Architecture for Collaborative Learning Activities in Hybrid Learning Environments

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Outline

- Learning environment combining Real and Virtual World
- Functionality
- Architecture
- Collaborative Learning Activity
- Conclusion

“Drawing Hands.”
Escher (1898 – 1972)
Hybrid Environment

Gran Vía (Madrid) 
Real World

Mirror World

Gran Vía (Madrid)
Functionality

- Augmented Reality
- Augmented Virtuality
- Communication:
  - Chat
  - VoIP
  - Geolocation of multimodal information:
    - Pictures
    - Vídeos
Real world: a new client for the architecture

Virtual world clients

OWL Server extended

Real world clients

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Communication between the worlds

(1) <login, user_id> via TCP
(2) <n_avatars> via TCP
(3:3+n) <info about n avatars> via TCP
socket remains open for chat
Handling Geolocation

**Avatars** supperposed onto the real world -geolocated-

**Augmented Reality**

**NPC** represents real user into the virtual world -geolocated-

**Augmented Virtuality**
Handling Multimodal Information

**Augmented Reality**

Multimodal information superposed onto the real world -geolocated-

**Augmented Virtuality**

Multimodal information superposed onto the virtual world -geolocated-
Handling Multimodal Information

Sending geolocated information to OWL Extended Server

Multimodal-type-info:
Change in virtual world state
NPCs to help Orchestration
Architecture
A collaborative learning activity

Virtual World

NPC Professor
NPC Guide
Participant A
Participant B

Real World

Participant D
Participant C

Ask for Photo
Done!
Watch video & Take note
Go to T3

Ask for Video
Done!
Watch video & Take note
What is your answer?
Answer

Send me Photo T1
Send me Video T3

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Conclusions

- Architecture that supports:
  - Augmented Reality
  - Augmented Virtuality
  - within an hybrid environment:
    - Real world
    - Mirror world

- Collaborative learning experience using the environment.