**Immersion of Xwindow Applications Into a 3D Workbench**


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**Motivation**

"Escaping flatland" (van Dam, CHI’91) seems among the promising alternatives for the replacement of the current GUI.

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**Implementation**

**Initialization**

- **XQueryTree** — call to server
  - Gets top-level windows (children from the root window)

  **for each top-level window**

  - **XGetGeometry**
    - Gets window size
  - **OpenGLTextureSize**
    - Computes compatible width and height for OpenGL texture
  - **XResizeWindow**
    - Resizes window
  - **XGetImage**
    - Gets the image of the window
  - **CreateOpenGLWindow**
    - Creates OpenGL face textured with the image
  - **XQueryTree**
    - Gets hierarchy of widgets (subwindows) composing this top-level window

**Interaction**

- **Click in the 3D interface**
  - Determines in which top-level window the mouse click occurred

  **Determines 3D coordinates of the click point**

  **Computes 2D coordinates relative to the top-left corner of the 2D window**

  **Gets in widget's hierarchy the subwindow in which the mouse click occurred**

  **Sends events to subwindow**

  **window texture change**

  **Stores new created widgets in hierarchy of subwindows (for popup menus for ex.)**

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**Conclusion & Future Work**

**What this system does:**
- Mixes 3D objects and 2D windows,
- Handles mouse events within 3D windows in order to interact with their content,
- Offers simple mouse interactions for positioning and rotating windows and objects.

**What it proves that:**
XWindow applications can be immersed into a 3D scene with a minimal software development and a standard hardware configuration.

**Evolution of the prototype:**
The prototypical application is a simple XWindow client. It should evolve in two different projects:
- a window manager in order to obtain the special authority for resizing and reparenting other applications (to meet OpenGL texture size requirements) and use the root window as the rendering one,
- a new XServer that handles all graphic primitives in 3D coordinates and shares its pixmap with other applications to ease the recovery of textures and to avoid duplicating some large structures (i.e. waste of computing power).

**Tested under Linux with an accelerated Xserver for Matrox G400 graphic card using the standard X and Mesa (v. 3.1) libraries.**