VIRTUAL REALITY: THEORY AND PRACTICE

FINAL EXAM – 2024 WINTER – GIUSEPPE TURINI

EXAM

Instructions

- This exam is take-home, open-book, open-notes, individual (no collaboration allowed).
- Each part indicates the points awarded if correctly answered (partial credit available).
- The exam grade is in 100/100, but it will be converted in the appropriate range linearly.
- Submit your solution as a single PDF file, via email using your academic email account.
- The submission deadline is: Friday 1 March 2024, before the end of the day.

Exercise 1 (100 points)

Create a document describing the design of a virtual reality system of your choice.

Use the concepts and terminology learned in lessons 1-4 of the course.

Reference any hardware device included in your design.

Include a brief rationale and budget, when appropriate.

Follow best practices for immersion/comfort/safety, and use a user-centered design.

These are the technical requirements that each document should follow:

a The document should be 4-6 pages long, including a title and the author name (5 points).

b The document should include a *"Design Concept"* section briefly describing the core idea driving the design of the VR system (5 points).

c The document should include a *"VR System Design"* figure (see examples in Lesson 2), including in the figure or in the caption: (1) all hardware, (2) standing/seated modality, (3) user workspace size, and (4) interaction/locomotion information (5+5+5+5 points).

d The document should include a *"Stereo Visualization"* section briefly describing the visualization provided by the VR system, including: (1) stereo camera configuration (left/right camera separation, FOV, etc.), and (2) virtual content design (comfortable viewing distance, peripheral zones, curiosity zone, text readability, etc.) (5+5 points).

e The document should include a *"Interactions and User Interface"* section briefly describing the interactions and UI included in the VR system, including: (1) necessary tracking (VR controllers, hand-finger, gestures, etc.), (2) an example of interaction (affordance, signifier, feedback, reticle, etc.), and (3) an example of in-game user interface (UI elements, diegetic, interaction zone, etc.) (5+5+5 points).

f The document should include a *"VR Locomotion"* section briefly describing the physical and artificial locomotions supported by the VR system, including: (1) necessary tracking (inside-out, motion tracking, wearables, etc.), (2) physical locomotion supported (user workspace, standing/seated modality, etc.), and (3) artificial locomotion supported (avatar movements, teleportation, etc.) (5+5+5 points).

g The document should include a *"In-Game UI Example"* figure (see examples in Lesson 3), including in the figure or in the caption: (1) the UI, (2) the interaction modality (gaze, raycasting, etc.), and (3) the user feedback (color, haptic, etc.) (5+5+5 points).

h The document should include a *"Artificial Locomotion Example"* figure (see examples in Lesson 4), including in the figure or in the caption: (1) the in-game VR view, (2) the artificial locomotion controls (thumbstick, buttons, etc.), and (3) the artificial locomotion challenges (seated mode, jumping, etc.) (5+5+5 points).

Note For any clarification, contact the instructor via email or during the last course lesson.

SUBMISSION

Submission

Send an email to the instructor (gturini@kettering.edu) using your academic email.

The email subject should be: *"Ph.D. Course "Virtual Reality" – Submission Final Exam"*.

Include your document in the attachment as a PDF file.

Deadline

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