Pedestrian Navigation with **Augmented Reality, Voice** and **Digital Map**

Results from a Field Study assessing Performance and User Experience

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TraffiCon Verkehrstechnik, Verkehrstelematik

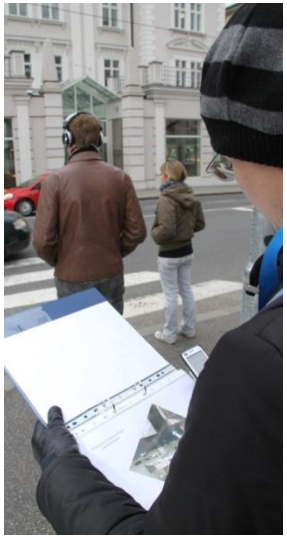
STADT : SALZBURG salzburg research

Motivation

Augmented Reality

Navit
Source: Kluge, University of Potsdam

Voice



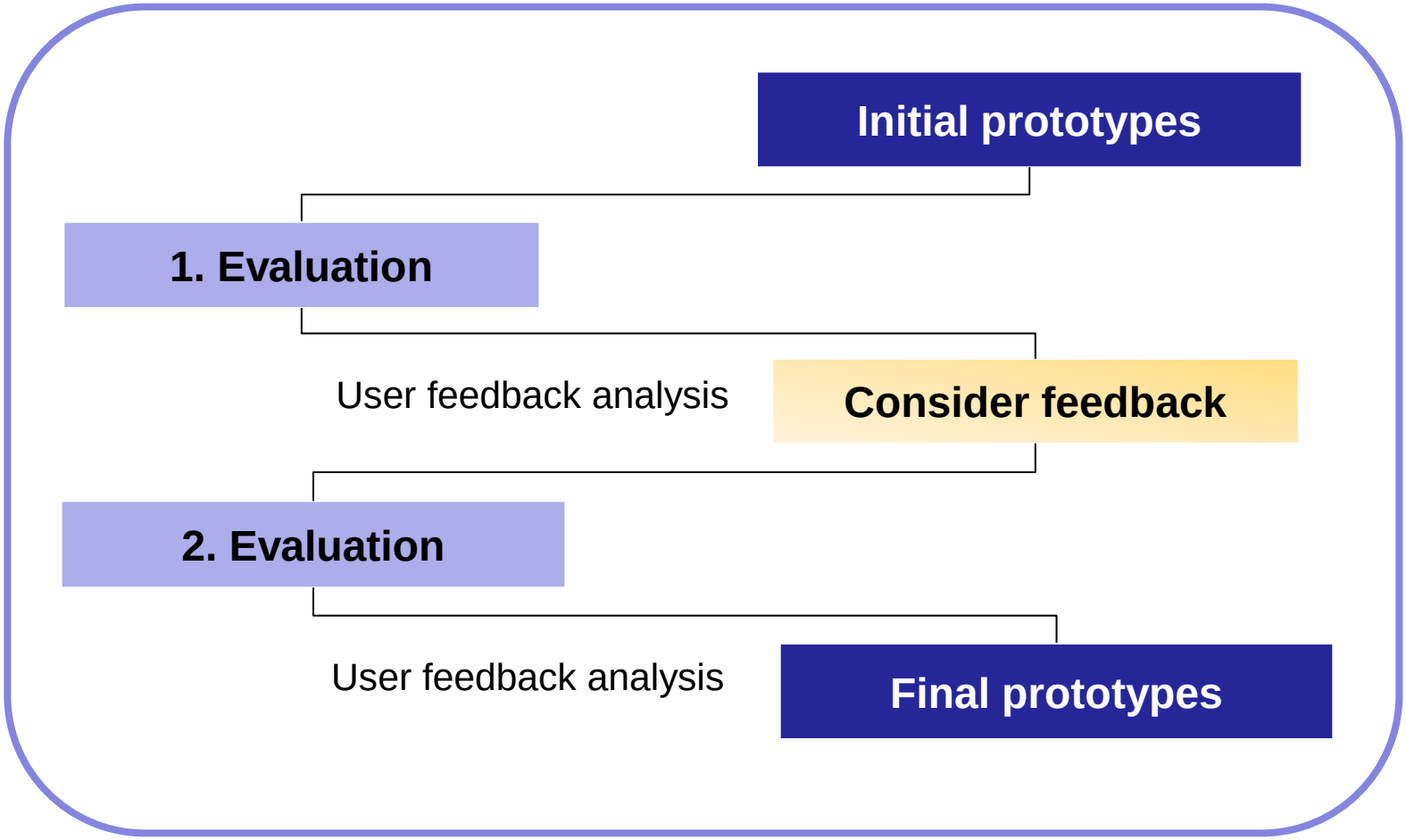
Semway
Source:
Salzburg Research

Digital Map

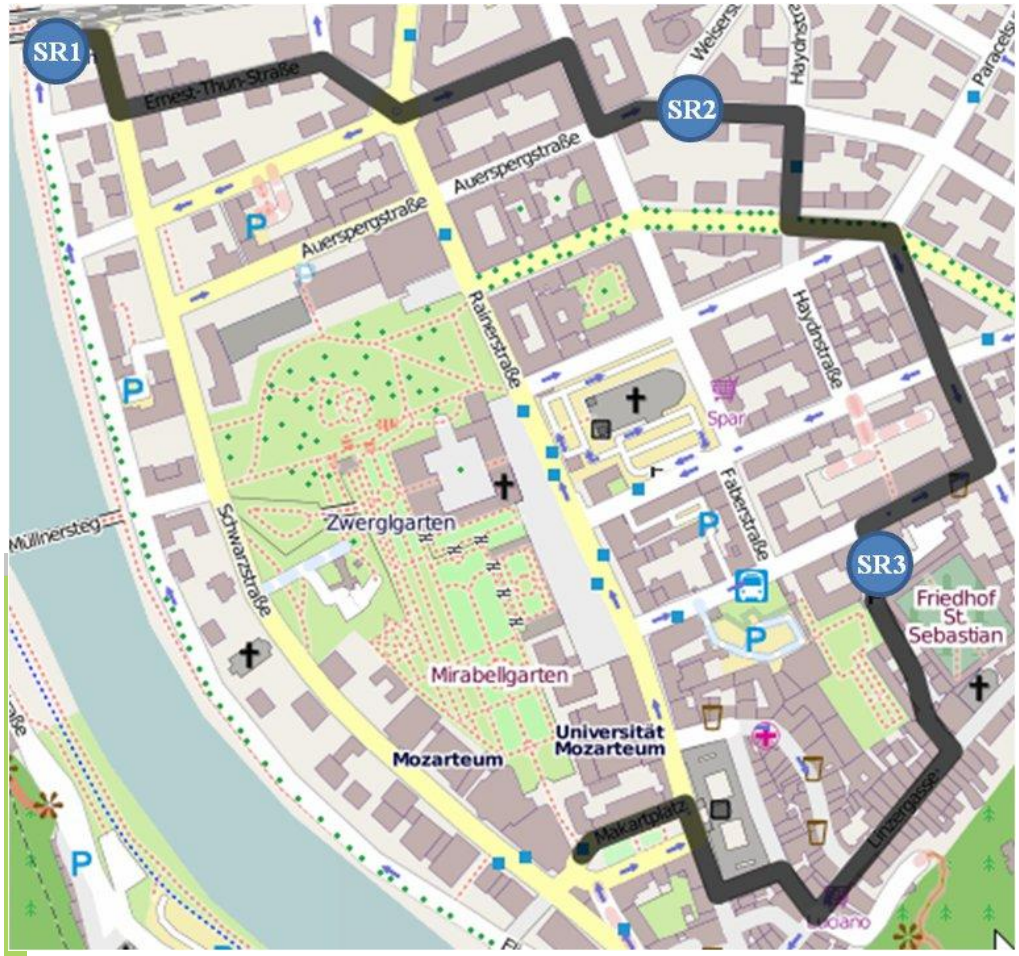
Navigon

- Compare **performance** and **user experience** of electronic navigation support for pedestrians in a **real world navigation task**

User experience prototyping



Field Study - Test Setting



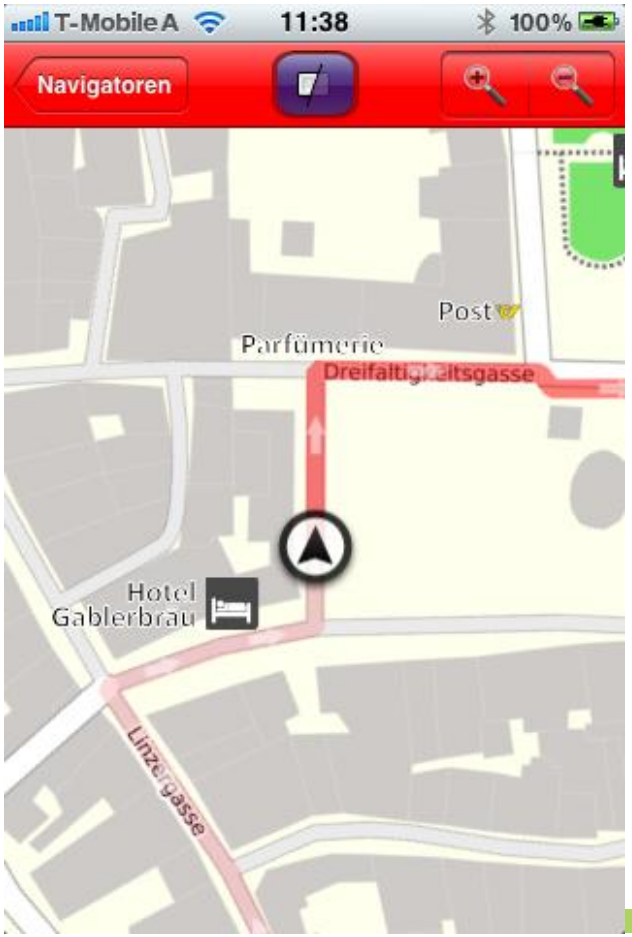
- 2 test iterations
- 3 sub-routes
- 24 test persons per test
- test person characteristics
  - sex
  - age
  - navigation experience
  - Familiarity with test routes

Results of user experience evaluation

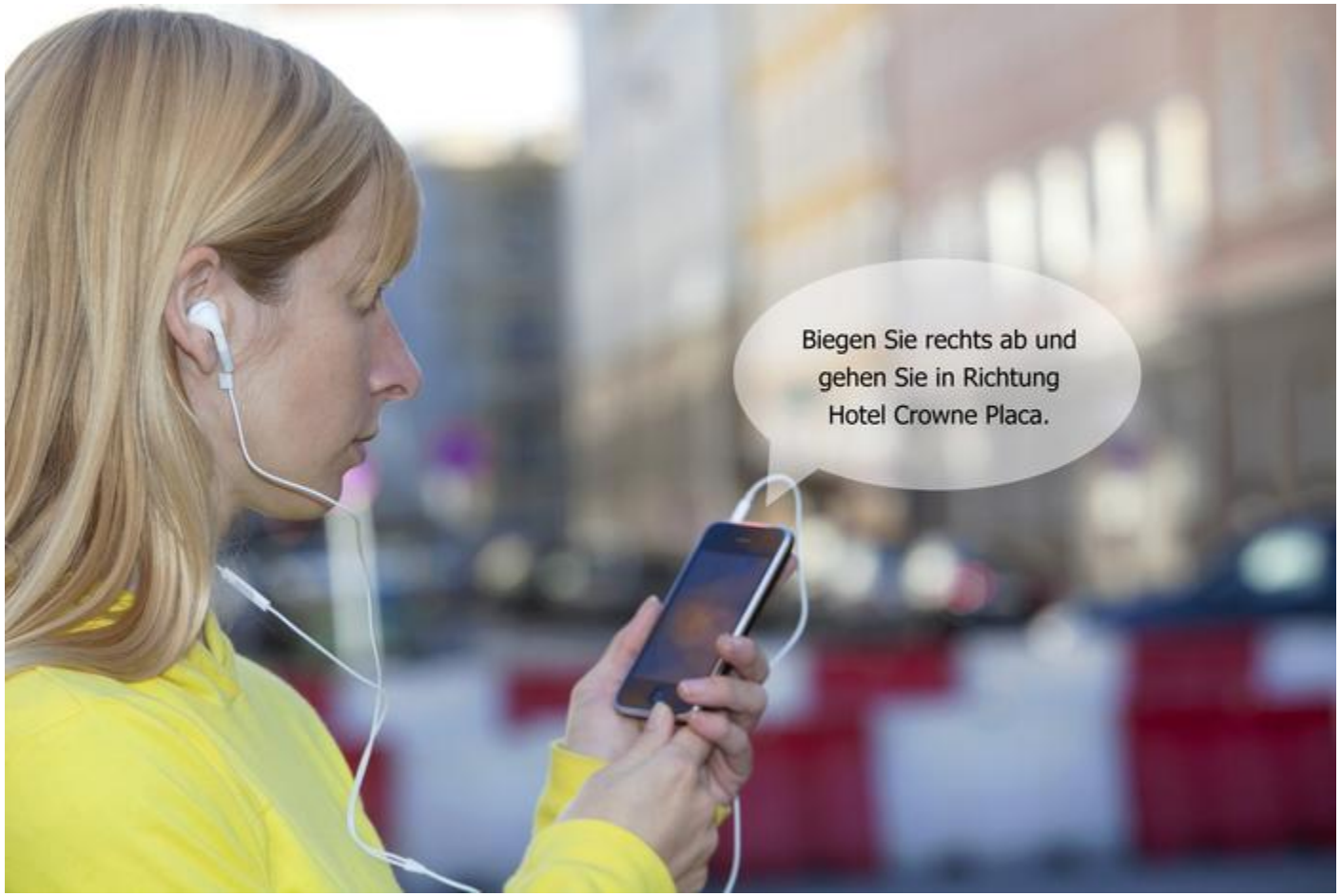
Digital Map

1. Iteration

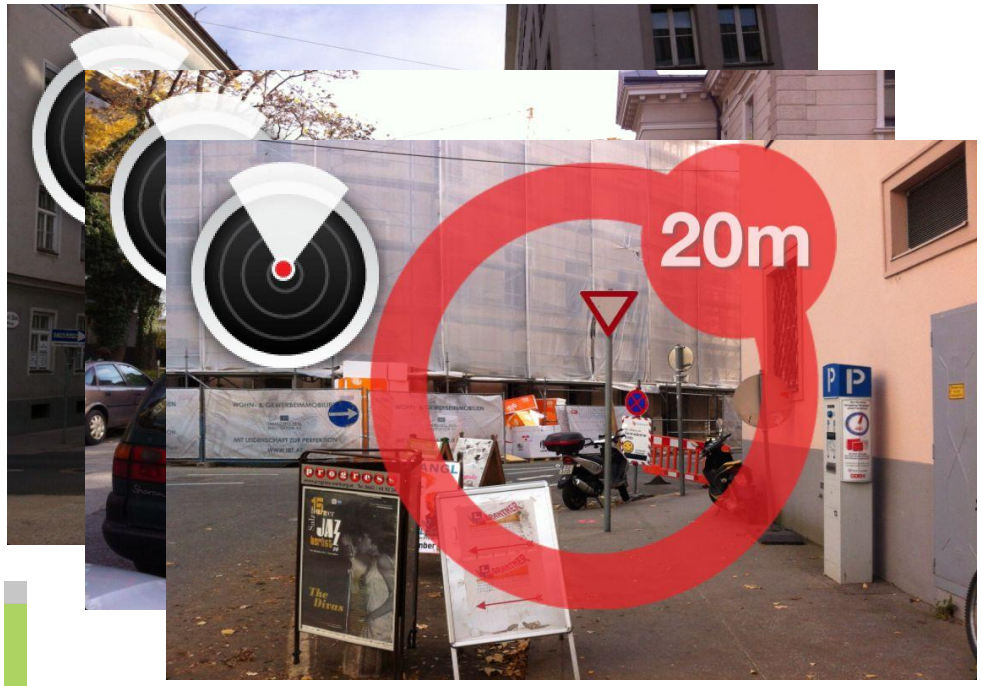
2. Iteration



Voice

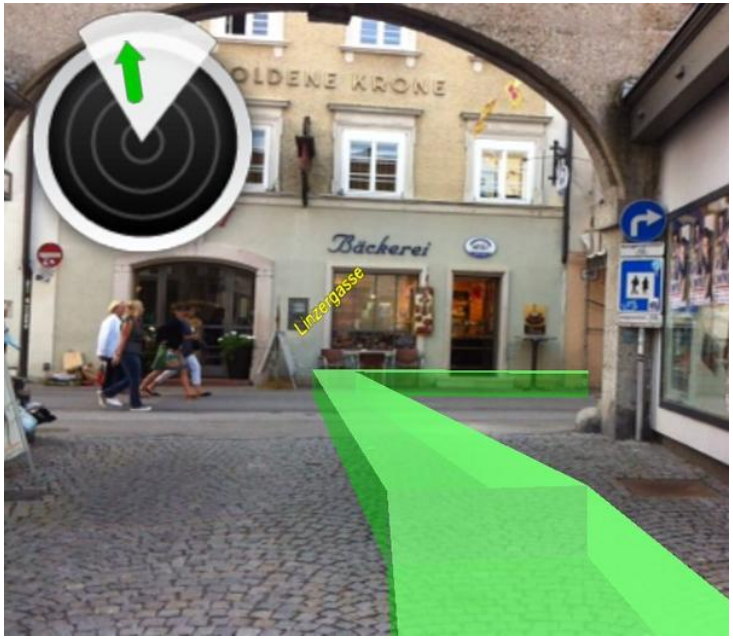

Biegen Sie rechts ab und
gehen Sie in Richtung
Hotel Crowne Placa.

Augmented Reality



1. Iteration

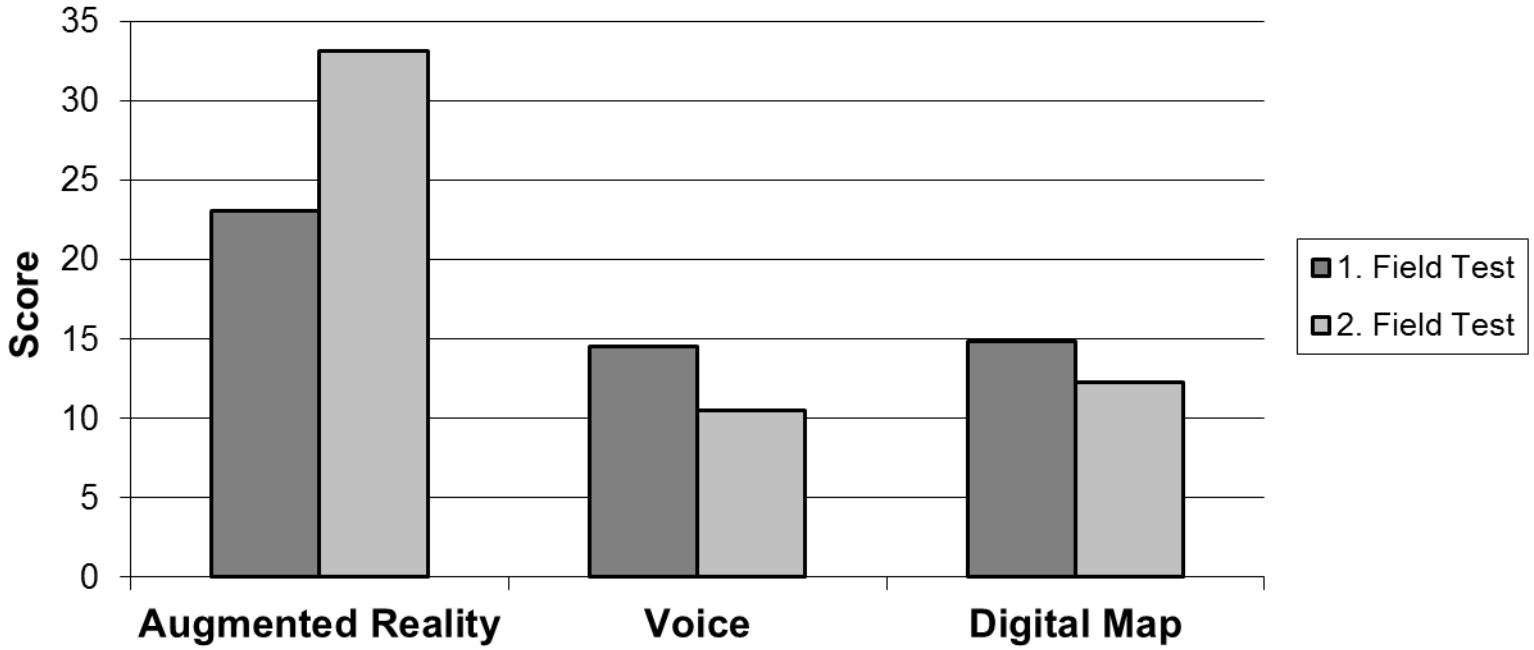
2. Iteration



Results: NASA Task Load Index

(Hart&Staveland 1988)

- Subjective, multidimensional assessment tool

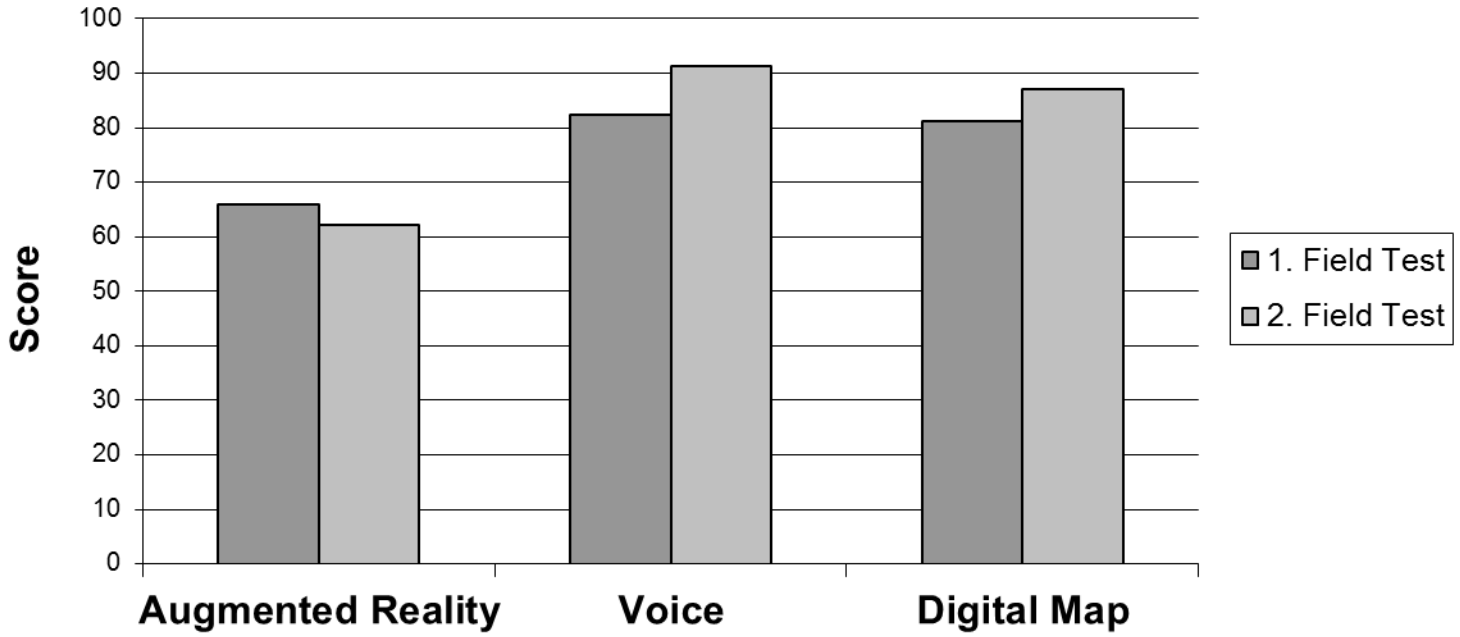


- Augmented Reality significant higher cognitive workload
- No significant difference between 1. and 2. field test

Results: System Usability Scale (SUS)

(Brooke 1996)

- Test to assess usability



- Voice and Digital Map significant higher SUS score than Augmented Reality
- No significant differences between 1. and 2. field test

Conclusions

- **Digital Map**
  - Very good results in both field tests
  - Validation improved from 1. to 2. field test
  - Mature technology, existing design guidelines from cartography
- **Voice**
  - Very good results in both field tests
  - Good scientific results already available, usage of carefully composed voice instructions
- **Augmented Reality**
  - Poor results in both field tests
  - Lack of previous scientific studies
  - Challenges: sensors in smartphones, inexperience of test persons using AR etc.

Thank you for your attention!

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