VR in TSD
HTW Dresden - Artificial Intelligence Lab

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Agenda

Motivation
State of VR Technology
Roadmap
User Tracking
Conclusion
Demo
1. Implement new features, hunt old bugs
2. Drive to Museum
3. Deploy new version
4. Prepare Robot for experiments
   (a) Attach new/exclusive Hardware
   (b) Charge Batteries
   (c) Drive to Starting Position
5. Prepare environment for experiments
   (a) Wizard of Oz Workstation
   (b) Network Connections
   (c) (Prepare special exhibits)
6. Wait for visitors that are willing to cooperate with the robot / us
7. Copy Log Files and Pack Up
8. Drive to HTW
9. Analyze the data and draw conclusions
10. GOTO 1
Current Workflow

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Already available
Near Future

1. Wireless \o/
   (a) GiFi - (60 Ghz-Wifi-Adapter by TPCast 1st Quarter 2017) - 8gbs (real world conditions)
   (b) LiFi - Visible Light Communications - 224 gbs (lab conditions)

2. Higher Resolution
   (a) OLED
   (b) 4k Mobile screens

3. Built In Eye Tracking
   (a) FOVE Eyetracking VR Headset available for preorder
   (b) SMI Mobile Eye Tracking HMD (Sensor Motoric Instruments)
What is done...

- Greyboxing Environment with
  - robot dummy
  - navigational scripts (motion + path planning)
  - Preparation of Points of Interest (later exhibits)

- Remodelled 3d-printer-ready CAD robot as usable 3D game object
- Speech synthesis with same backend as real world robot
- HTML5 based interactive robot display (based on awesomnium)
- Locomotion via armswinger/vrtk script
- First steps to *technical* photogrammetry
More steps towards an easy accessible **technical** photogrammetry

Implement interfaces to use our real world algorithms within VR

- Path planning, obstacle avoidance
- People tracking

Projection onto exhibits

Refinements of existing solutions

Stepwise modelling of museum environment

User tests
User Tracking
Physical Properties

- User position in space
- Gaze Estimation
- Position of Points of Interest and of robot
- Speech Recognition with
  - acoustic and semantic language processing
  - interest / emotion estimation
Wheel of Emotions, by Robert Plutchik

..., by Robin Nixon
Intrinsic Parameters II

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TiltBrush Color Picker by Google
Conclusion

• Amazingly easy to create software for/in/with VR with aid of modern game engines
• New VR hardware can immerse people in a virtual scene
• Challenges:
  ○ Cope with photogrammetry problems
  ○ Usability Testing the usability tests

• Find ways to apply VR to elderly care
Thanks for listening and enjoy the video.