XIANG 'ANTHONY' CHEN

PORTFOLIO (2011←2009)

COMPUTER SCIENCE × COMPUTATIONAL MEDIA DESIGN

2011

BODY-CENTRIC INTERACTION *P2 master thesis | in submission*

SPALENDAR *P11 to submit*

HOW DO DEVELOPERS CHOOSE APIS? *P12 course project*

GRADUAL ENGAGEMENT BETWEEN WORKSPACES *P13 course project*

2010

SUBJECT ASSESSMENT OF 3D COMPRESSION *P14 bachelor thesis*

INTERACTIVE CAPTCHA *P15 shipped to Microsoft*

2009

EXPRESSIVE CITY SCENE RENDERING *P16 published*

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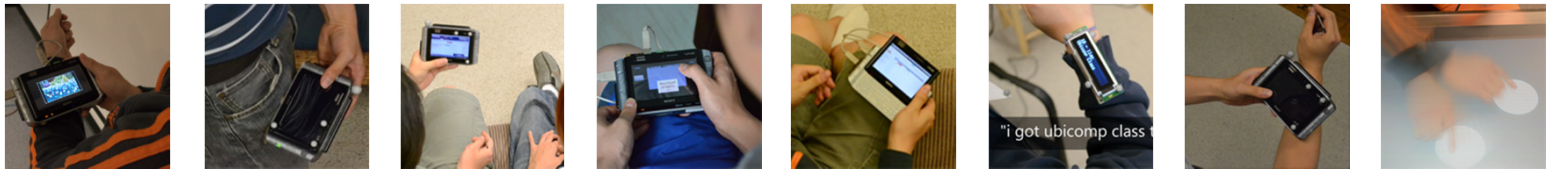
BODY-CENTRIC INTERACTION

Master's Thesis, 2010-2011
The Interactions Lab, University of Calgary

Current mobile devices require a person to navigate and interact with applications and their content via on-screen operations. The problem is that mobility trades off with screen size, providing limited space for interactions. To mitigate this problem, I explore how our body can extend the interaction space of a mobile device. I also built the following prototypes to illustrate this *Body-Centric Interaction* concept.



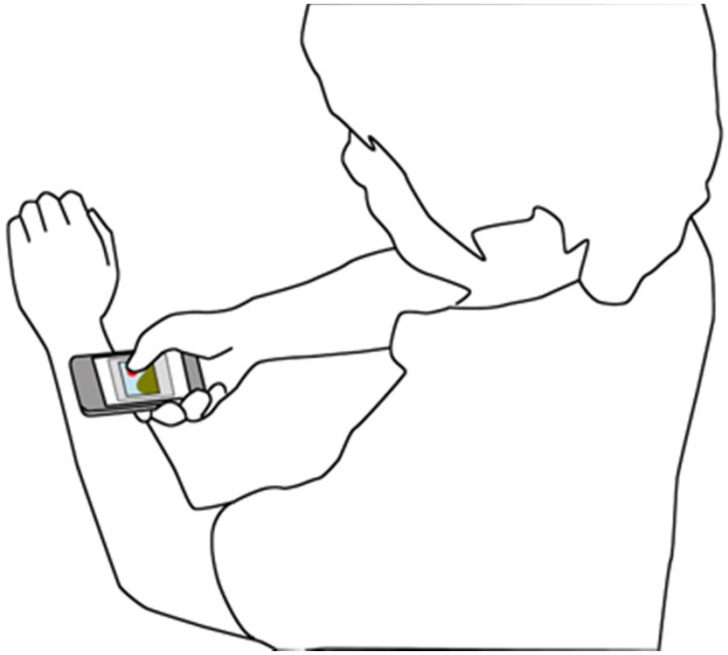
In submission:
•Xiang 'Anthony' Chen, Anthony Tang, Sebastian Boring, Saul Greenberg (2011). Body-Centric Interaction: Using the Body as an Extended Mobile Interaction Space, in submission to the 30th ACM conference on Human Factors in Computing System (CHI 2012). http://grouplab.cpsc.ucalgary.ca/Publications/2011-BodyCenteredInteractions.Report2011-1016-28
•Xiang 'Anthony' Chen (2011). Body-Centric Interaction with Mobile Devices, in preparation for the Graduate Student Consortium of the 6th International Conference on Tangible, Embedded, and Embodied Interaction (TEI 2012). http://xiangchen.me/bodyCentric-TEI.pdf

Body-Centric Interaction

BODY VIEWER

Body Viewer is an image viewer where people can drop an image on their body locations and later pick it up.

The prototype was built using Radio Frequency Identification (RFID) sensing technology. RFID tags were embedded in people's clothing to identify different body locations.



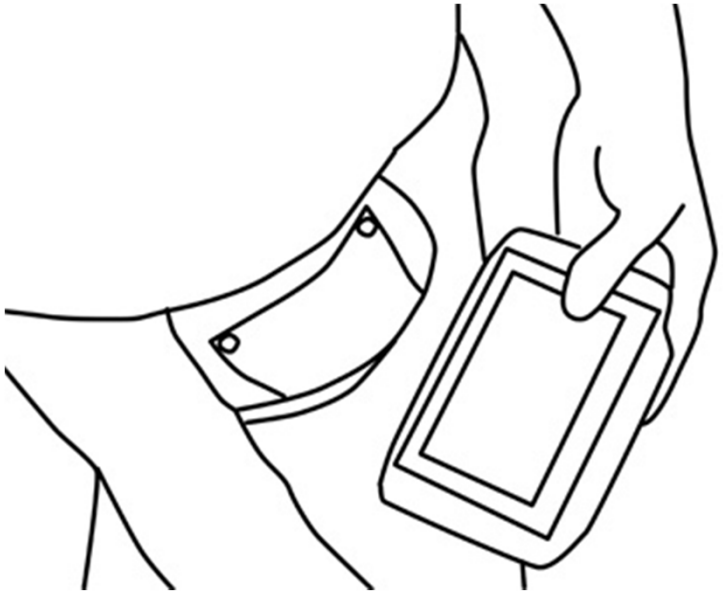
http://xiangchen.me/Projects/BodyViewer/bodyViewer.html

Body-Centric Interaction

POCKETS

People use their physical pockets to store/access digital objects, e.g., showing and exchanging business cards.

The prototype was also built using RFID sensing technology. This time, the tags were attached at the device and the readers in the pockets. This setup could tell the coarse-grained spatial relationship between a device and a pocket and then maps it to the storage of digital objects.



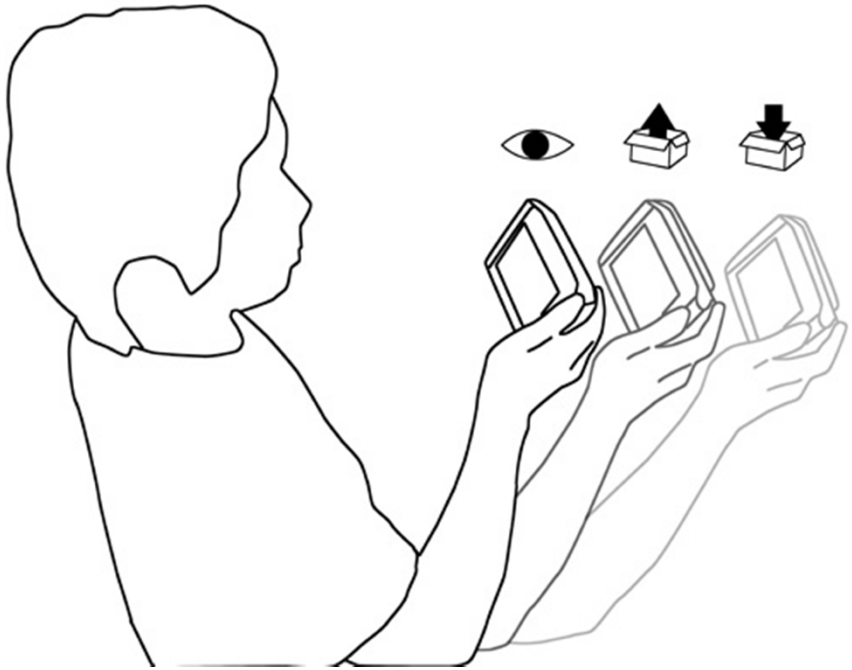
http://xiangchen.me/Projects/Pockets/pocket.htm

Body-Centric Interaction

BODY COBWEB

Body Cobweb is an imaginary cobweb surrounding and travelling with people. 'Touching' the cobweb sticks a digital object on it. To retrieve one, simply point to where it is 'stuck'.

The prototype was built using Motion Capturing System. It tracked the spatial locations of the user and the device. It then sensed where the device pointed-to/touched the 'cobweb' (which was actually a circular bounding box of the user).



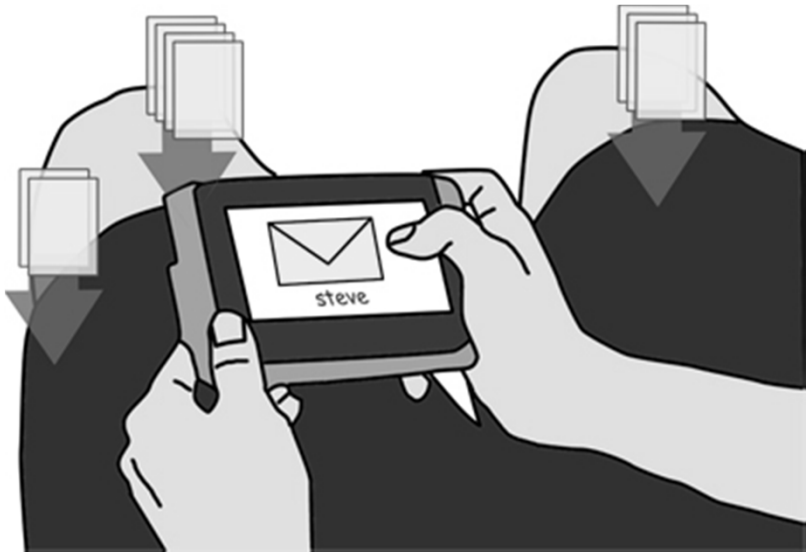
http://xiangchen.me/Projects/BodyCobweb/bodyCobweb.html

Body-Centric Interaction

BODY WORKSPACE

Body Workspace is an imaginary workspace on your body (e.g., laps), where you can place, move and organize your work items.

The prototype was built using RFID sensing technology, similar to mechanism in Body Viewer.



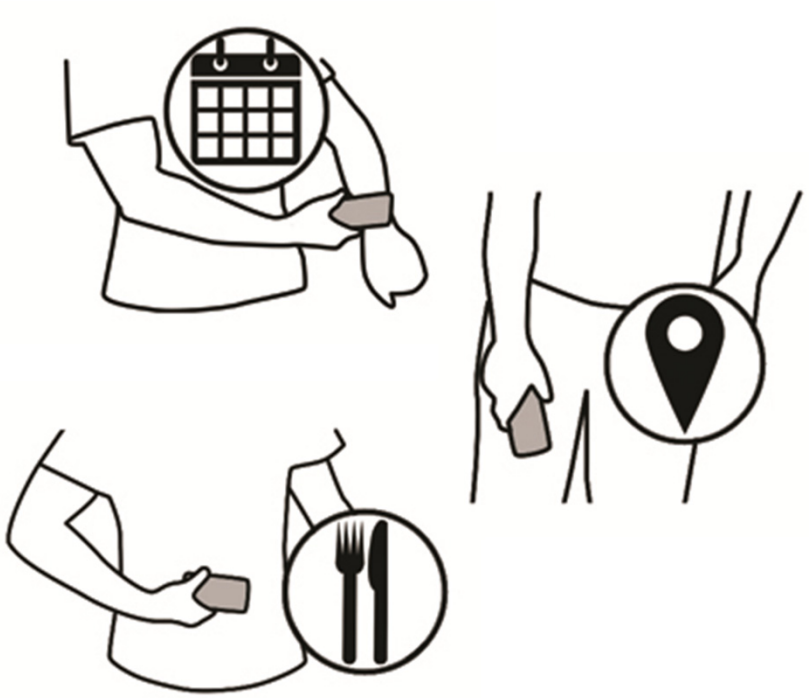
http://xiangchen.me/Projects/BodyWorkspace/bodyWorkspace.html

Body-Centric Interaction

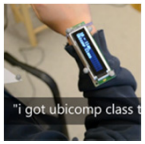
BODY SHORTCUTS

Body Shortcuts is a mechanism of using body parts to trigger programmable digital actions, such as wrist triggers calendar application, right knee finds route info for a frequently-visited place, abdomen searches restaurants nearby.

The prototype was built using RFID sensing technology, similar to the mechanism in Body Viewer.



http://xiangchen.me/Projects/BodyShortcuts/bodyShortcuts.html

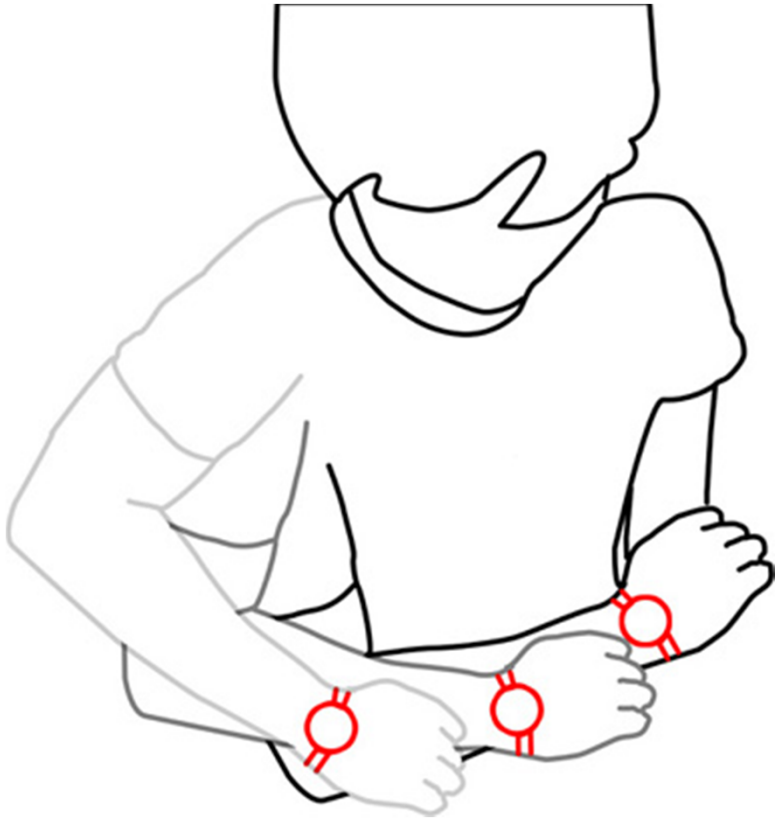


Body-Centric Interaction

MOVING WATCH

Moving Watch is a watch that shows one of your calendar events at a time. To go through his schedules, one moves the watch around the body. As the watch moves, it switches to next/last event.

The prototype was built using Motion Capture System which tracked the watch's spatial relationship with the user. The orientation maps to the forthcoming events in the user's calendar.



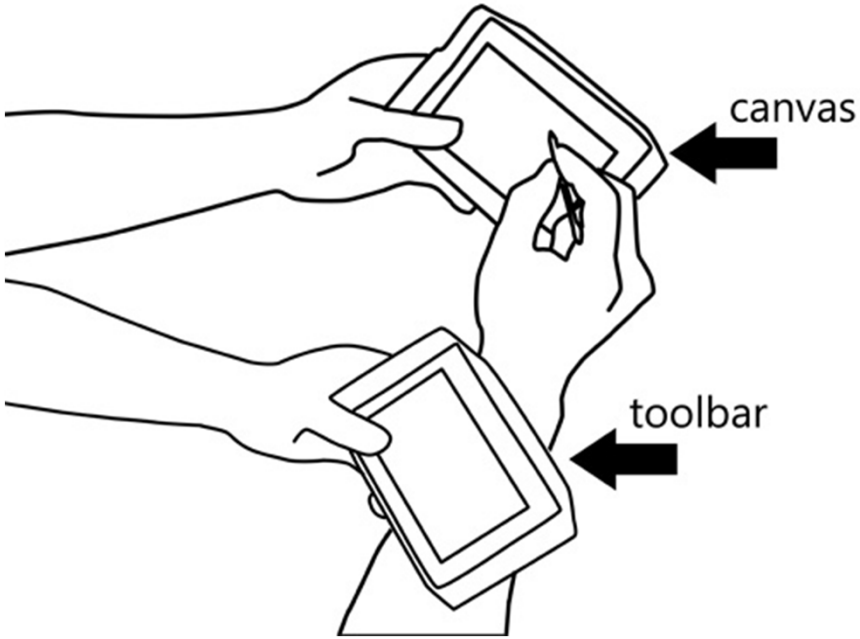
http://xiangchen.me/Projects/MovingWatch/movingWatch.html

Body-Centric Interaction

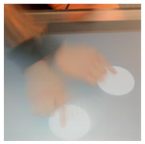
BODY TOOLBAR

Body Toolbar is toolbar outside the screen, on your body. Consider a sketching application. To select painting tools, go to the right arm; to pick colors go the left arm; etc.

The prototype was built using RFID sensing technology, similar to Body Viewer. Instead each body locations map to a specific set of application controls.



http://xiangchen.me/Projects/BodyToolbar/bodyToolbar.html



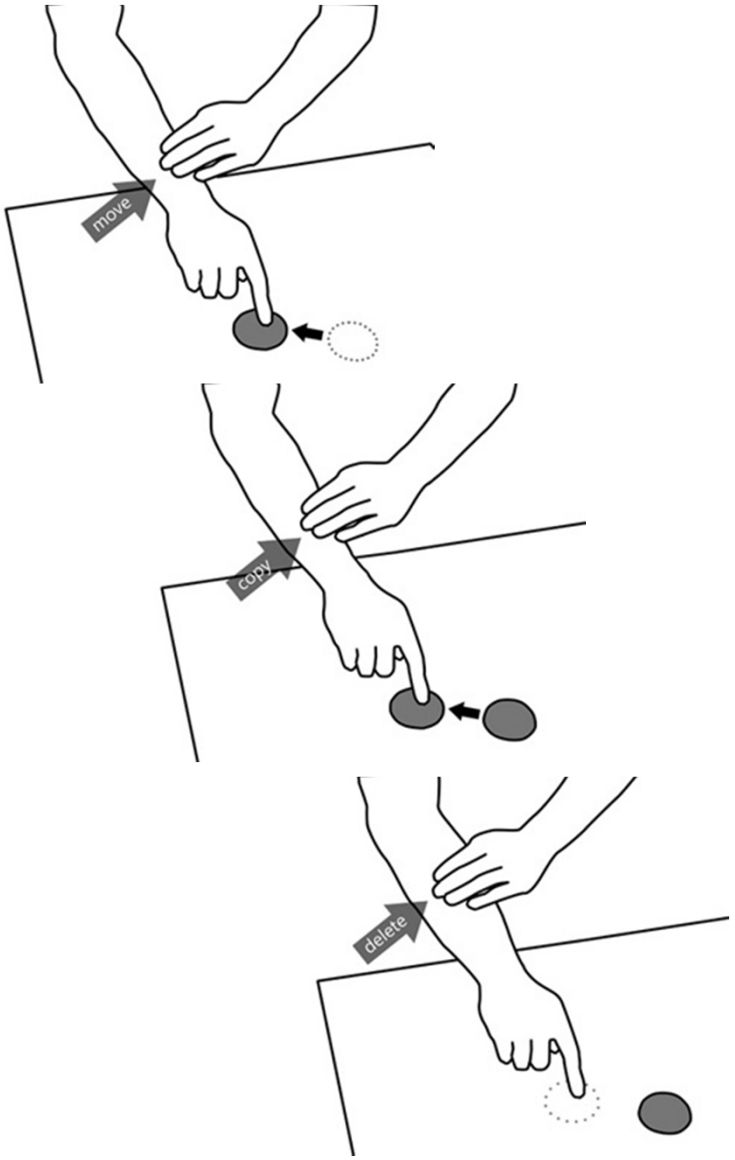
Body-Centric Interaction

BODY SURFACE

Body Surface is an interactive surface where people use their dominant hand to touch the device surface and the other to touch the body surface, and the two combined makes various controls to the device.

From top to bottom: lower forearm triggers *move* control; mid forearm triggers the *copy* control; upper forearm triggers the *delete* control.

The prototype was built using RFID sensing technology, similar to the mechanism in Body Toolbar.



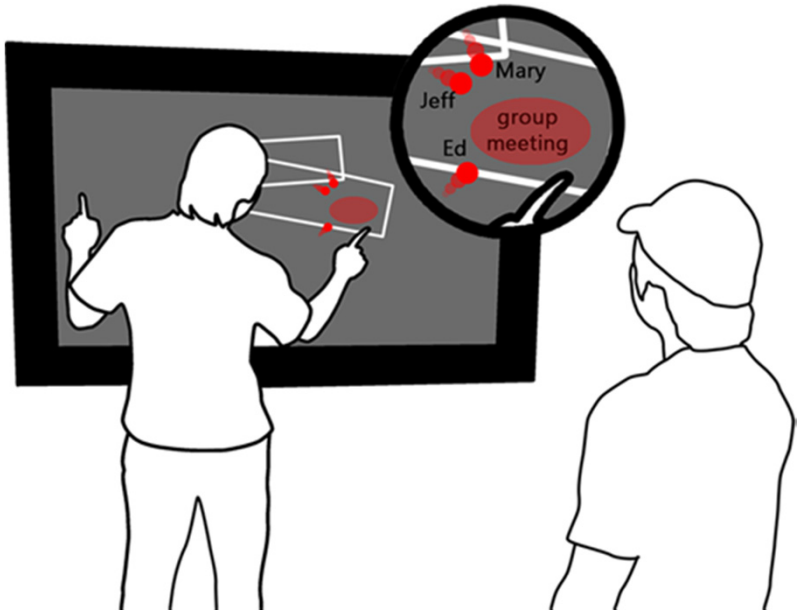
http://xiangchen.me/Projects/BodySurface/bodySurface.html

SPALENDAR

Information Visualization Project, 2010-2011
The Interactions Lab, University of Calgary

Spalendar (or Spatial Calendar) is a calendar that visualizes a social network of people's forthcoming movements between different places to attend their individual or shared events.

For example, as shown in the figure (right), when situated at an office's public display, the calendar will show to people a scheduled meeting between three colleagues.



In preparation:
•Xiang 'Anthony' Chen, Sheelagh Carpendale, Anthony Tang, Sebastian Boring, Saul Greenberg (2011). Spalendar: Spatially Visualizing Group's Calendar Activities as a Public Interactive Display, in preparation for the 11th International Working Conference on Advanced Visual Interfaces (AVI2012).

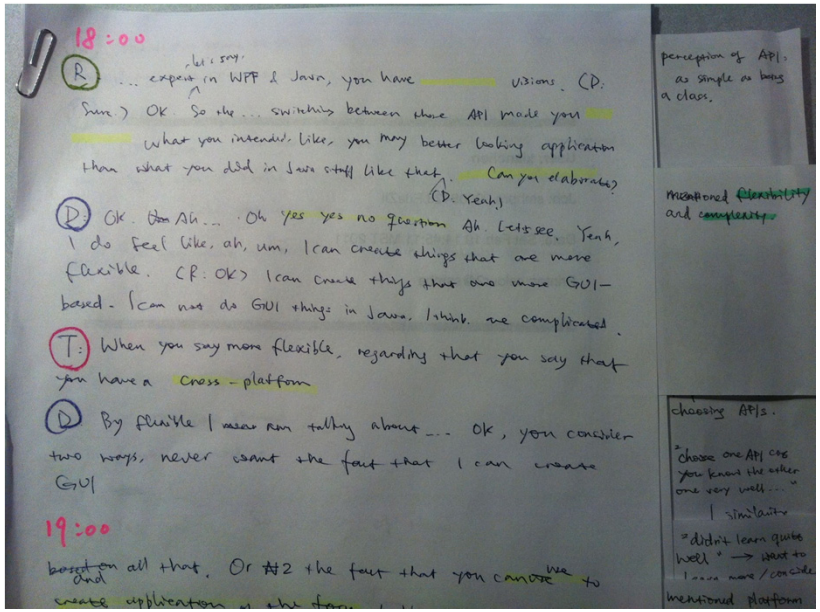
http://xiangchen.me/Projects/Spalendar/spalendar.html

HOW DO DEVELOPERS CHOOSE APIS?

Software Engineering Project, 2011
Department of Computer Science, University of Calgary

We took a qualitative approach to investigate this question where we interviewed people from both industry and academia and with various development experience.

We then went through an iterative open coding process (figure shows a transcript) and came up with three important phases of developers' choosing a particular API: they first LOOK for candidates; then they DO try out different APIs; finally they PLAN for an actual employment of APIs to their projects.



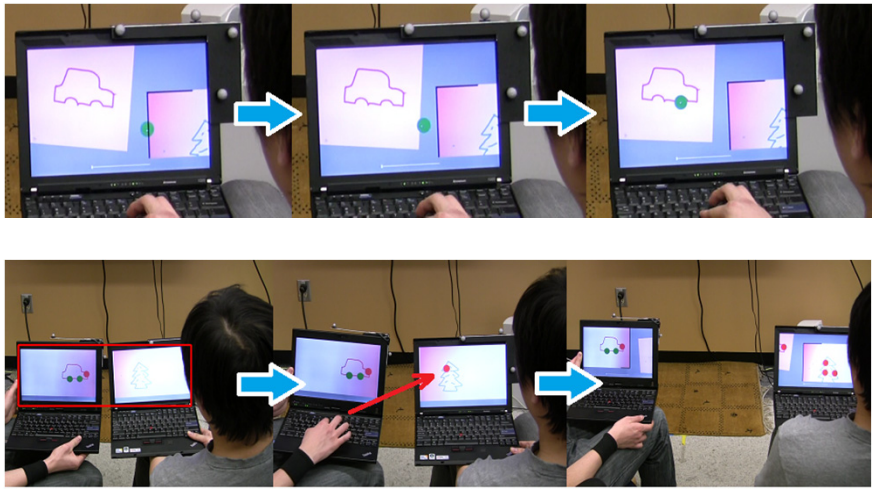
Tech report
• Xiang 'Anthony' Chen, Matthew Dunlap, Richard Fung, Túlio Souza (2011). How Do Developers Choose APIs?
http://ucalgary.academia.edu/XiangChen/Papers/985765/How_Do_Developers_Choose_APIs

GRADUAL ENGAGEMENT BETWEEN WORKSPACES

Ubiquitous Computing Project, 2010
The Interactions Lab, University of Calgary

Can two digital workspaces collaborate by physically positioning/moving towards each other? This project explored the design space that enables such 'gradual engagement'.

For example, as shown in the figure (right): as one device approaches the other, its workspace is partially visible and accessible by the other as well (top). Aligning the two devices merges the canvases into one, allowing two users to operate it unanimously (bottom).

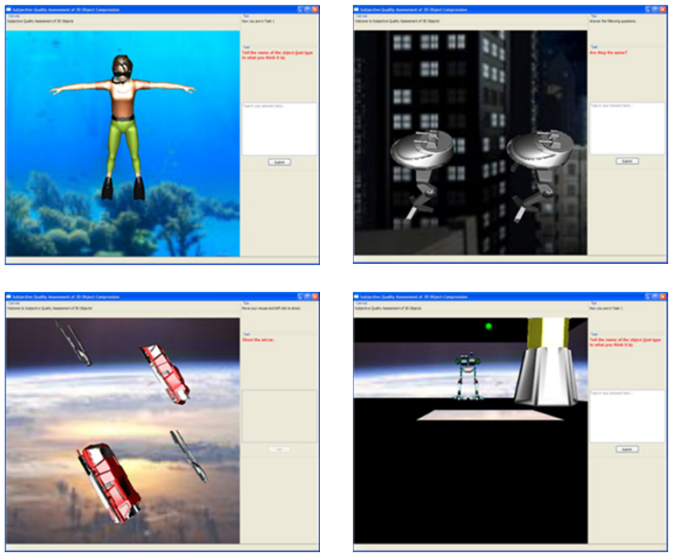


Tech report:
•Xiang 'Anthony' Chen, Saul Greenberg (2010). ProxemiCanvas: Gradual Engagement Between Mobile Workspaces Based on Proximity
http://ucalgary.academia.edu/XiangChen/Papers/1156527/ProxemiCanvas_Gradual_Engagement_Between_Mobile_Workspaces_Based_on_Proximity

SUBJECT ASSESSMENT OF 3D COMPRESSION

Bachelor Thesis Project, 2010
Escuela Técnica Superior de Ingenieros de Telecomunicación, Universidad Politécnica de Madrid

The compression quality of a 3D object can also be measured by how well it 'fits in' the scenario that uses it. We let people play small games where the characters were rendered with compressed geometric models. We found different compression methods yielded varied game performances and experiences.

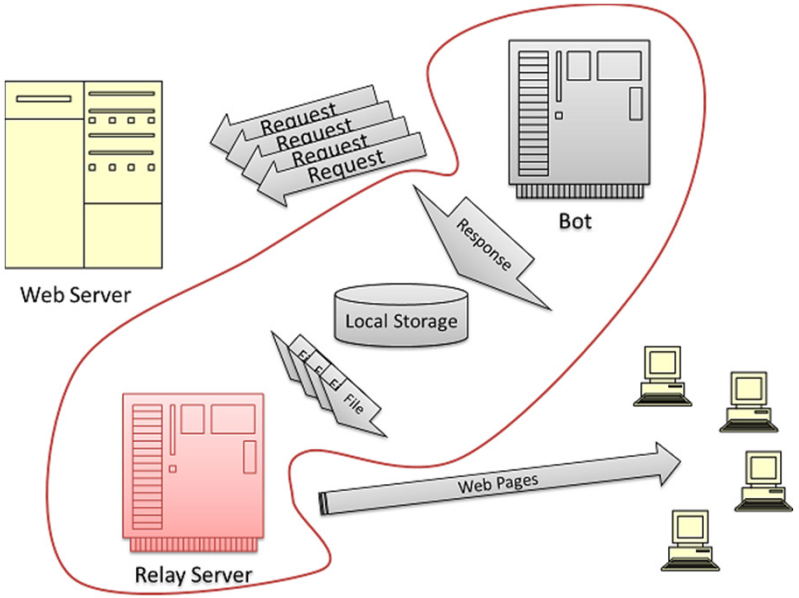


Tech report:
•Xiang 'Anthony' Chen, Francisco Morán Burgos (2010). A Scenario-based Subjective Approach to Assess the Quality of 3D Object Compression
http://ucalgary.academia.edu/XiangChen/Papers/1166068/A_Scenario-based_Subjective_Approach_to_Assess_the_Quality_of_3D_Object_Compression

INTERACTIVE CAPTCHA

Microsoft Project, 2009 - 2010
Media Computing Group, Microsoft Research Asia

CAPTCHA is short for "Completely Automated Public Turing test to tell Computers and Humans Apart ". Our research goal was to make CAPTCHA more interactive. The first project tried to parameterize CAPTCHA so that developers can customize it to balance between security and usability. The second project tested a type of game-based CAPTCHA to evaluate how it could prevent Botnet attack (right figure). The last project compared a 3D CAPTCHA with conventional ones to validate its usability.

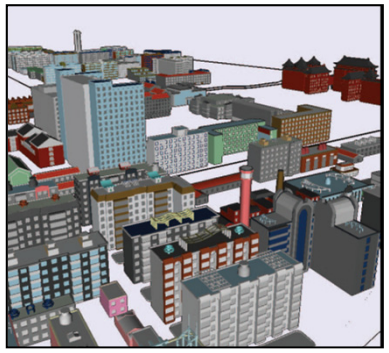


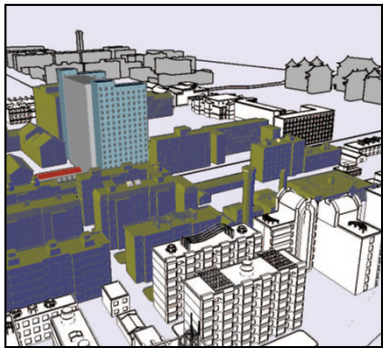
EXPRESSIVE CITY SCENE RENDERING

Undergrad Research Project, 2009
State Key Lab of CAD/CG, Zhejiang University

Most 3D city visualizations employ a uniform rendering style (right figure, top). This project explores an expressive rendering approach with various styles integrated in a seamless way. Each view is a combination of photorealistic rendering, non-photorealistic rendering, and line drawing, so as to highlight the information that interests the users and de-emphasize the other that is less important (right figure, bottom).

At run-time, the users specify their interested locations with pre-determined 3D landmarks. Our system automatically computes the salience of each location and visualizes the entire scene with emphasis in the area of interests. The GPU-based implementation enables real-time performance, and demonstrates outstanding practicality.





Published paper:
•Bin Pan, Xiang Chen, Xiaoming Guo, Wei Chen, Qunsheng Peng (2011). Interactive Expressive Illustration of 3D City Scene. Proc. Of CAD/Graphics 2011: 406-409, Jinan, China, Sept 15-17, 2011
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6062820

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	Richard Fung		
	Matthew Dunlap	Zhejiang University	Bin Pan
	Túlio Souza		Wei Chen
			Qunsheng Peng
Universidad Politécnica de Madrid	Francisco Morán Burgos		

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