range and are in perfect harmony with background music. The whole experience of playing Celestia can be defined by connecting those notes in chord as game progress. We also adopted two different pitch ranges to accommodate both female and male voices.

Future Work

We introduced Celestia to its closest on introducing the game for live audiences, turned out to be a great success. People think "It's visually and aurally appealing." Celestia is not confined to human voice, users can play instruments, such as guitar, harmonica or water bells.

We will keep exploring more possibilities of Celestia, iOS version will follow soon.
PRESENTATION OF
TIME-EVOLVING ACTIVITIES
USING COMMUNICATION ARCHIVE DATA
Planetary Defence

Introduction
Planetary Defence is an online 3D graphics multiplayer game. You shoot rockets at your opponents and you can shoot your opponents' rockets down.

Motivation
- Build lightweight socializing
- Learn new technologies
- Design Entertainment

Goals
- Multiplayer
- Multiplatform
- High resolution
- 3D game
- On the web

Technology
- WebGL
- Web sockets
- HTML5
- Three.js

Interaction
- Swipe / click and drag
- Tap / click

Conclusions
- Real-time 3D graphics
- Multiplayer interaction
- Online
- No downloading!

References
1. Three.js https://github.com/mrdoob/three.js

bit.ly/QwaRhj  
Demo: Questions

• Clarifying questions:
  – What do you mean by “so and so”?
  – I don’t understand, could you explain it differently?
  – Could you talk about that further?
  – Tell more about that...
  – How does that make you feel?
  – ”Following” questions
Demo: Questions

• Leading questions:
  – What do you think?
  – Is it working for you?
  – **Do you like it?**
  – What would you improve?
  – What would you change?
  – Why don’t you like it?
  – Why do you like it?
Observers

• Pen and pad
• Take copious notes
• Count, count, count!
• Take photos
• Record (VERY SHORT) videos – be selective
• Record (VERY SHORT) testimonials
Remember: Deliverable

- Working VIC Demo
- Code with good comments
- Webpage with:
  - Description
    - Goal and motivation of the project
    - Explanation and Justification of the graphics and interaction technologies used and developed
    - Challenges
    - Obstacles
    - Related work
    - Lessons learned
  - Photos
  - "Making of" documentary (2 minutes)
  - Demo Reel (30 seconds)
  - Optional PR material (logo, trailer, flyers, posters, catalog)
  - User testimonials (what did people say)
Demo: Audience

- Take notes
- Comment during demo
- Take notes of comments
- Transfer your notes to the facebook wall
- Help each other
Grading of ForskarFredag

• 10%
• Group
  – 9:00 – 16:00 (- 1% per hour missed)
• Individual component – KTH social
  – Answer the survey which will be posted on Friday, September 26 at 17:00 before Sunday September 28 before 23:55. It is very important that you answer it as soon as possible after ForskarFredag is over.
ForskarFredag Survey

• What did you learn presenting, observing, interacting?
• What were the most common questions?
• What were the challenges?
• What were the rewards?
• A few technical questions.
Communication

• Poster feedback
• Printing (Tuesday morning)
• Other communication materials
  – Web page
  – Flyers
  – Logo
  – Slogan
  – …
Thank you!

marior@kth.se