TOOLS FOR MIXED REALITY IN SMART ENVIRONMENTS

LAB 3: Virtual-Physical dimensions
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AGENDA

• Mixed reality tools
• Collab task.
BEFORE START...

• Any question about topics of the previous lecture/lab?
• Suggestion/petition?

Go to www.menti.com and use the code 7618369
MIXED REALITY TOOLS FOR BUILDING SMART OBJECTS/ENVIRONMENTS
MIXED REALITY

SMART OBJECTS IN X-REALITY

Real Reality | Amplified Reality | Augmented Reality | Mediated Reality | Augmented Virtuality | Virtualized Reality | Virtual Reality

Real | Mixed Realities | Virtual

Hardware + Software (e.g. Phidgets + Raspberry)
Projected reality agent
Mobile augmented (e.g. ARCore, ARKit)
Virtual

https://unsplash.com/photos/J3x5ohZ3hZQ?utm_source=unsplash&utm_medium=referral&utm_content=creditShareLink
EXTENDING THE SPACE AND THE ACTOR

What information should be added to extend the user model in a x-reality?
COLLAB. TOOLS FOR MIXED REALITY
COLLAB. TOOLS FOR MIXED REALITY

- PaaS (Platform as a Service)
  - Heroku
  - Glitch
  - Google cloud
  - Azure cloud
  - ....

- IDEs
  - Unity (free 3 seats)
  - Visual Studio Code (Live Share Extension Pack)
  - NetBeans and Eclipse through Git
  - ...

COVID situation requires collaborative tools!
BASICS ON GLITCH

Collab IDE

Pro: easy, temporal free no-signup accounts, collab sharing, ...
Cons: ...

https://glitch.com/
VR on Web

Pro: easy to start, free, plenty of collab. tools, ...
Cons: not easy to integrate with Python, Java, ...

https://aframe.io/
GLITCH A-FRAME

Demo

1. Go to: https://glitch.com/~aframe
2. “Remix your own”
3. Select main page, click in “index.html”
4. Show the VR (Next to The Code)
AR QUICK DEMO

• Image tracking
  o Open in your computer browser, open Web camera:
    ▪ https://ar-js-org.github.io/AR.js/aframe/examples/image-tracking/nft/
  o Open in your mobile phone, and show to the camera

• Location-based
  o Open in your mobile phone browser (in Firefox may not work)
    ▪ https://codepen.io/nicolocarpignoli/pen/MWwzyVP

• Marker-based
  o Similar to Image tracking

Tools:
• AR.js (https://ar-js-org.github.io/AR.js-Docs/)
• Unity Vuforia
• Many others
TASK
MIXED REALITY IN AN ELDERLY
SMART HOUSE ENVIRONMENT
EXTENDING THE SPACE
AND THE ACTOR

Minimal demos of interactions: case VR

- Goal: create the skeleton of a virtual smart object
- Tools: A-Frame + Javascript + HTML + rdflib.js + ise-core-ontology.owl + Glitch
- https://glitch.com/~ise2020-lab3
COLLABORATIVE TASK

Procedure:  Time 20 minutes

1. Split the group in Zoom rooms to form teams –randomly–
2. Take example of an older adult living at home with some specific needs (smart home environment)
3. Consider one option of mixed reality (projected, augmented, virtual, etc.)
4. Upload ontology ise-core-ontology.owl (in Canvas) into Web Protege
5. Update/create the knowledge graph collaboratively with mixed reality smart objects
   1. Define functionalities of a smart object/environment
6. Share with user: esteban guerrero
7. Glitch!
   2. Remix!
8. Answer questions (next slide), take notes about those answers. Then present those answers.
QUESTIONS

• What additional knowledge about the space and actor did you add to the knowledge graph considering a VR solution?
• What advantages may have VR in a real scenario? For example older adult smart environment?
• What disadvantages may have VR?

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EXAMPLES
- Easier to develop and test, not expensive devices needed
- Not specific SDK available
- It can be used same environments for building native Windows/Linux/Ios applications (e.g. C++, Java, .NET, Python, etc.)

X-COUNTRY SKIING

- 3D camera
- Machine learning tool: random forest
- Reasoning tool: DLV
- C# Python
MEDAR PROJECTED

- 3D camera
- Mini projector
- Machine learning tool: random forest
- Reasoning tool: DLV
- C#
OTHER RESOURCES
UNITY VUFORIA

- Unity Vuforia, Image tracking
- https://youtu.be/RKSSMT8eLro
THANK YOU