

Mixed Interaction Spaces

– a new interaction technique for mobile devices

A mixed interaction space is a space for interaction that maps interaction in a physical space to a set of applications in a virtual space.

By using the camera on mobile devices to track a feature, a mixed reality interface is created. The mixed interaction space has the shape of an inverse pyramid bound by the camera's field of vision. When the device is close to the feature the space is small, and the further away from the fixed-point the larger the space becomes.

Moving the phone in the interaction space can be mapped to actions in the graphical user interface on the device or to actions

Concept

With the software running on the device we are able to track a large set of features. Fixed-point features are tracked with the camera by looking at their shape or colour profile.

One algorithm tracks hand drawn circles and uses them as the base for the interaction space.

Another algorithm records an object's colour profile and use this profile to create the interaction space e.g. a simple brick can be used as fixed-point.

Fixed feature

By using mobile devices with multiple cameras we have developed a face tracking algorithm running on the device that is able to locate and track the user's face in real time.

The position of the face in relation to the mobile device is used to create a mixed interaction space.

The movements of the device in the interaction space can be mapped to a set of different applications running on the device or a nearby computer.

The entire interaction space can be moved by tilting the device which provides another way of interacting with mixed interaction spaces.

Face tracking

By using several mobile devices communicating through Bluetooth we have used mixed interaction spaces to create a set of multi-user applications running on nearby screens.

Connecting to a multi-user system with your personal device will e.g. give you your own cursor that can be used to manipulate and pick up objects or play games.

Multi-user

ImageZoomViewer

Use the mixed interaction space spanned by a fixed-point or the user's face to navigate and zoom on a map or images.

DrawMe

An application for drawing your own interface. Draw a circle, draw a symbol, use the mobile phone to recognize the symbol and use the interaction space to interact with different applications mapped to the symbol.

DROZO

Drag, rotate and zoom on images on a large wall display by using the mobile phone and the mixed interaction space as tool.

FacePong, Layered Pie Menu, Multi-User Pong ...

We have build a large set of other applications taking advantage of one or more mixed interaction spaces.

Applications

