

Systems Development for TableTop Display

Exit presentation

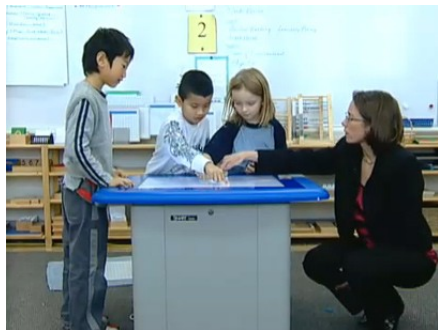
Khaled TANGAO

Collaborative Systems Lab,

Telecom Bretagne.

July, 29 2009

Introduction



Smart Table (source: <http://tech.aol.hk>)

Outline

- 1 Hardware Classification
 - MultiTouch TableTops
 - TableTops that support User Identification
- 2 Software Side.
 - Choice of Language for building prototypes
 - Choice of the Graphics Framework for building prototypes
- 3 Development Challenges
 - Design Challenges
 - Images
 - Inputs

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More Than One Input From A User At The Same Time.

- Traditional interactions come from a mouse, a keyboard, stylus, sometimes a finger...
- Multitouch is when you have more than one input from the same device or/and from multiple users at the same time



multitouch input (source: <http://www.nuigroup.com/>)

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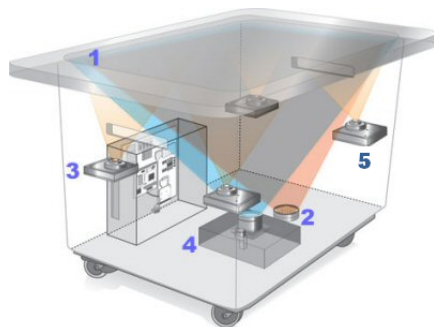
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Optical Systems

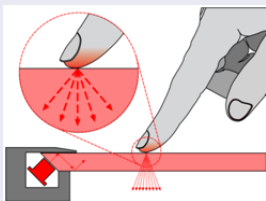


multitouch optical system (source:
<http://www.cheaplaptops.org.uk/>)

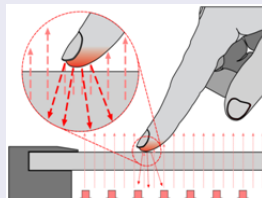
FTIR and DI

- Smart Table uses FTIR(Frustrated Total Internal Reflection) while Microsoft Surface uses DI (Diffused Illumination)

How does it work ?



FTIR



DI

(source: Media Interaction Lab)

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Anoto and Some Capacitive System

- Anoto does not allow multiple input from the same user at the same time but user identification is possible.



Anoto pen (source: <http://www.anoto.com/>)

- Diamond Touch from Mitsubishi Electric can distinguish between user touches, enabling personalized interaction.
- Next step will be a tabletop that enables user identification and full multiTouch at a user level.

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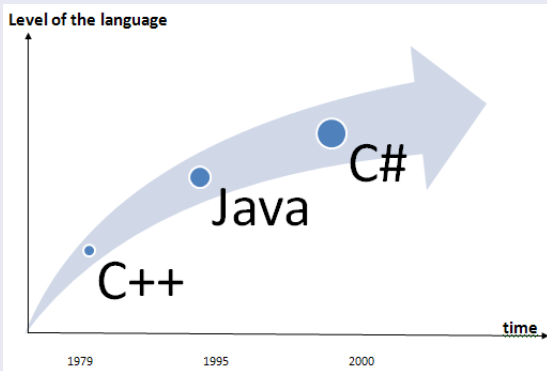
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Which language is better for TableTop Applications ?

Main Object Oriented Languages



the evolution of languages through time

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Which Graphics Library is Better for TableTop Systems Development? (1)



Screen-shot of OpenGL App

Open Graphics Library (OpenGL)

- Advantages: Flexible; Open Source; Platform independent; Pixel level API; Available in all languages.
- Disadvantages: Difficult to manage; Absence of high level tools such as button, window...; not recommended for text applications.

Which Graphics Library is Better for TableTop Systems Development? (2)

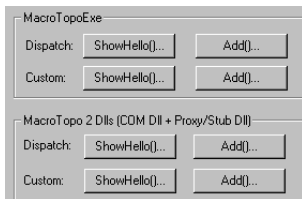


Screen-shot of QGraphics View

Qt

- Advantages: Platform independent; High Level tools (QWebKit, QGraphics View...); Supports OpenGL; Big developers community; Support of multiTouch in the next version.
- Disadvantages: Not available in C#; Not totally open source; Difficult to use with Visual Studio.

Which Graphics Library is Better for Tabletop Systems Development? (3)



Screen-shot of MFC App

Microsoft Foundation Classes (MFC)

- Advantages: Supports OpenGL; An application can have multiple handle.
- Disadvantages: Only available in C++ language; Not possible to apply strategies to visual objects.

Which Graphics Library is Better for Tabletop Systems Development? (4)



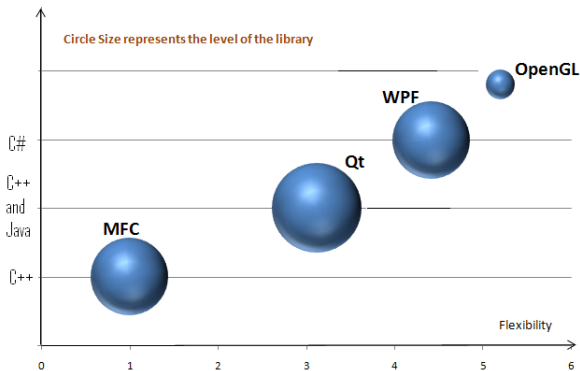
Wpf App (ASPECTS project)

Windows Presentation Foundation (WPF)

- Advantages: XAML/code-behind; good looking tools; natural strategies can be applied to all visual objects; .NET framework; high level tools.
- Disadvantages: only available in C# on Microsoft platforms; an application has only one handle; new language to learn.

WPF.

Level of languages the
Framework is available in



WPF is the only one that gives us the flexibility and the tools we need on Windows platform.

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Design Challenges.

- Simulate real world's movements. Gestures recognition, Real world's objects recognition ...
- Take in account collaborative aspects. What happens if two people tried to interact with the same object? New strategies to share information around the table.
- On what kind of hardware their application will be run. Does the hardware have a gesture recognition, multi touch at the user level?

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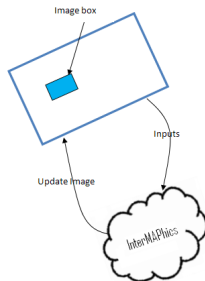
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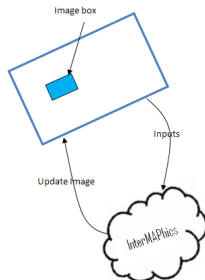
- Tabletop strategies are easy to apply to pictures because most of all graphics engines handle well images.
- One of the problem for developers is how to apply tabletop strategies to traditional MFC containers; Converting everything in images can be the solution.



- Example of InterMAPhics Viewport

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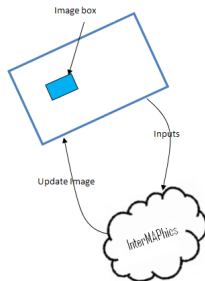
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Handling Input.

- How input events usually work on Windows ?
- Developers need to raise their own events to handle inputs.
- A standard protocol for multitouch and multi-user input doesn't exist. Most of OS (XP, Vista, Linux...) only supports keyboard and mouse input.

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- Huge market

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Questions ?

