Sweat and Survive - the VR Edition

Kick-Off

Felix Kosmalla & Dr. André Zenner

Saarland University & DFKI

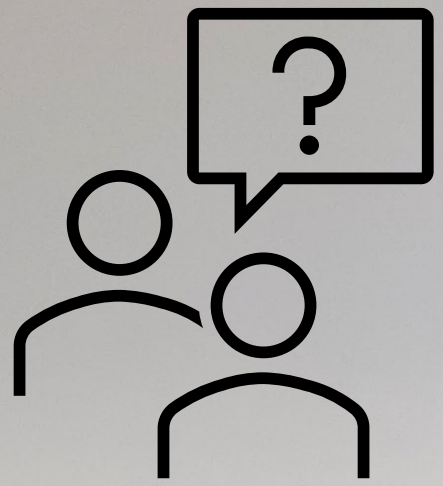
15. April 2025

UMTL

dfki ai Deutsches Forschungszentrum für Künstliche Intelligenz *German Research Center for Artificial Intelligence*

SIC Saarland Informatics Campus

UNIVERSITÄT DES SAARLANDES



Who are you?

Agenda:

~~Introduction Round~~

Goals & Content of the Seminar

Organisation

How to:
- Find Scientific Literature
- Write a Concept Document

Q&A

(Learning) Goals of the Seminar

Conceptualization, implementation and evaluation of a VR fitness application based on scientific literature.

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Conceptualization, implementation and evaluation of a VR fitness application based on scientific literature.

VR Fitness Application

Combining classical (body weight) exercises with virtual threats to motivate users.

low | mid | high

Danger Level

But does it work?

Phases

during this semester

Phases

during this semester

today

Basics

How To

- Search for Scientific Literature
- Ideate and Write a Concept

Find Groups…
… and decide for topic

Ideate and Document Concept
(Draft until 27.04.; Final Concept until 07.05)

Hands-On

How To

- Unity 3D & VR

Implementation of Prototype…
… based on concept

Mid-Term Presentation
of concept and progress
(on 03.06.)

Evaluation & Documentation

How To

- User Study
- Write a project report

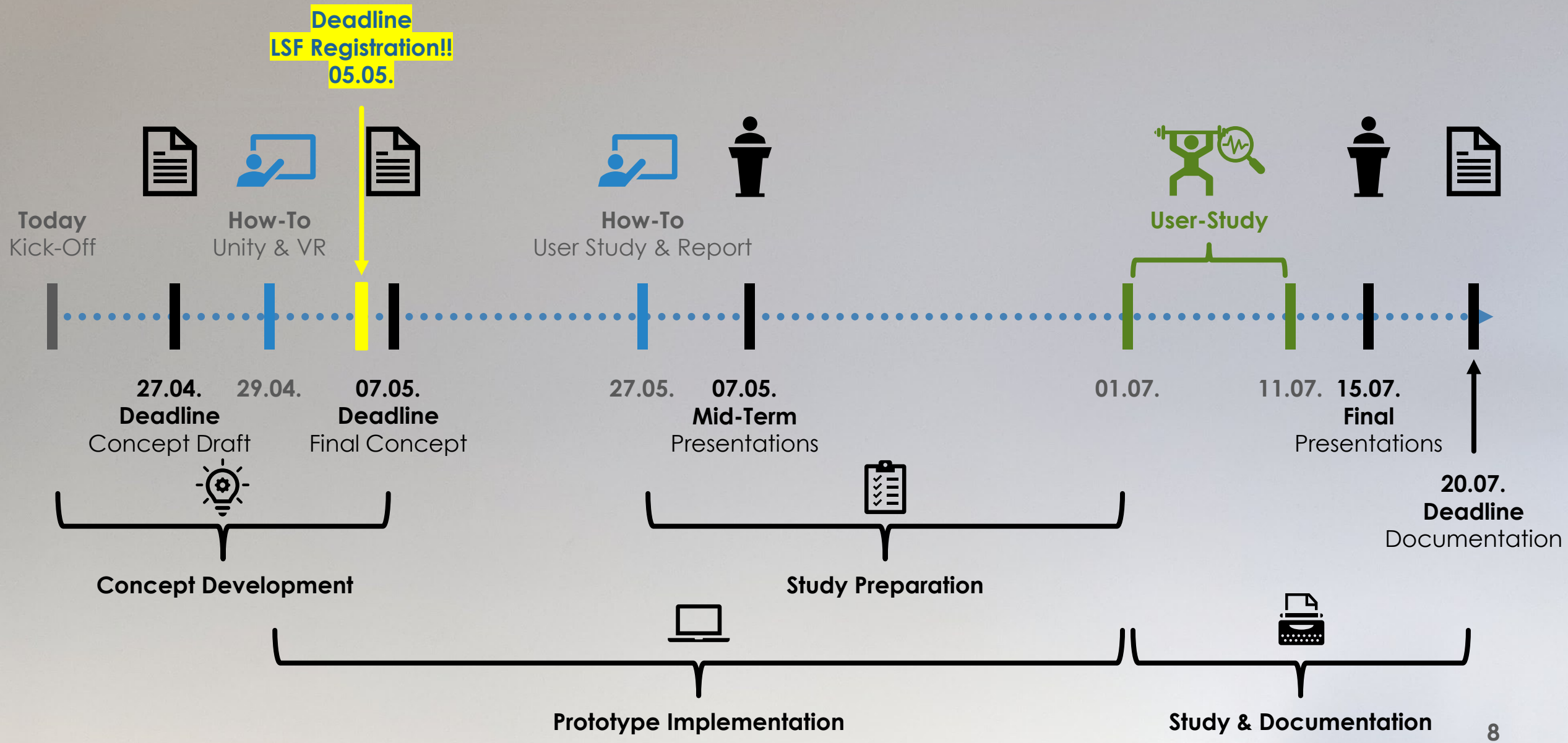
Conduct User Study ….
… with the prototype
(from 01.07. until 11.07.)

Participate in User Studies...
… of your fellow students

Final Presentation and Report
(on 15.07.) **(until 20.07.)**

Phases

during this semester



Each group should target a different exercise

Leg Mobilisation

Balancing

Squatting

Hanging/Pull-Ups

....

Inspiration:

Mueller et al. 2012. Hanging off a bar.
CHI '12 Extended Abstracts. ACM.
https://doi.org/10.1145/2212776.2212384

Inspiration:

London Tourists Try Richie's Plank Experience On Oculus Quest
Source: YouTube Video by Virtual Reality Oasis
https://youtu.be/BQXa8qQK7ow?si=SwvO4uQXJwN-sMJZ

Inspiration:

Kosmalla et al. 2022. InfinityWall – Vertical Locomotion in Virtual Reality using a Rock Climbing Treadmill. CHI '22 Extended Abstracts. ACM. https://doi.org/10.1145/3491101.3519654

Inspiration:

Dietz et al. 2022. Walk This Beam: Impact of Different Balance Assistance Strategies and Height Exposure on Performance and Physiological Arousal in VR. VRST '22. ACM.
https://doi.org/10.1145/3562939.3567818

Group and Topic Finding….

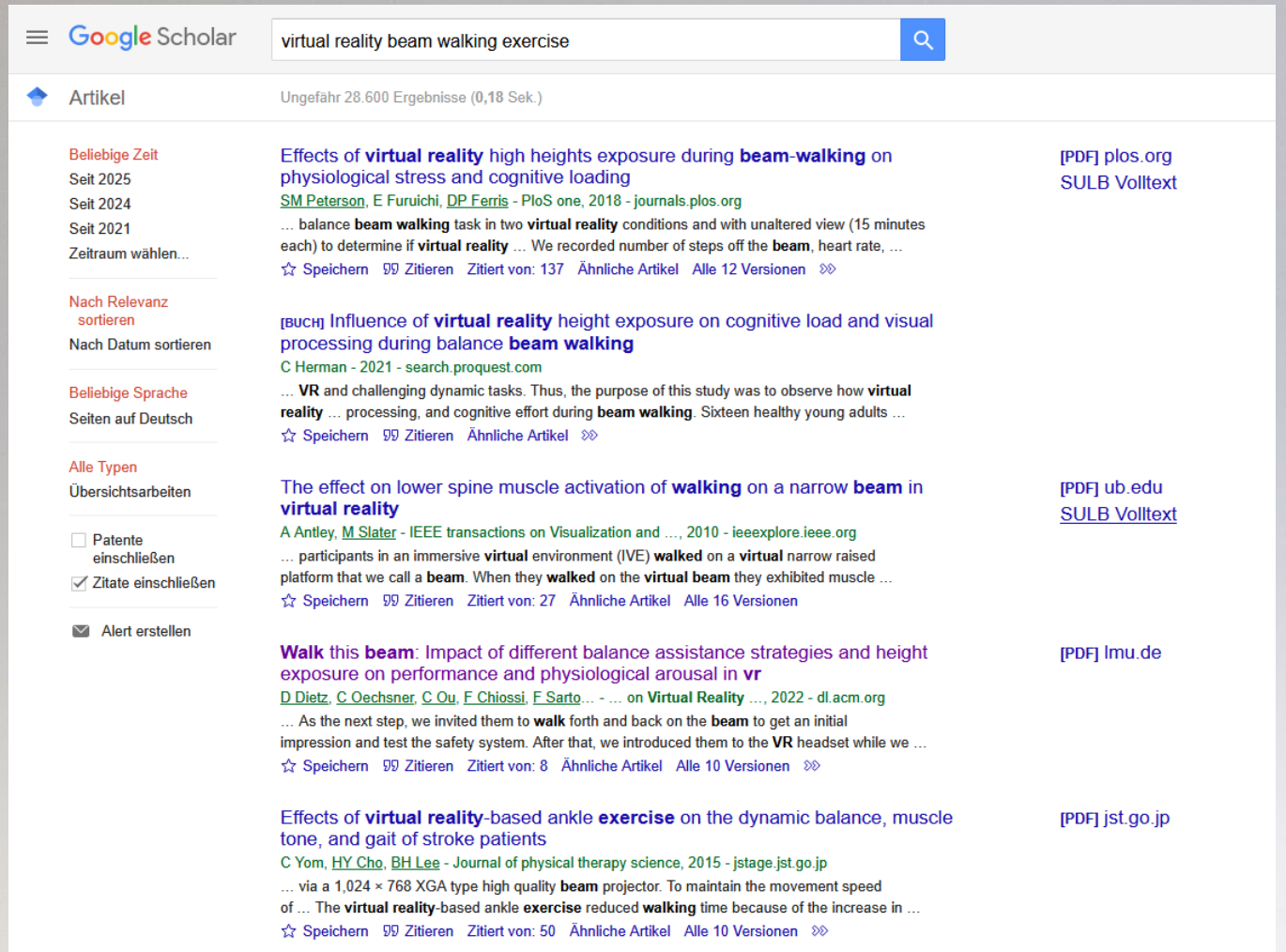
…. after this presentation

Look for Scientific Literature

1. **Define Your Research Question**
2. **Identify Keywords** (also list synonyms)
3. **Choose Databases**
    - Select appropriate academic databases and online libraries for your search. Common are:
        1. ACM Digital Library
        2. IEEE Xplore
        3. Google Scholar

Look for Scientific Literature

Look for Scientific Literature



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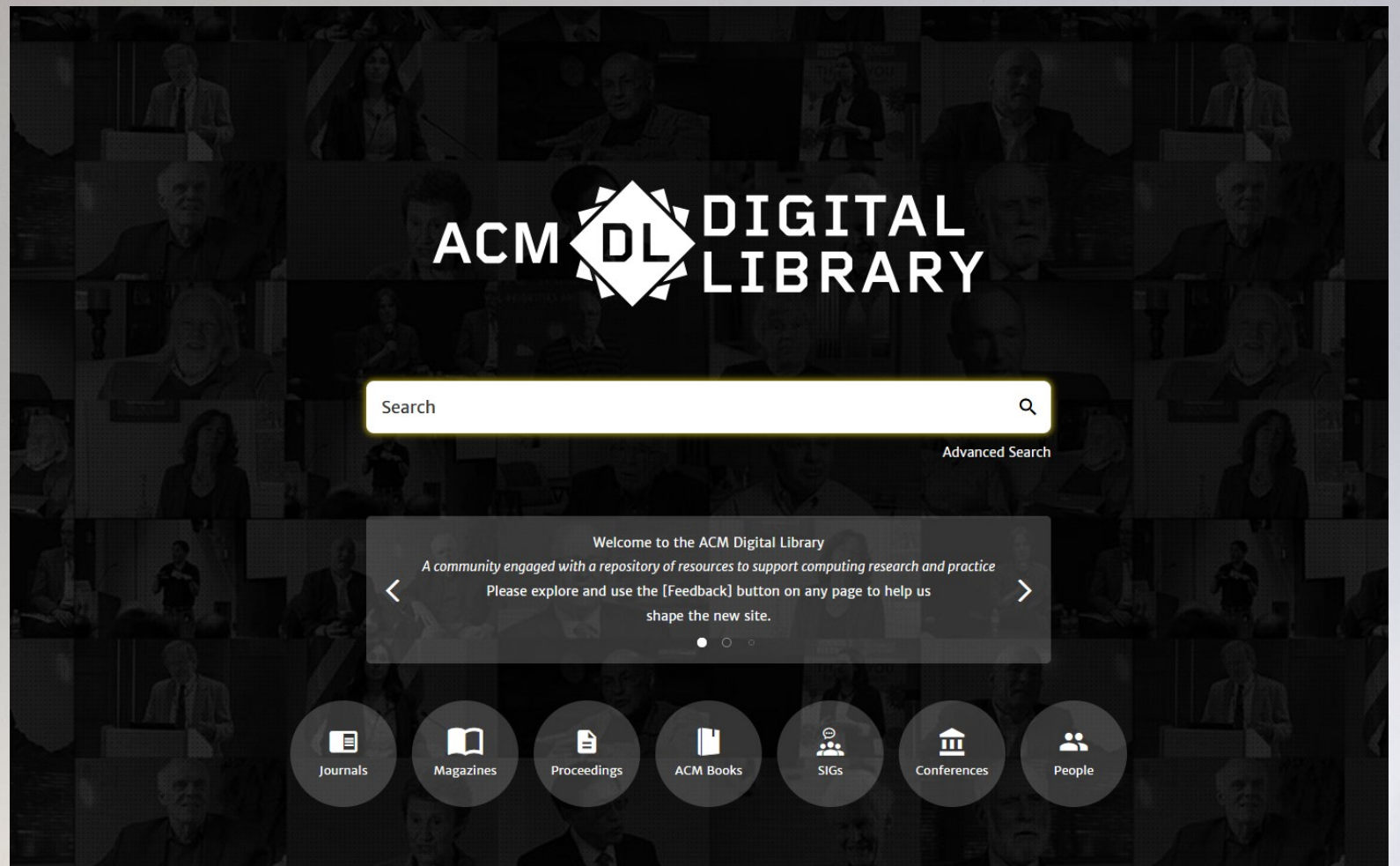

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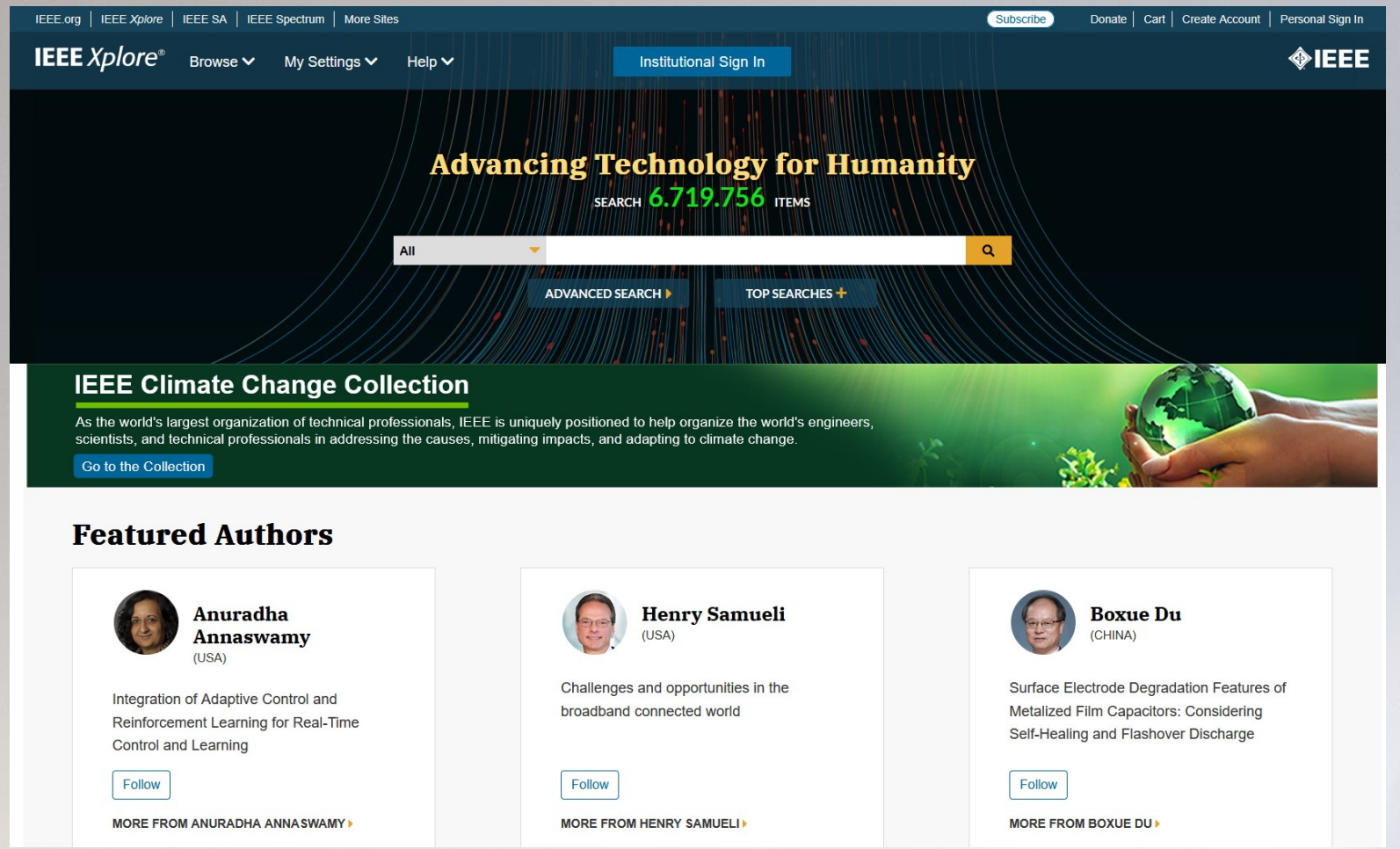

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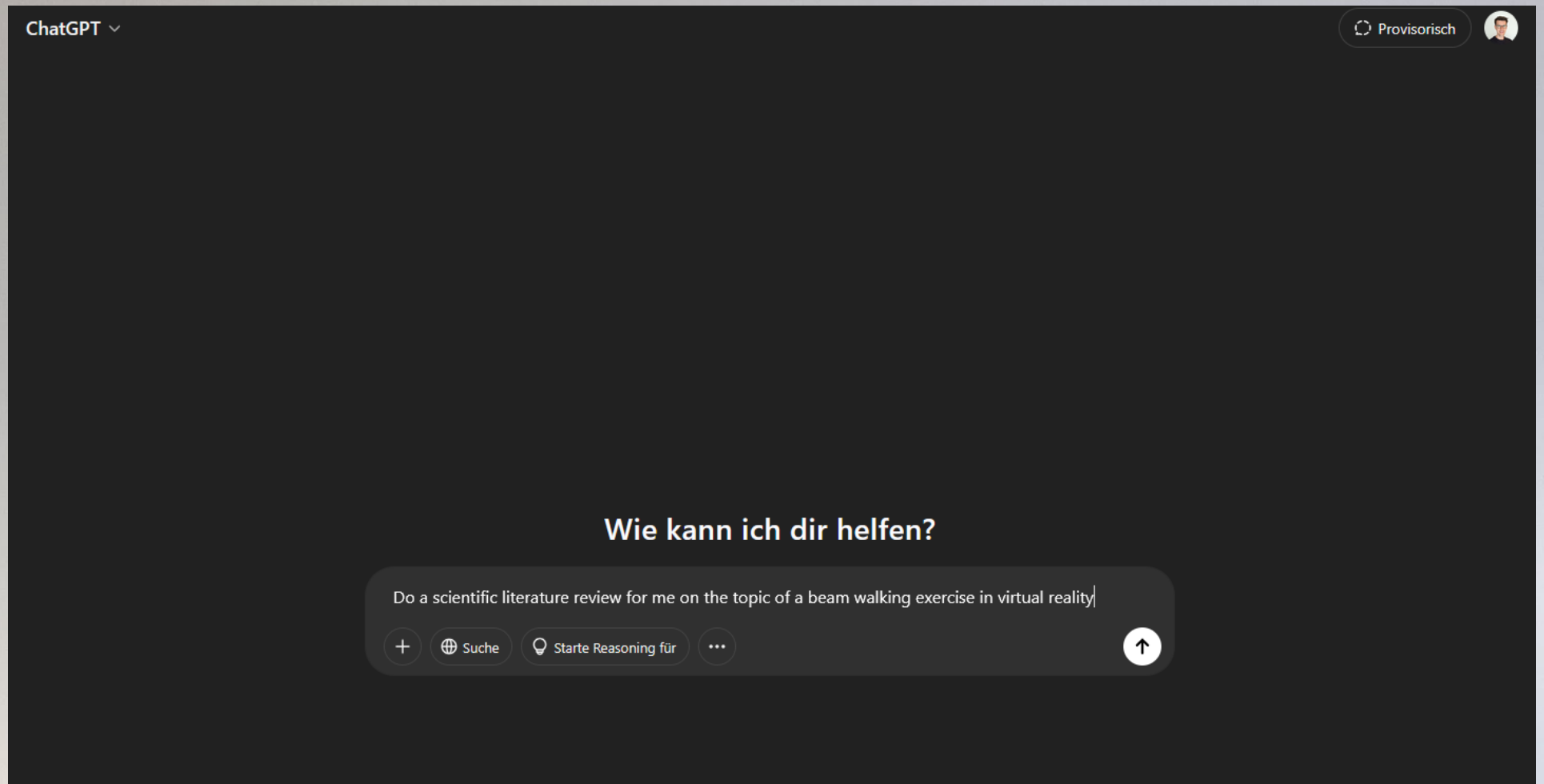
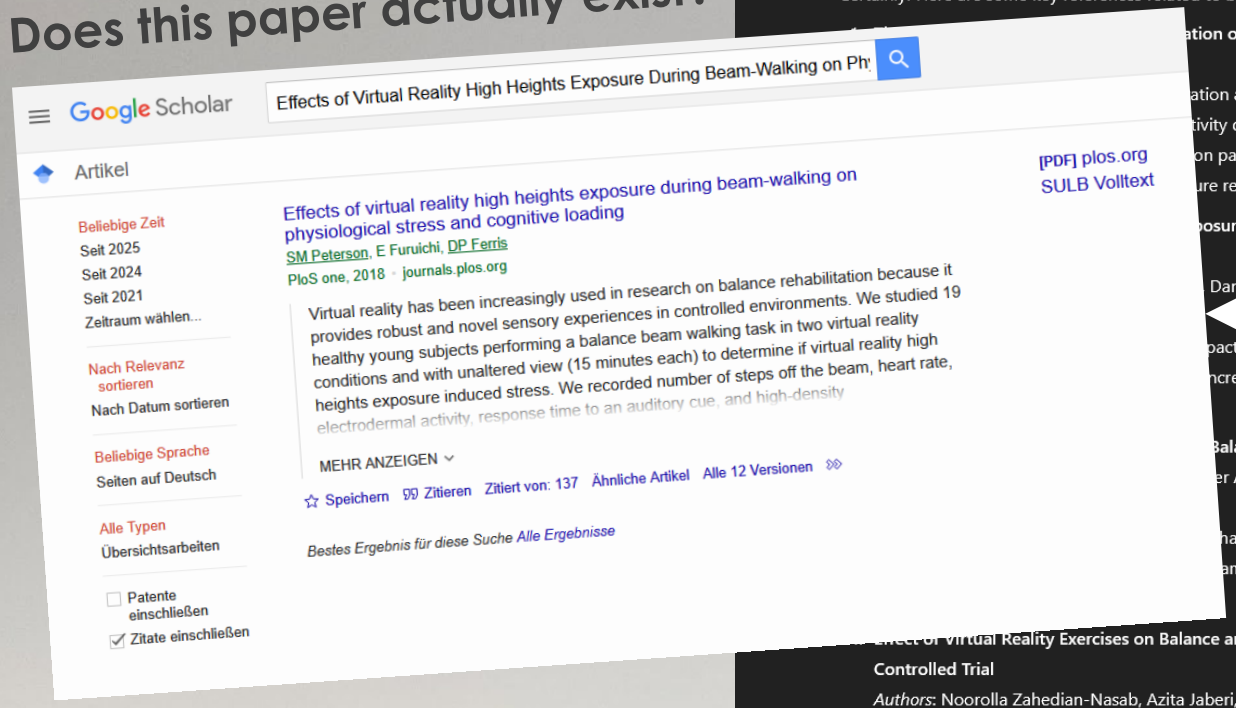
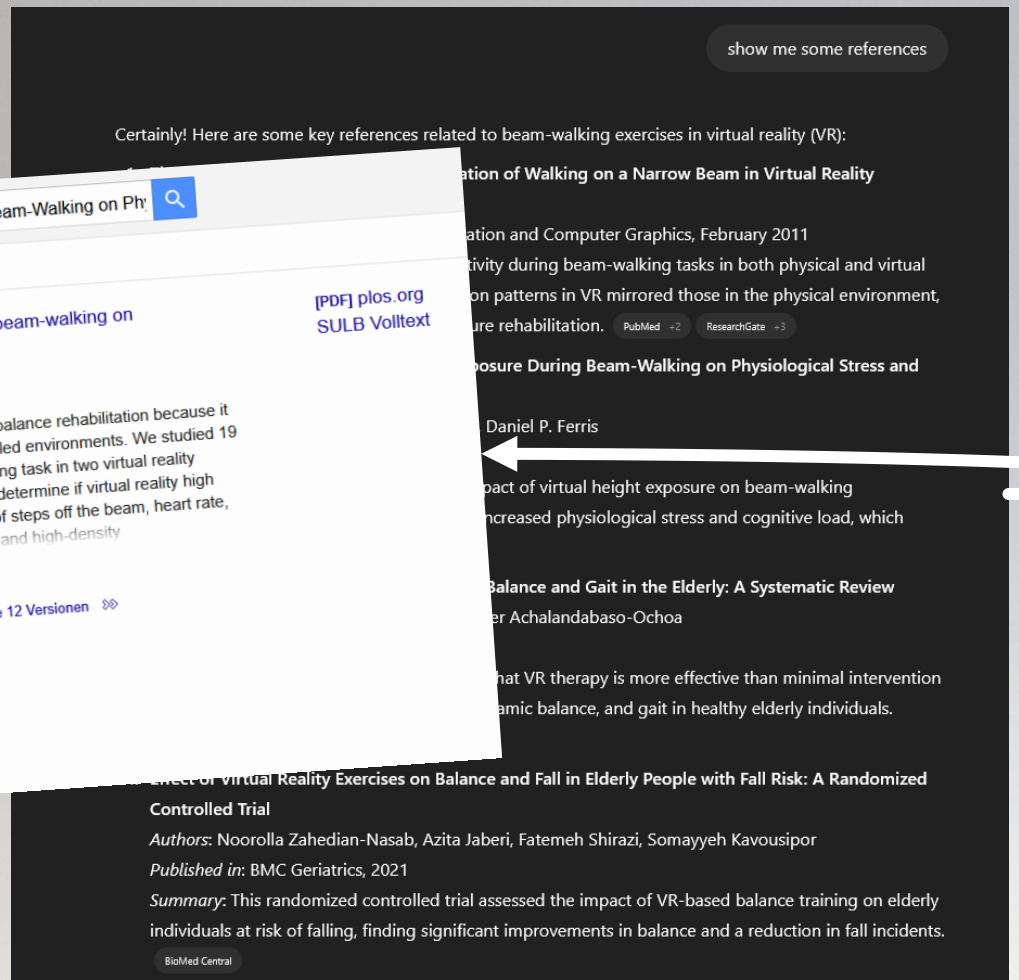


Look for Scientific Literature

Does this paper actually exist?

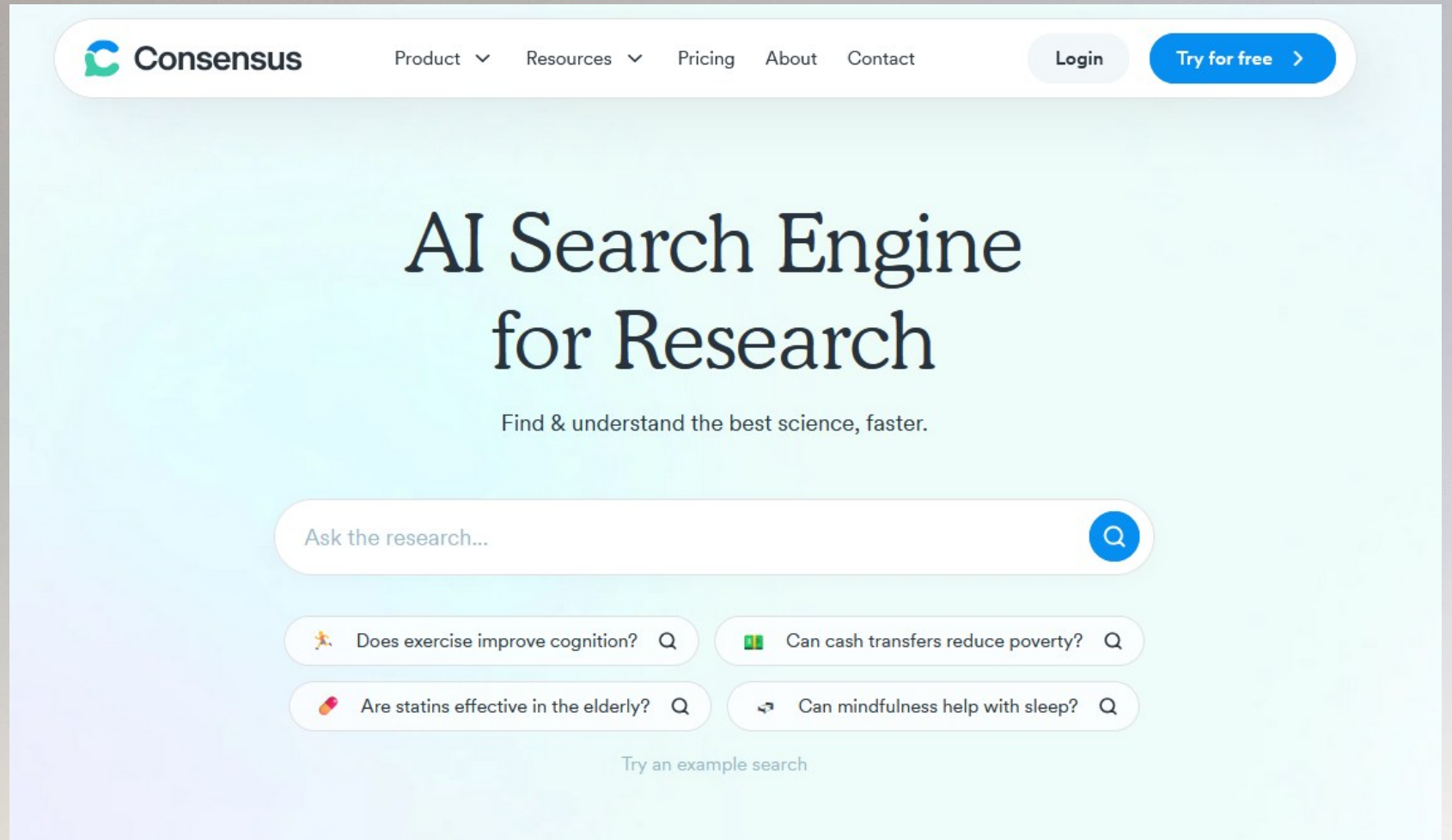




Be very careful:
LLMs can hallucinate papers that do not actually exist!

If you use LLMs
→ always double-check!!

Look for Scientific Literature



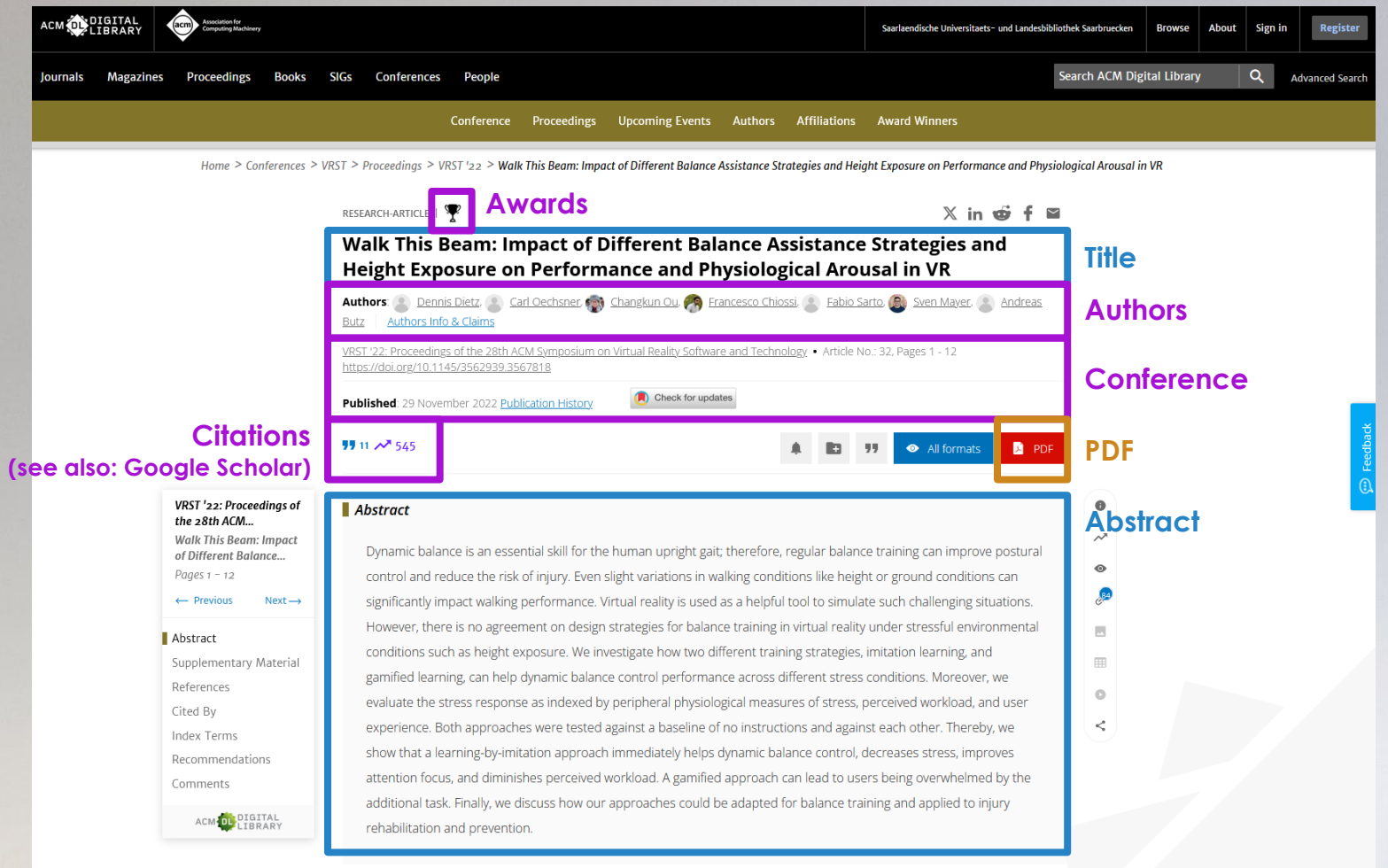
Better:
LLMs designed for academic research.

But still:
If you use LLMs
→ always double-check!!

Look for Scientific Literature

1. **Define Your Research Question**
2. **Identify Keywords** (also list synonyms)
3. **Choose Databases**
    - Select appropriate academic databases and online libraries for your search. Common are:
        1. ACM Digital Library
        2. IEEE Xplore
        3. Google Scholar
4. **Conduct the Search**
5. **Review Abstracts and Titles** (identify the most important papers)
6. **Read Full Texts**
7. **Evaluate Relevance, Credibility, and Quality**
    - peer-reviewed papers
    - reputable conferences/journals (e.g. ACM CHI, ACM UIST, ACM VRST, ACM SUI, IEEE VR, IEEE ISMAR, …)
8. **Check References for Further Relevant Papers**

Look for Scientific Literature



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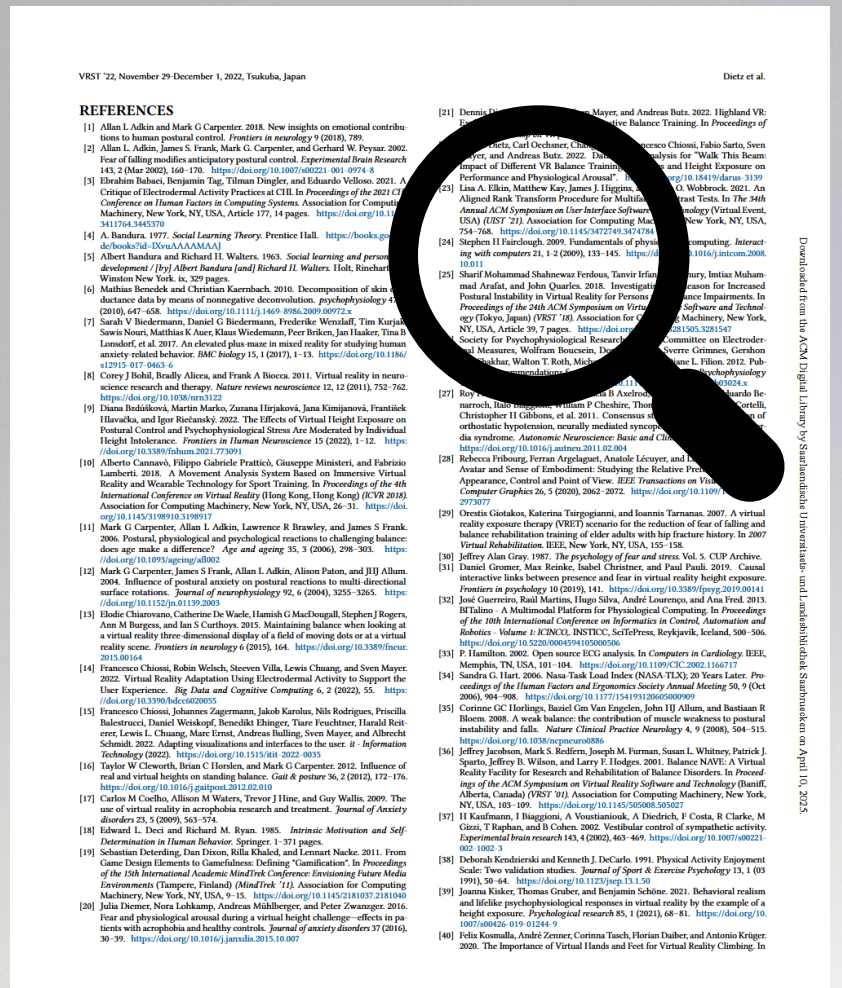

VRST '22, November 29-December 1, 2022, Tsukuba, Japan Dietz et al.

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... Dietz, Carl Oechsner, Chi... ...ncesco Chiossi, Fabio Sarto, Sven ...yer, and Andreas Butz. 2022. Dat... ...alysis for "Walk This Beam: ...mpact of Different VR Balance Trainin... ...and Height Exposure on ...Performance and Physiological Arousal". ...g/10.18419/darus-3139

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Scan for further exciting & relevant papers!

Look for Scientific Literature

http://www.conferenceranks.com/

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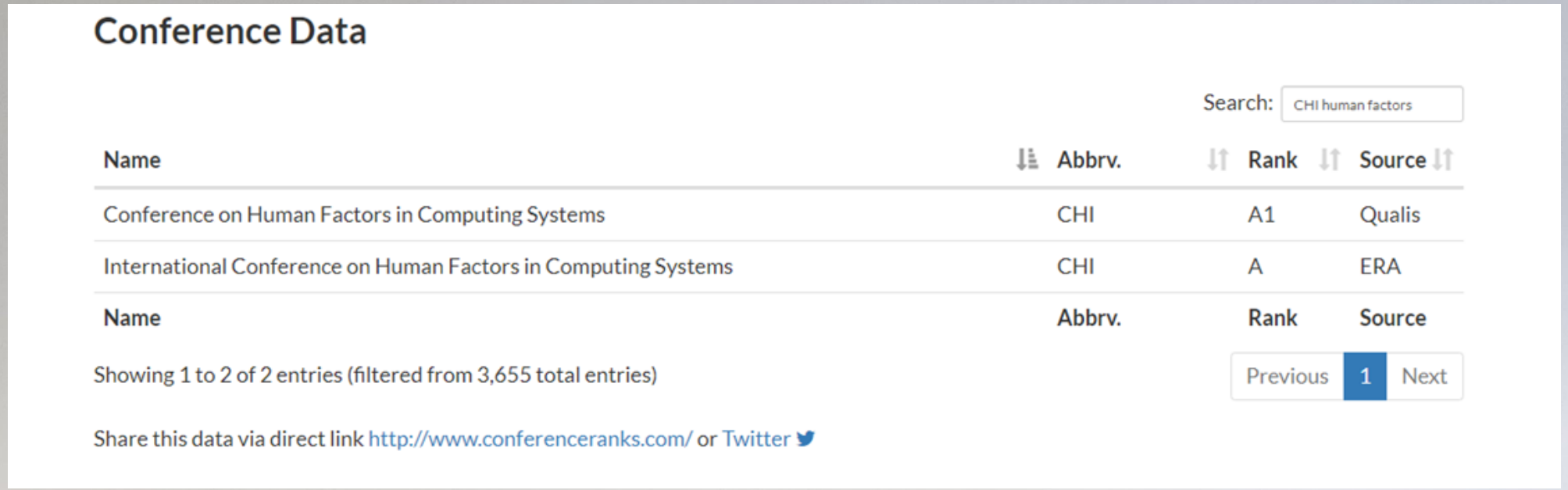


Conference Data

Search: CHI human factors

Name	Abbrv.	Rank	Source
Conference on Human Factors in Computing Systems	CHI	A1	Qualis
International Conference on Human Factors in Computing Systems	CHI	A	ERA
Name	**Abbrv.**	**Rank**	**Source**

Showing 1 to 2 of 2 entries (filtered from 3,655 total entries)

Previous 1 Next

Share this data via direct link http://www.conferenceranks.com/ or Twitter

How to write a concept

It's basically a project proposal!

Your goal: Convince the reader (us), that this is a good idea and worth 7CP!

- No bullet points!
- Good Quality of Writing
- Sketches

Basics | Topics | Groups | How To | **Concept Document**

UMTL Research People Mediainformatics Teaching Jobs/Interns Student FAQ Contact

Ubiquitous Media Technology Lab
Seminar: Sweat and Survive - the VR Edition

UMTL / Teaching / Summer 2025 / Seminar: Sweat and Survive - the VR Edition

SUMMER 2025

- Proseminar: Virtual Reality - Grundlagen und Stand der Forschung
- Seminar: Sweat and Survive - the VR Edition
- Seminar: GameCraft: Spielmechaniken und Spiele-Prototyping

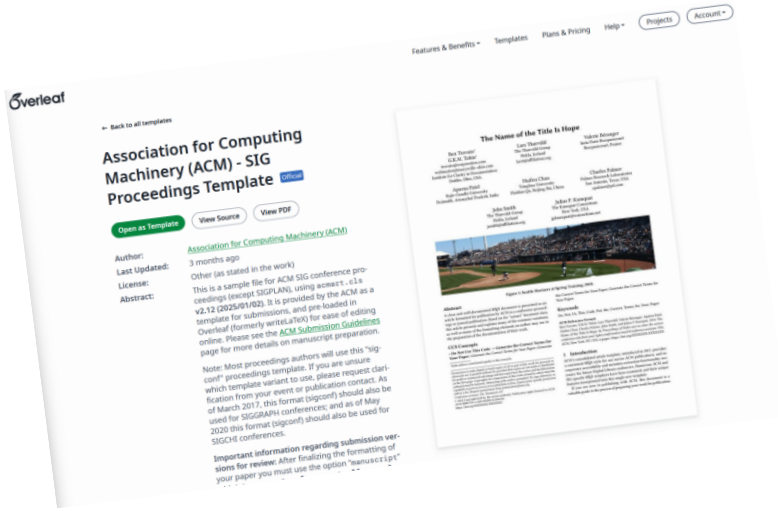
Seminar: Sweat and Survive - the VR Edition

Goal of the Seminar

In this practical seminar, small groups of students (3) will develop a Virtual Reality (VR) fitness application with a twist. Users will be immersed in a virtual environment that guides them through a fitness exercise while motivating them

Your group's tasks will be:

- Preparing your prototype for a user study
- Conducting the user study & analyze the results
- Participating in the studies of the other groups
- Prepare and give a presentation about your fina
- Write up a final report detailing your project and



Reports

Two written reports have to be submitted in this seminar - the concept report and the final report.
Below you can find the formal requirements for these two reports and examples of how they could be structured.

While the formal requirements (template, overall length, number of cited papers) must be adhered to, you are free to deviate from the proposed structure if that makes more sense to present your project. If you deviate, however, ensure that the topics proposed in the example structures are adequately discussed in your document.

Concept Report

The written concept report should be 2-3 pages long (excluding references) and submitted as a PDF in ACM SIG format (2-column). The following LaTeX template should be used:
https://www.overleaf.com/latex/templates/association-for-computing-machinery-acm-sig-proceedings-template/bmvfhcdnxfty

A concept report could be organized like this:

1. **Motivation of the General Topic**
   - Why is the topic of the seminar important?
   - What problem is being addressed?
2. **Related Work**
   - What have other people already done/discovered in this area?
   - Review of relevant literature and previous work in VR sports applications and virtual threat scenarios.
   - Citation of at least 5 scientific papers related to the topic.
   - Online libraries for literature search (examples):
     - ACM Digital Library (https://dl.acm.org/)
     - IEEE Xplore (https://ieeexplore.ieee.org/Xplore/home.jsp)
     - Google Scholar (https://scholar.google.com/)
3. **Concept**

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     - IEEE Xplore (https://ieeexplore.ieee.org/Xplore/home.jsp)
     - Google Scholar (https://scholar.google.com/)
3. **Concept**
   - Description of the chosen sports exercise (e.g., planking, squatting, hanging on a hangbar, ...).
   - Explanation of the adrenaline-inducing threat scenario tailored to the exercise (e.g., being chased by virtual creatures, navigating through hazardous environments).
   - How the threat scenario enhances the exercise experience and induces adrenaline.
   - How will people use the system?
4. **Implementation Approach**
   - What would an implementation of your idea include?
   - Technical details of the implementation, including software and hardware used.
   - Steps taken to integrate the sports exercise with the threat scenario.
5. **Challenges**
   - What aspects need to be considered to ensure the system works and provides a good user experience?
   - Potential technical and user experience challenges.
   - Solutions and adaptations planned to overcome these challenges.
6. **Evaluation Idea**

- Citation of at least 5 scientific papers related to the topic.
- Online libraries for literature search (exam
  - ACM Digital Library (https://dl.acm.o
  - IEEE Xplore (https://ieeexplore.ieee
  - Google Scholar (https://scholar.goog

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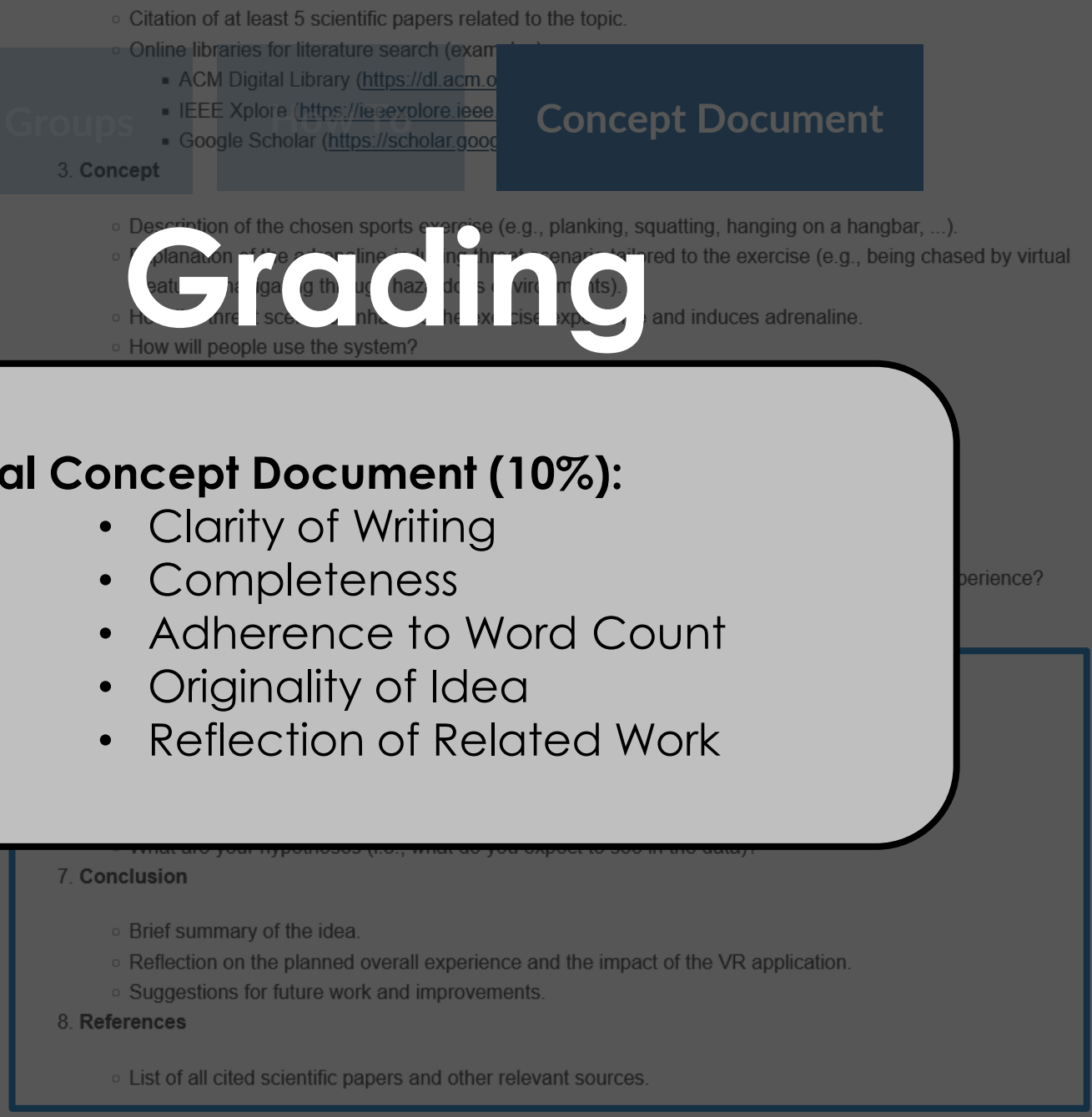
   - Potential technical and user experience challenges.
   - Solutions and adaptations planned to overcome these challenges.
6. **Evaluation Idea**
   - How could you demonstrate that the system actually solves the problem?
   - Methodology of the user study conducted with the prototype.
   - Description of the planned procedures.
   - What data do you plan to collect and how.
   - What are your hypotheses (i.e., what do you expect to see in the data)?
7. **Conclusion**
   - Brief summary of the idea.
   - Reflection on the planned overall experience and the impact of the VR application.
   - Suggestions for future work and improvements.
8. **References**
   - List of all cited scientific papers and other relevant sources.

Grading

Final Concept Document (10%):

- Clarity of Writing
- Completeness
- Adherence to Word Count
- Originality of Idea
- Reflection of Related Work



Final Report

Introduction to the Unity 3D-Engine - 29.04.2025

Available Hardware

Vive Pro Wireless + Trackers

Banana-Lab

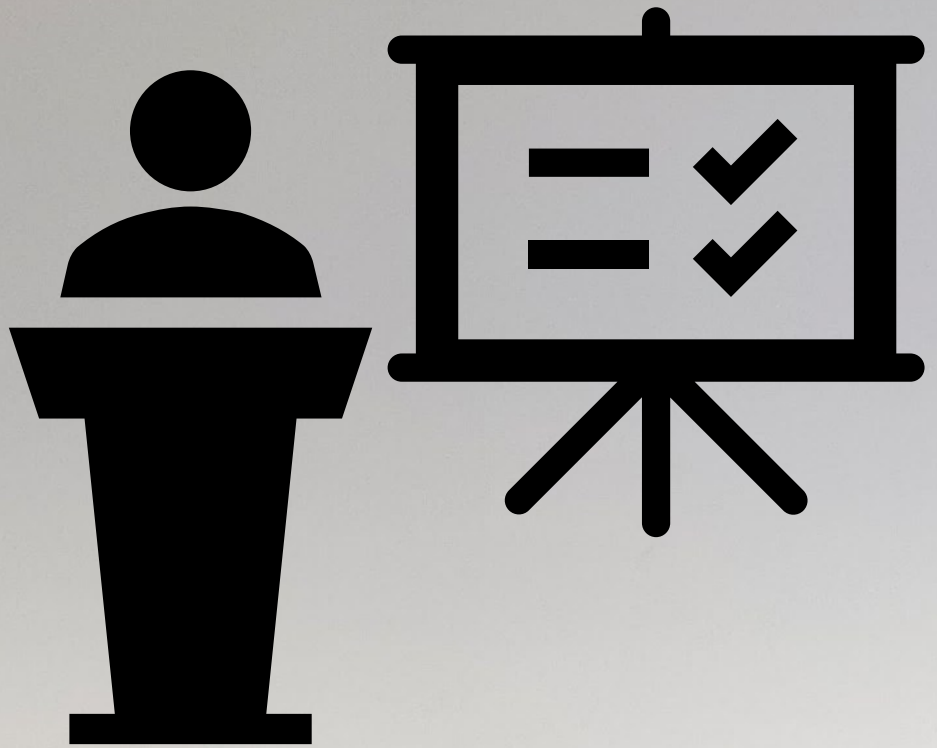
At the DFKI

You can book slots to work there – details TBA

Grading

Final Prototype (40%):

- Usability
- Stability
- Design
- *Documentation*
  - Clarity and Readability
  - Technical Accuracy
  - Visual Presentation



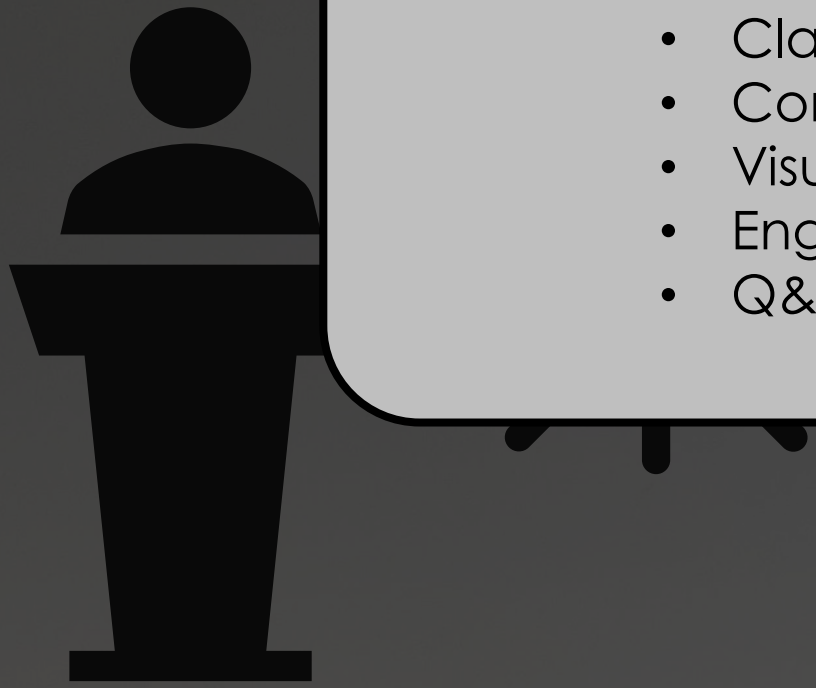
Mid-Term Presentation

Talk about:
- concept
- current development state

Content of the talk:
- similar to concept document
- show current state
- images/videos of concept & prototype

→ everyone should present!
→ balanced speaking time!

Grading



Mid-Term Presentation (10%):

- Clarity and Organization
- Content Quality
- Visual Aids
- Engagement and Delivery
- Q&A Handling

Mid-Term Presentation

state

ocument

- images/videos of concept & prototype

→ everyone should present!
→ balanced speaking time!

Introduction to User Studies & Scientific Reports - 27.05.2025

(Learning) Goals of the Seminar

Conceptualization, implementation and evaluation of a VR fitness application based on scientific literature.

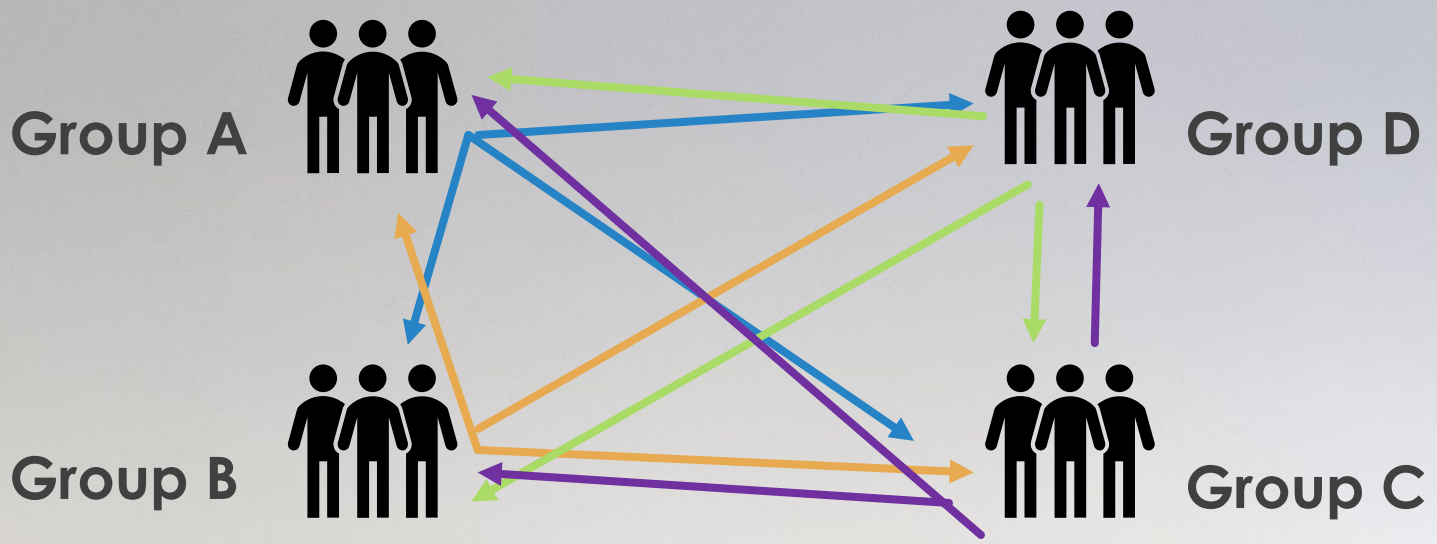
VR Fitness Application

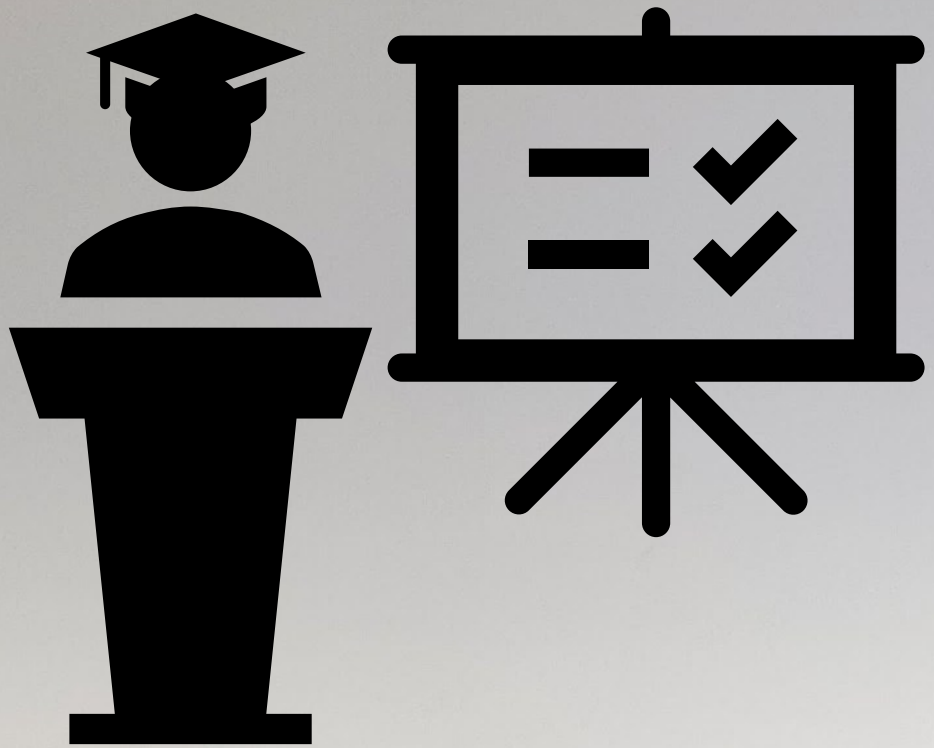
Combining classical (body weight) exercises with virtual threats to motivate users

But does it work?

Evaluation of your Prototype

Your goal: Prototype needs to be working well enough to execute a user study.





Final Presentation

Talk about:
- original concept & changes to it
- final prototype
- user study & results
- future work

Content of the talk:
- similar to final report
- images/videos of final prototype
- live demo in the Banana Lab

→ everyone should present!
→ balanced speaking time!

Grading

Final Presentation (20%):

- Clarity and Organization
- Content Quality
- Visual Aids
- Engagement and Delivery
- Q&A Handling
- Live-Demo

Final Presentation

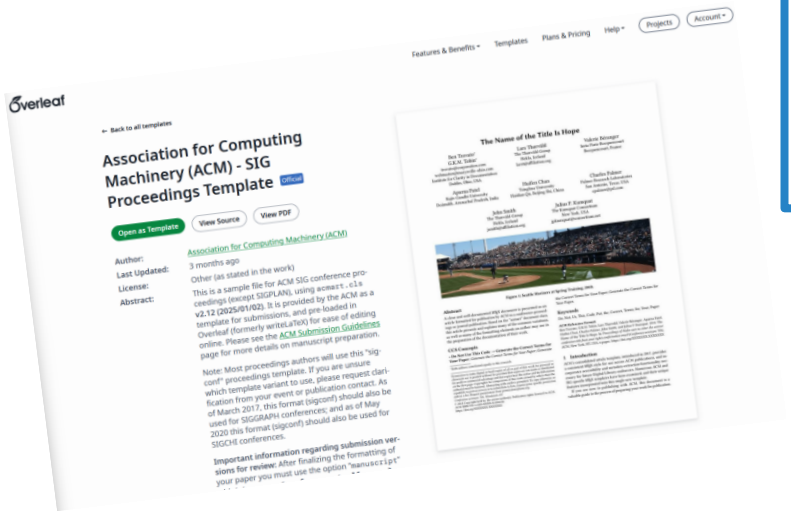
anges to it

- images/videos of final prototype
- live demo in the Banana Lab

→ everyone should present!
→ balanced speaking time!

- Reflection on the planned overall experience and the impact of the VR application.
- Suggestions for future work and improvements.

8. **References**
   - List of all cited scientific papers and other relevant sources.



Final Report

The written final report should be 3-5 pages long (excluding references) and submitted as a PDF in ACM SIG format (2-column). The following LaTeX template should be used:
https://www.overleaf.com/latex/templates/association-for-computing-machinery-acm-sig-proceedings-template/bmvfhcdnxfty

A final report could be organized like this:

1. **Introduction**
   - Brief overview of the project and its objectives.
   - Summary of the initial concept and motivation.
2. **Related Work**
   - Review of relevant literature and previous work in VR sports applications and virtual threat scenarios.
   - Citation of at least 5 scientific papers related to the topic.
3. **Concept and Implementation**
   - Detailed description of the proposed VR application.
   - Explanation of how the application allows users to perform sports exercises while experiencing high adrenaline in virtual threat scenarios.
   - Technical details of the implementation, including software and hardware used.
4. **User Study**
   - Methodology of the user study conducted with the prototype.
   - Description of the participants and the procedures followed.
   - Data collection methods and tools used.
5. **Results and Discussion**
   - Presentation of the findings from the user study.
   - Analysis of the data collected, including user feedback and performance metrics.
   - Comparison with other groups' user studies and their virtual scenarios and sports exercises.
6. **Challenges and Solutions**

The written final report should be 3-5 pages long (excluding references) and submitted as a PDF in ACM SIG format (2-column). The following LaTeX template should be used:
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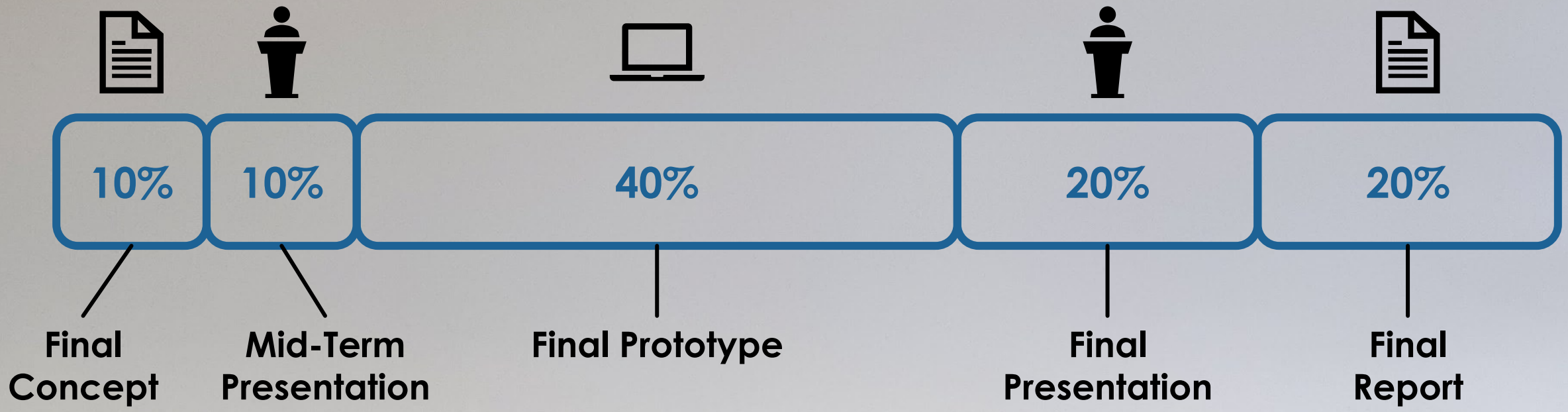
   - Presentation of the findings from the user study.
   - Analysis of the data collected, including user feedback and performance metrics.
   - Comparison with other groups' user studies and their virtual scenarios and sports exercises.
6. **Challenges and Solutions**
   - Discussion of the challenges faced during the implementation and user study.
   - Solutions and adaptations made to overcome these challenges.
7. **Conclusion**
   - Summary of the key findings and insights gained from the project.
   - Reflection on the overall experience and the impact of the VR application.
   - Suggestions for future work and improvements.
8. **References**

Grading

Final Report (20%):

- Clarity of Writing
- Completeness
- Visual Aids

Grading


10%
10%
40%
20%
20%
Final Concept
Mid-Term Presentation
Final Prototype
Final Presentation
Final Report

Organizational Stuff

Groups & Exercise Assigments

Today!

Mandatory Attendance

Exceptions
exam, illness (only with medical certificate)
No Exceptions
other lectures, tutorials, etc.

Room

VisRoom
- here -

Meeting Room Turing 1
DFKI (new part, top floor, +2)

LSF Registration

Until May 07 the latest!
No exceptions!

Organizational Stuff

We want a fair seminar for everyone!

If it's not on Git, it did not happen!

Everyone commits their own work!

Pair programming? **Add it to the commit message!**

Trying something out? **Push to a new branch!**

Wrote some text? **Better be pushed!**

Worries and fears?

Talk to us early!

- general problems
- work-balancing problems in the team
- questions
- …

Organizational Stuff

We want a fair seminar for everyone!

The rules on the website count!

(if you have questions, ask us)

Progress Control

To ensure a fair and even distribution of the work within the project groups, we require the following measures:

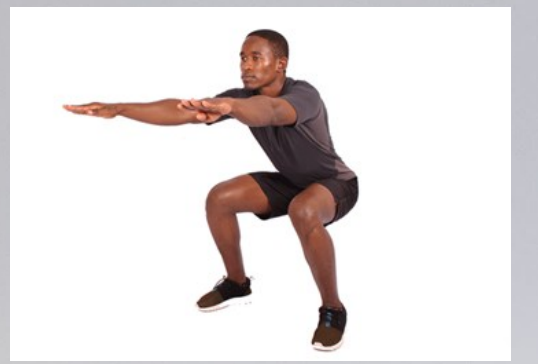
- All code has to be committed at the provided GitLab
  - Everybody commits their own work
  - When pair programming, note this in the commit message, e.g. "Implemented Feature X - André + Felix"
  - When experimenting and trying out things (that eventually might not be part of the final prototype), still commit such work in Git on a separate branch
- Sources of all written documents have to be committed at the provided GitLab (e.g. LaTex or Markdown)
  - Everybody commits their own work
  - When pair-writing, note this in the commit message, e.g. "Updated Introduction - André + Felix"

Now

Group & Topic Finding

Leg Mobilisation

Balancing



Squatting

Hanging/Pull-Ups

Next Steps

Ideate & Document Concept

Draft due by 27.04.

Final Concept due by 07.05.