Excursion: Applications of Computer Vision

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Organisation of the Excursion

- Excursion topic: Augemented Reality Glasses
- Company: SNAP
- You **have to** visit the excursion to pass the course

Image taken from: https://www.spectacles.com/

Augmented Reality

- Definition: AR overlays digital content onto the real-world environment in real-time.

- How AR Works:
  - Captures real-world data (camera input)
  - Processes data using computer vision algorithms
  - Renders and displays augmented content seamlessly

- Examples:
  - Pokemon GO
  - Microsoft Hololens
  - Meta Orion Glasses
  - Meta Quest? (Yes/No)
  - Apple Vision Pro (Yes/No)

Augmented reality

- Computer Vision
  - Environment mapping
  - Object tracking
  - Alignment of virtual objects with real-world coordinates
  - Hand pose estimation
  - Gesture tracking
  - Object recognition
  - Depth from stereo

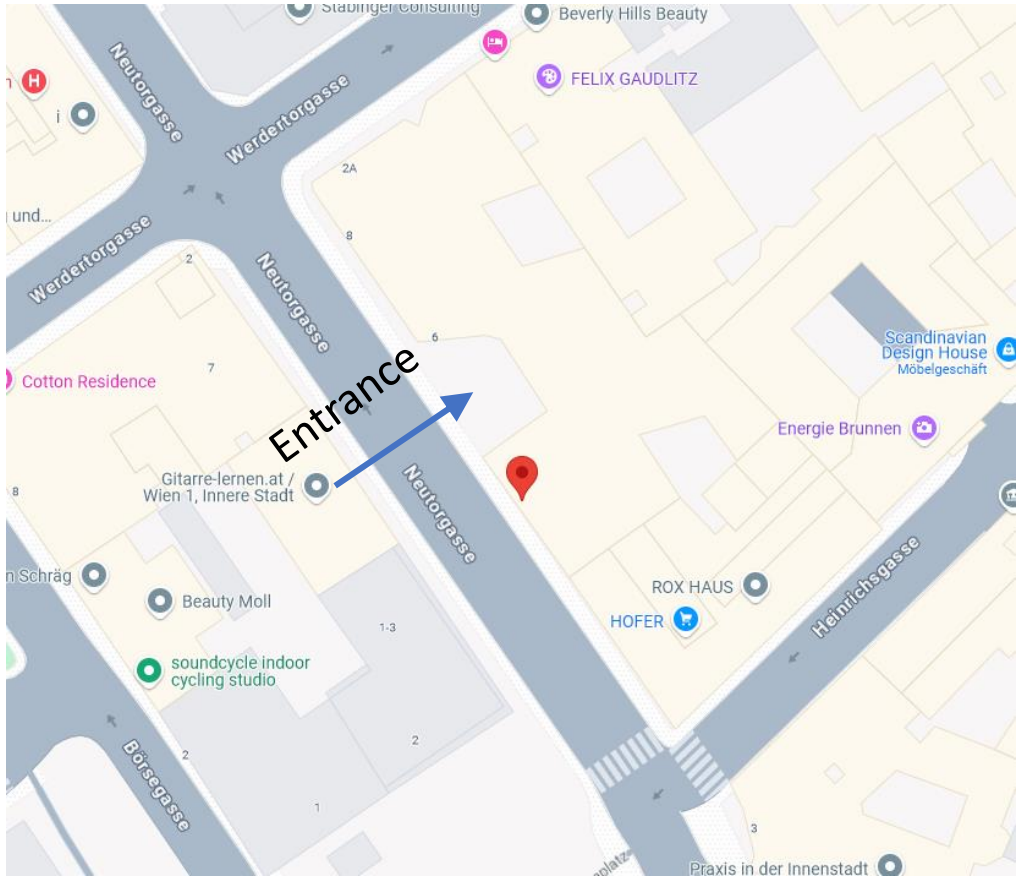
- Others
  - Display technology
  - Computer graphics (low latency!)

Snap spectacles

- 226 grams
- Four cameras for hand tracking
- 46 degree of field
- 37 pixel-per-degree resolution (100 inch display 10 feet away
- Snapdragon processors
- 45 min battery runtime

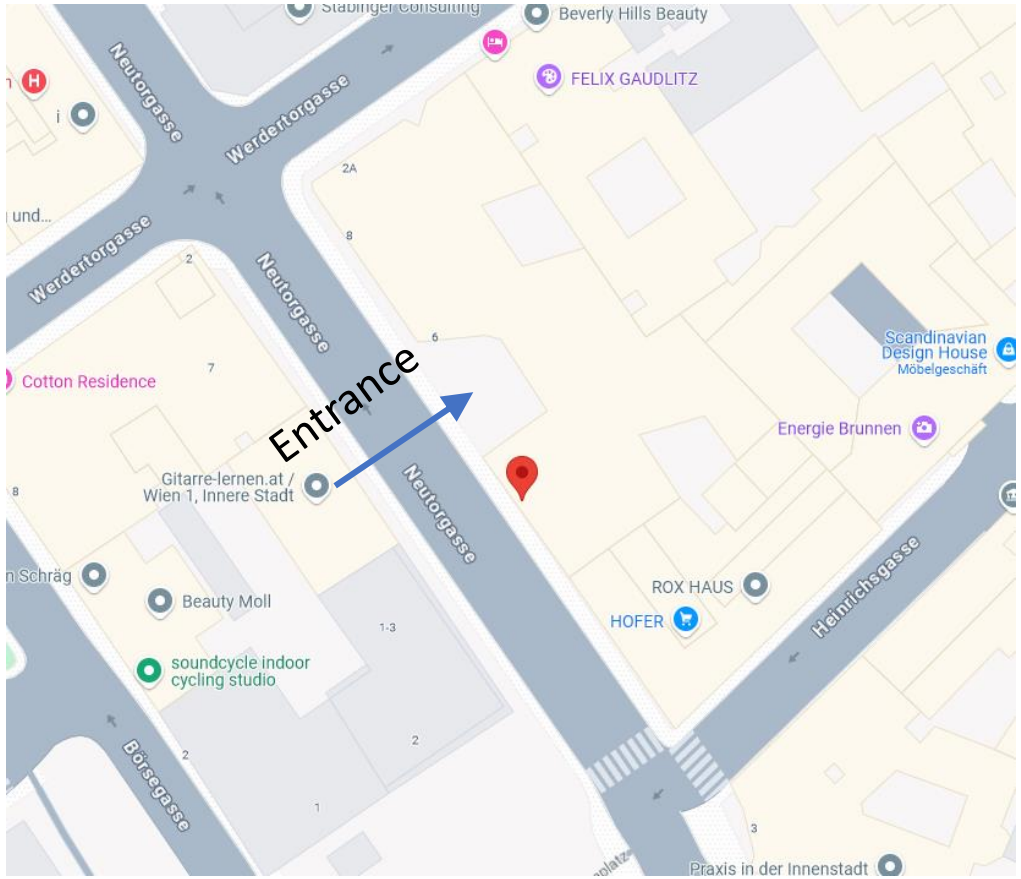
Organisation of the Excursion

- Excursion date: **FRI 22.11. 14:00-16:00**
- We will meet in front of **Neutorgasse 4-8/3rd Floor, 1010 Wien.**
- After Excursion you have to
  - Create a written report
  - Create a presentation



Organisation of the Excursion

- Schedule:
  - **14:15 Introduction**
  - **14:45 Office Tour**
  - **15:00 Demo Session+**



During the excursion

- If you feel sick or cannot attend due to other reasons contact me (mwoedlinger@cvl.tuwien.ac.at)
- Ask questions (!!)

Written Report

- **4 pages** per student including references
- No generic „excursion summary“
- Pick a problem related to the excursion.
  - What is the problem that needs to be solved?
  - How was computer vision used to solve it?
- Don‘t generate the report with chatGPT …
- Enter your topic here and ensure that no one has the same topic: https://docs.google.com/spreadsheets/d/1dT5GDq90QVFV52qQLSlxnbBRA_D2sg7HcbLlbC3J8xk/edit?usp=sharing

Written Report

- Structure:
  - Introduction
  - Problem statement
  - Solution/discussion of state-of-the-art approaches
  - Conclusion
- Due Dates
  - First draft: 13.01.2025
  - Final report: 27.01.2025
- Submit to: **TUWEL**

Examples for report topics

- Object tracking
- Hand tracking
- Facial recognition and emotion detection
- Object recognition
- Depth estimation from stereo vision systems
- Simultaneous Localization and Mapping (SLAM)
- Environment Mapping and Scene Reconstruction
- Optical Flow and Motion Estimation
- Marker Based vs . Markerless Tracking Techniques
- Pose estimation
- Visual Odometry for Motion Tracking
- Camera Calibration and Distortion Correction in AR
- Augmented Reality for Low-Light Environments

Presentation

- Max **8 min** per person
- Due Date: 27.01.2025

Summary of Tasks

- Find and describe computer vision applications
- Present the results
  - Written document (4 pages)
  - Presentation (max. 8 minutes per student)

Schedule

11.11.2024 (today)	**1. Excursion exercise**: Details on excursion, work plan, work flow, preparations
22.11.2024 14:00-16:00	**2. Exkursion exercise**: Excursion to SNAP
20.01.2025	**3. Excursion exercise**: Discussion of the 1st document, improvements, planning of presentation
27.01.2025	**Final Presentations**: 1 Document submission 1 Presentation submission

DEADLINE 1st DRAFT
13.01.2025
Submission on TUWEL

Thank you

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https://cvl.tuwien.ac.at/course/applications-of-computer-vision-ex/