A User Interaction Model for Augmented Reality Systems
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Technology
Users
Human Computer Interaction
Constrained Interaction
Document **VS** User Interface

Simple
Linear
Hierarchical

Dynamic
Non-linear
Stochastic

Middleware is required!
Put interaction first!

```html
<box onclick="nextSlide();">
  <text font="arial 12">Next</text>
</box>

<button action="nextState" text="Next" />
```
New Interaction Model

- Specially designed for AR.
- User-Centered Approach.
- Context Awareness.
- Unified Syntax.
- Layered Complexity.
- Logical Consistency.
- Open Collaboration.
Main Characteristics

- Three-dimensional widgets.
- Physic-based Interaction Methods.
- Context-aware layer structure.
- Single user per device.
- No need for style properties:
  - The user defines general properties.
  - The system adapts the content for different situations.
Interaction Components

- Single user per device.
- Non spatial layer components.
- Spatial layer components.
Distribution architecture

• Both client-server and P2P models.
• Spatial location-based discovery.
• Ad-hoc collaborative environments.
UI Markup Language: ARUIML

- Based on XUL, XAML and UsiXML.
- Designed for AR:
  - Three-dimensional
  - Spatial positioning
  - Occlusion handling
  - Physical properties
- UIOM (User Interface Object Model).
Interoperability

- **Internal**: Content and widgets can be shared between different layers and services.
- **External**: taking advantage of already existing standards:
  - OGC ARML for non-interactive content and Geospatial location.
  - glTF for 3D model transmission.
Next Steps

• Implementation of the initial draft.
• Definition of multiple prototypes.
  – User-Centered Design.
  – Refine the ARUIML schema.
• Implementation of the proposed interaction model at a operating system level.