

Mario Romero
2014/11/05

Multimodal Interaction and Interfaces

Mixed Reality



VICSTHLM
VISUALISATION INTERACTION COLLABORATION

Outline

- Who am I and how I can help you?
- What is the Visualization Studio?
- What is Mixed Reality?
- What can we do for you?
- What can you do for us?

Contact Mario

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NORRKÖPINGS
VISUALISERINGSCENTER

*Knut och Alice
Wallenbergs
Stiftelse*

Students' Resources: Visualization Studio

- Research
 - Visualization Supported Collaborative Work
 - Foundational Technology
 - User Evaluations
- Showcase and classroom environment
- Outreach



VIC Personnel



Björn Thuresson
VIC director

Coordinate
Projects
Events



Henrik Edlund
VIC Engineer

Technical Support
Ideation
Critical Feedback

Technologies in



9/3/2014



AGI14 - L1

- High-resolution projection wall with stereoscopy
- Oculus Rift
- Cinema quality audio
- High-definition video communications with eye contact
- Holographic display
- Multi-touch interactive surfaces
- Eye tracking
- GPU-based computing cluster
- Diverse interaction and sensor systems (haptic, mocap, etc.)
- Haptic Devices
- 3D printer
- Epson Moverio

Visualization Pipeline

expanded from Readings in Information Visualization: Using Vision to Think
By Stuart K. Card, Jock D. Mackinlay, Ben Shneiderman, 1999



Follow us on Facebook: VisualizationStudio



The image shows a Facebook profile page for 'Visualization Studio VIC'. The background is a photograph of a busy exhibition space with people looking at various displays and posters. In the foreground, a group of people is gathered around a table, looking at a laptop. The profile picture is the KTH logo, which features a crown and the text 'KTH VETENSKAP OCH KONST'. The name 'Visualization Studio VIC' is displayed in large white text, followed by 'Technical Institute · Educational Research'. Below the name are buttons for 'Liked', 'Following', 'Message', and a three-dot menu. At the bottom, there are navigation tabs for 'Timeline', 'About', 'Photos', 'Reviews', and 'More'.

Visualization Studio VIC
Technical Institute · Educational Research

Liked Following Message

Timeline About Photos Reviews More

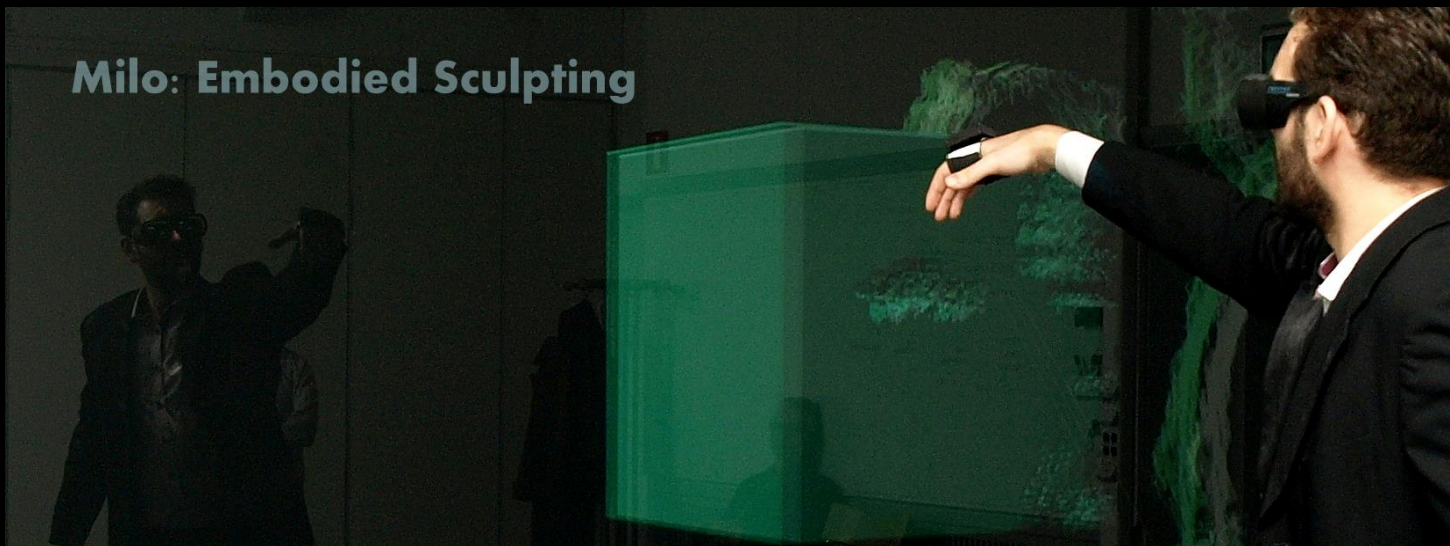


UNIVIEW

■ SCISS

TOUR

Milo: Embodied Sculpting



DEMO

WHAT IS MIXED REALITY?

**WARMING UP: LET'S THINK ABOUT
OUR PERCEPTION OF REALITY?**

A question of Phenomenology

WHAT IS REAL REALITY?

A Question about Human Perception

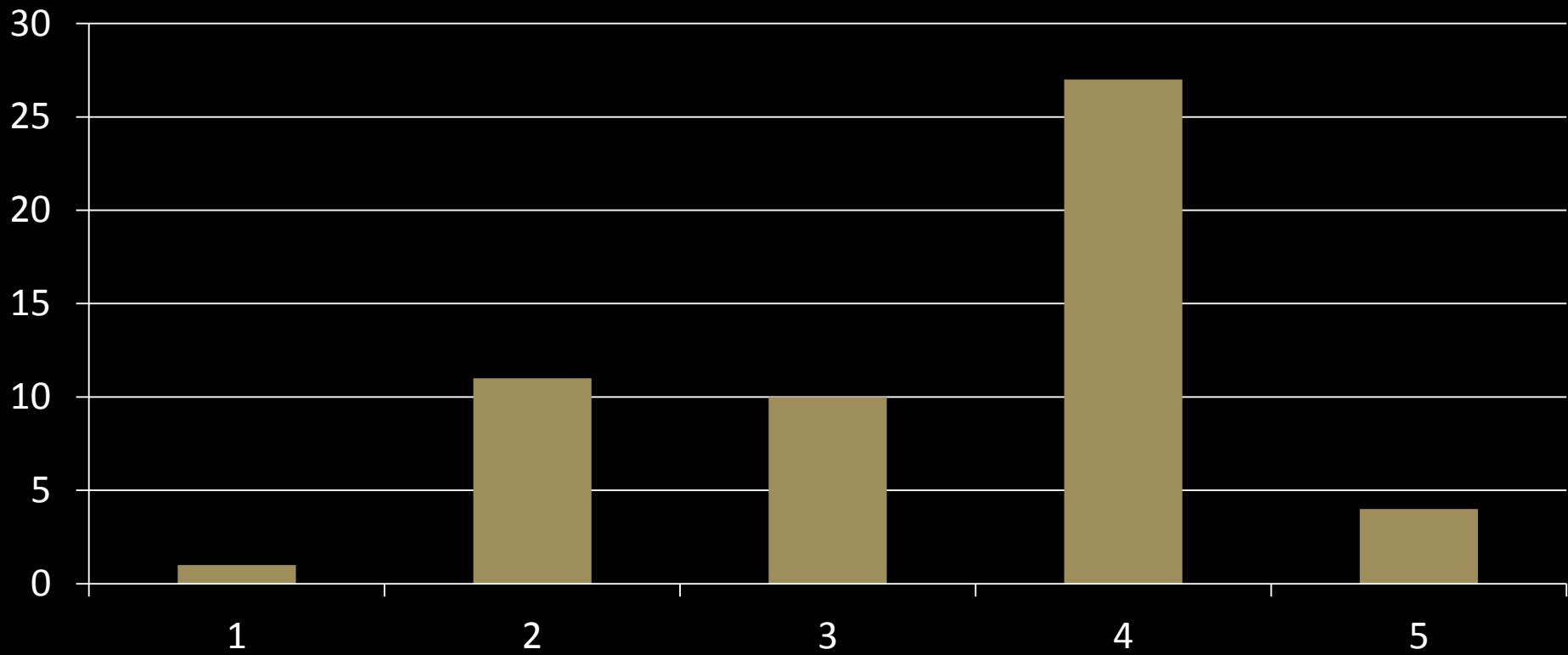
bit.ly/pollmmi



The human blind spot is:

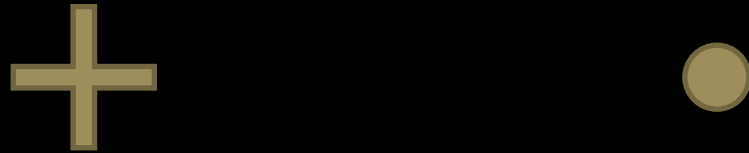
1. a myth.
2. a metaphor to explain our inability to see everything.
3. the area that is outside your field of vision that is approximately 175°
4. your brain fooling you into thinking you see in an area where you actually can't see.
5. the space between what you see in your rear-view mirror and your peripheral vision when driving.

Individual answers

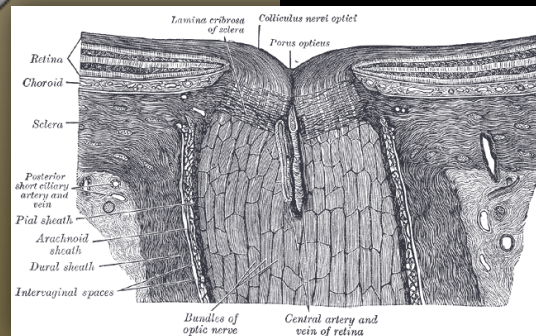
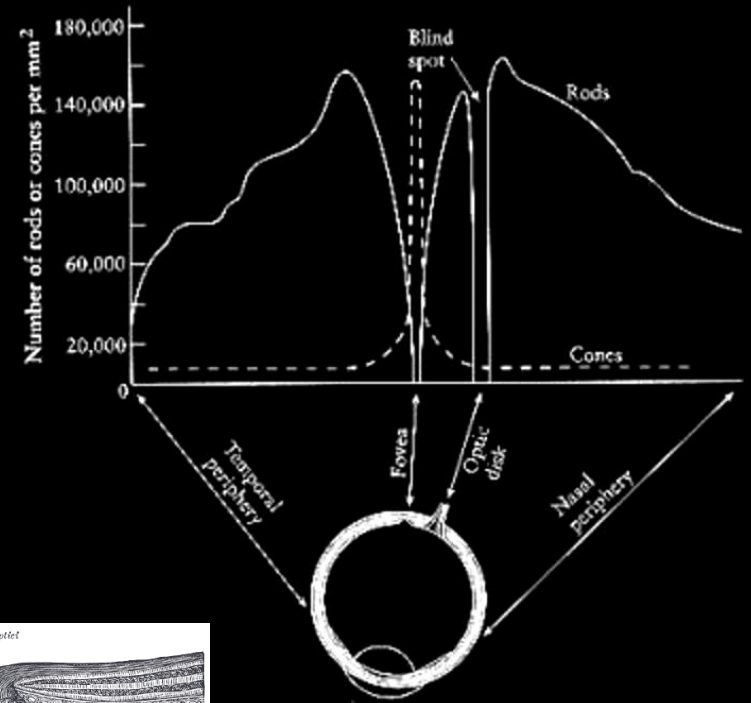
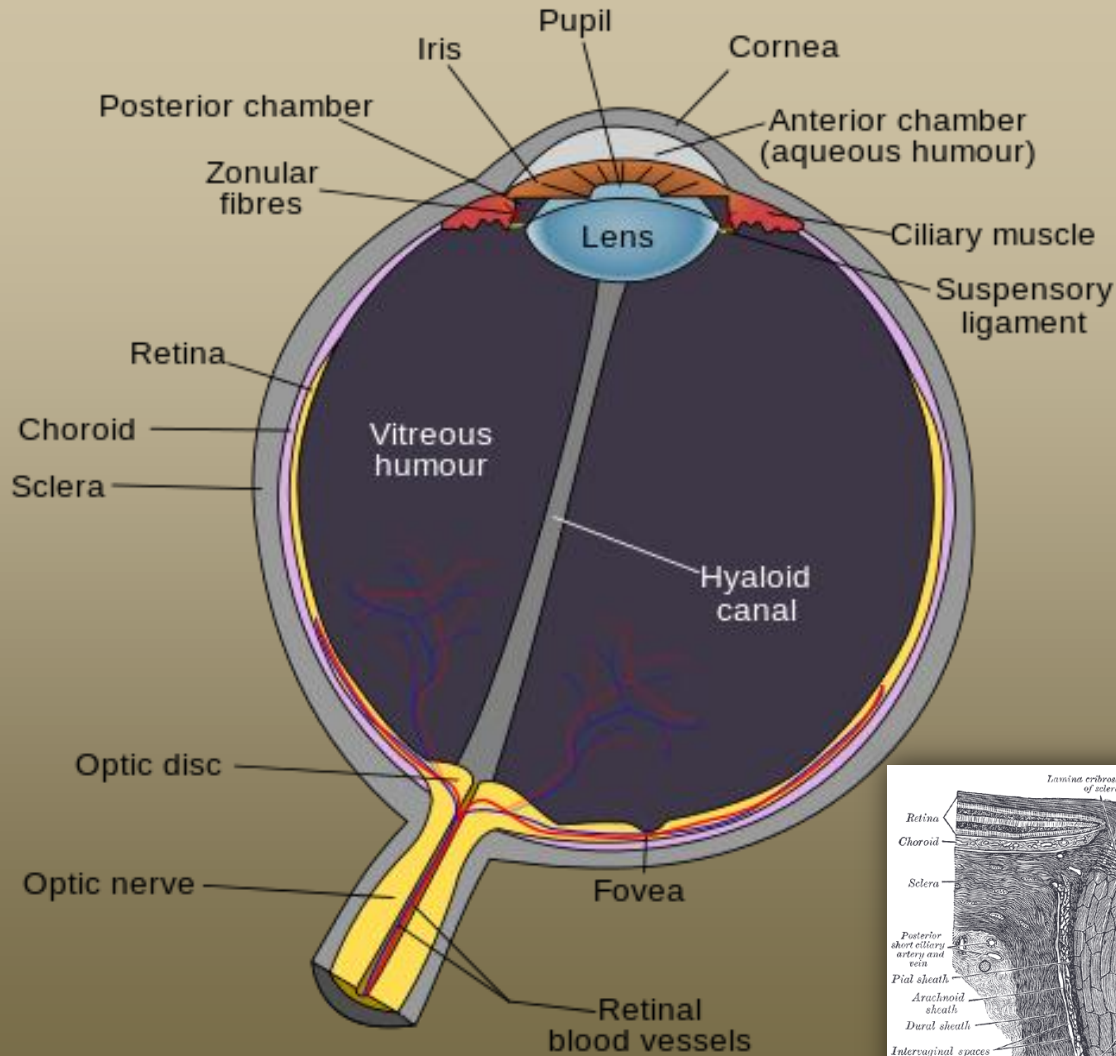


Try this out!

- Draw a cross and a circle on its right about 5 cm apart
- Place the paper in front of you with the dot on the right
- Close left eye and look **only** at cross (no cheating)
- Place paper about 15 cm from nose



The Human Eye



Human Vision

- Highest bandwidth
- Fast, parallel
- Pattern Recognition
- Pre-attentive
- Extends memory and cognitive capacity
- People think visually
- Brain: 30% vision, 8% touch, 3% hearing

Home Exercise

1. Choose a Topic from the next slide
2. Research it
3. Be able to explain it to my 4-year-old son

Topics

- Augmented Reality
- Augmented Virtuality
- Mixed-Initiative Computing
- Microsoft Vision 2020
- Google Glasses
- Epson Moverio
- iMedic
- Wearable computing
- Reality and its antonyms
- Virtuality
- Virtual Reality
- Real Virtuality (AKA Ubiquitous Computing)
- Vision
- Audition
- Haptics
- Head worn displays
- Retinal displays
- Miniature displays
- Handheld displays
- SkInput
- Spatial displays (projectors in the environment) Optical see-through displays
- Argon browser
- Focal Plane
- Video see-through display
- AR Facade
- Registration problem in AR
- Interaction
- Touch
- Gesture
- Pose
- Voice
- Sight
- Embodiment
- Non-intentional interaction
- Automatic Insulin Pump
- Brain-computer interfaces

Towards an ecology of interactive realities

- Explicit (Hands-on)
 - Touch
 - Gesture
 - Language
 - Sight
 - ...
- Implicit (Hands-off)
 - On-body
 - In-body
 - In-mind
 - Out-of-mind
 - In-environment
 - In-cloud
 - In-crowd
 - ...

**SOME INTERESTING PROJECTS TO
LOOK AT**

Sun Microsystems Starfire (1993)



Microsoft Vision 2020 (2010)



Google Glasses (2012)

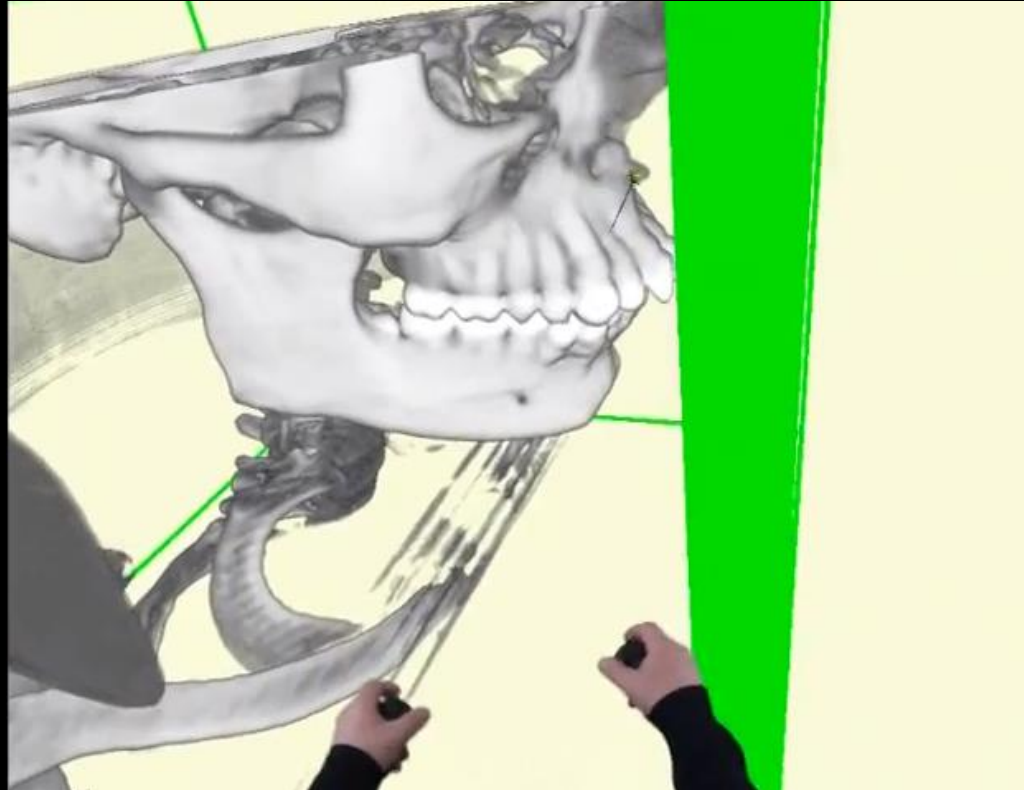


Brain Computer Interfaces (2010)

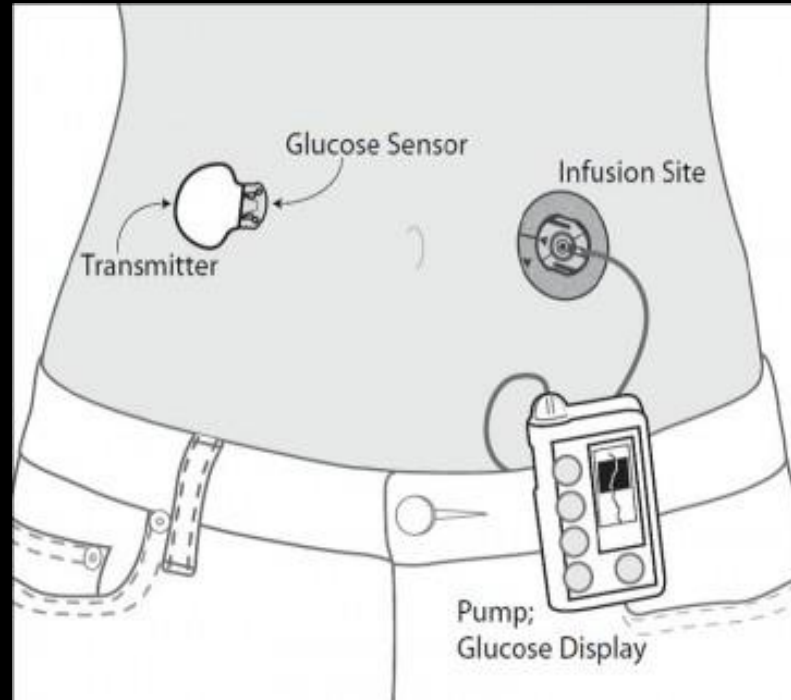


iMedic (2011)

paper



Real Time Glucose Monitoring (2010)



Workings of Kinect and Kinect Fusion (2011)



Beyond Surface Interactions (2010)



According to the observed IR markers,
the perspective of *i-m-View* can be decided

Skinput (2010)

Skinput: Appropriating the Body as an Input Surface

Chris Harrison

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Desney Tan

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Dan Morris

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Human-
Computer
Interaction
Institute

Carnegie Mellon

Microsoft

OmniTouch (2011)

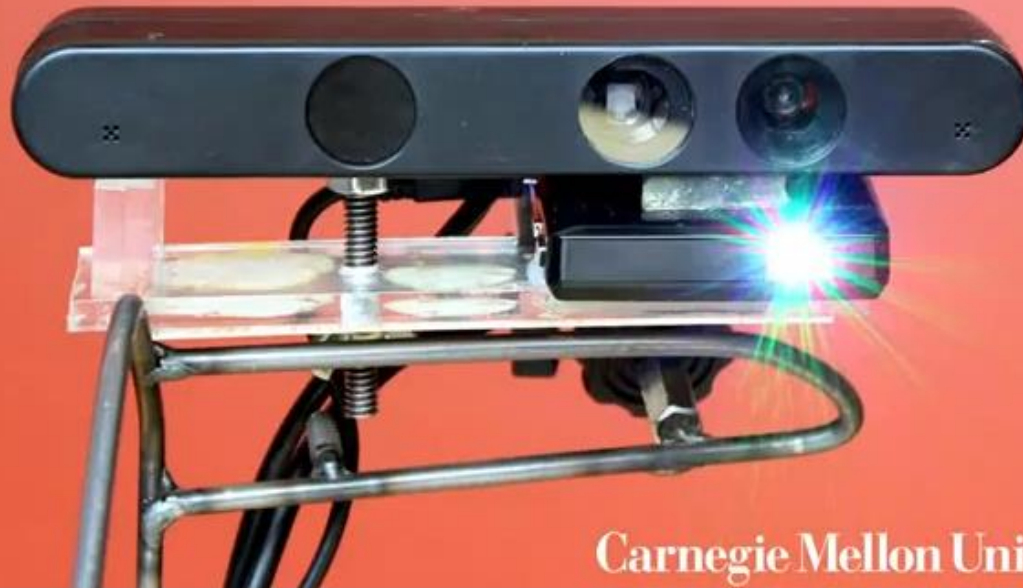
OmniTouch

Wearable Multitouch Interaction Everywhere

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Andrew Wilson
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Microsoft

Carnegie Mellon University

Exploring Gesture Interaction, Nokia (2009)




Resources

- Youtube, google
- ACM [SIGGRAPH](#)
- ACM [CHI](#)
- ASSETS: ACM International Conference on Computers and Accessibility
- CSCW: ACM conference on [Computer Supported Cooperative Work](#)
- DIS: ACM conference on Designing Interactive Systems
- ECSCW: European Conference on Computer-Supported Cooperative Work: ACM conference on supporting [group work](#)
- HRI: ACM/IEEE International Conference on [Human–robot interaction](#)
- ICMI: International Conference on Multimodal Interfaces
- ITS: ACM conference on [Interactive Tabletops and Surfaces](#)
- IUI: International Conference on Intelligent User Interfaces
- [MobileHCI](#): International Conference on Human–Computer Interaction with Mobile Devices and Services
- NIME: International Conference on [New Interfaces for Musical Expression](#)
- Ubicomp: International Conference on [Ubiquitous computing](#)
- UIST: ACM Symposium on User Interface Software and Technology
- i-USEr: International Conference on User Science and Engineering

Demos for MMI Lecture 3

You • Are • a • Tree




You • Are • a • Tree is an interactive experience where you control the growth of a tree with your body! By rotating your roots in the ground, you move fingers in the air.

The Microsoft Kinect is used to track your body movements which are translated into parameters from which a tree is generated. An Oculus allows us to show this in a water-colour fashion with leaves blowing in the wind!

When having good fun, please give us a thumbs up! read more at youareatree.philipshold.com

TRUST YOURSELF

A Spacewalking Simulator




tinyurl.com/trustyourself

PODRACER

AN IMMERSIVE RACING EXPERIENCE

OCULUS RIFT

NOVINT FALCON




Carl Ahrejs
Johan Storvall
Anton Warnhag

<http://bit.ly/1yFSPN>

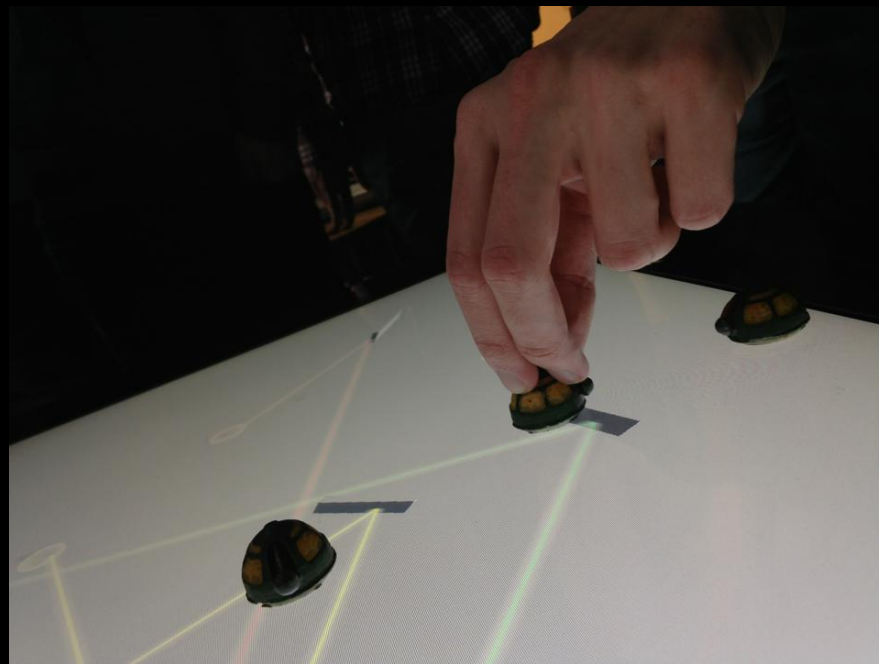
Advanced Graphics and Interaction

2PACS



LINREA BLOM - LINREA BLOM - LINREA BLOM - LINREA BLOM
LINREA BLOM - PETHRUS ENGSTRÖM - LÖNNERBERG - WISS

Demos for Lecture 3



Photos from MMI Lectures 2 & 3



7 projects presented



Milo: Embodied Sculpting



Thrust Yourself



YA3



2Pacs



PixelSense



Find more photos at:





Visualization Studio VIC
Technical Institute · Educational Research

👍 Liked ▾ ✓ Following 💬 Message ⋮

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Thank you!

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