Design Concepts for Tactile Maps to Support Visually Impaired Persons

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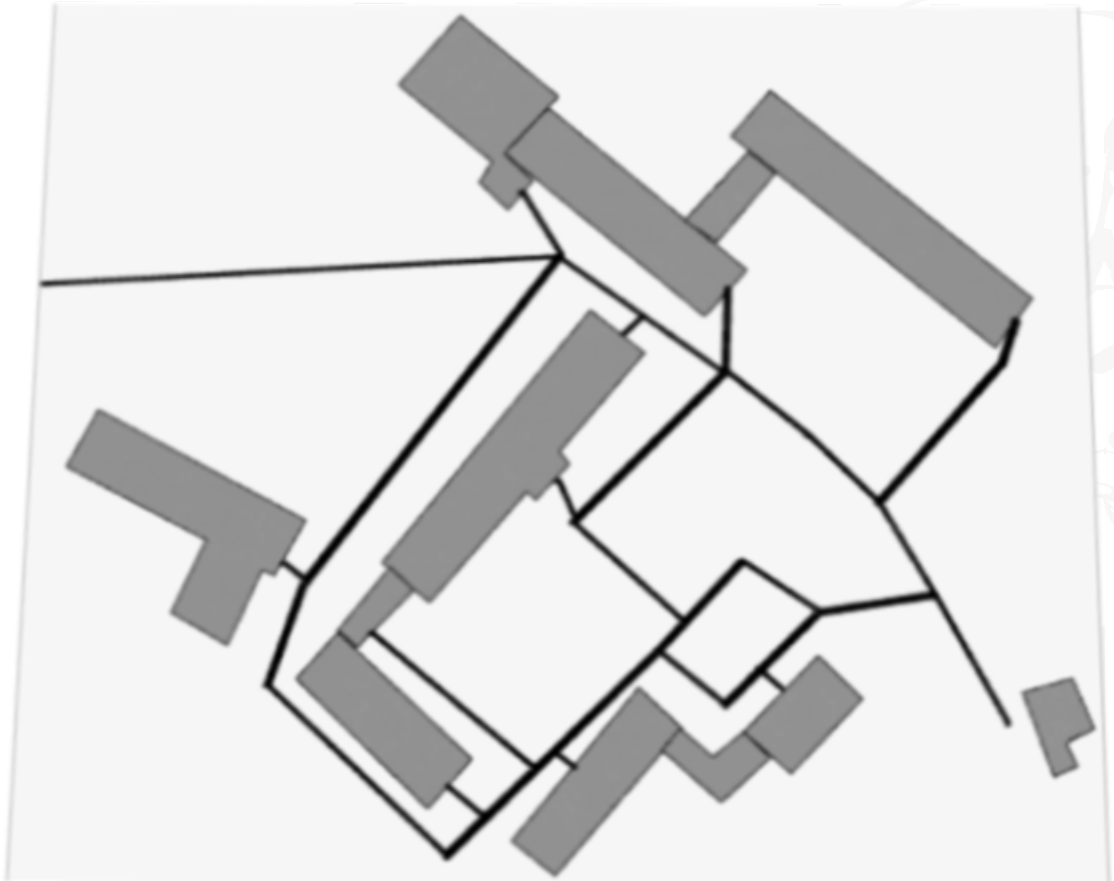
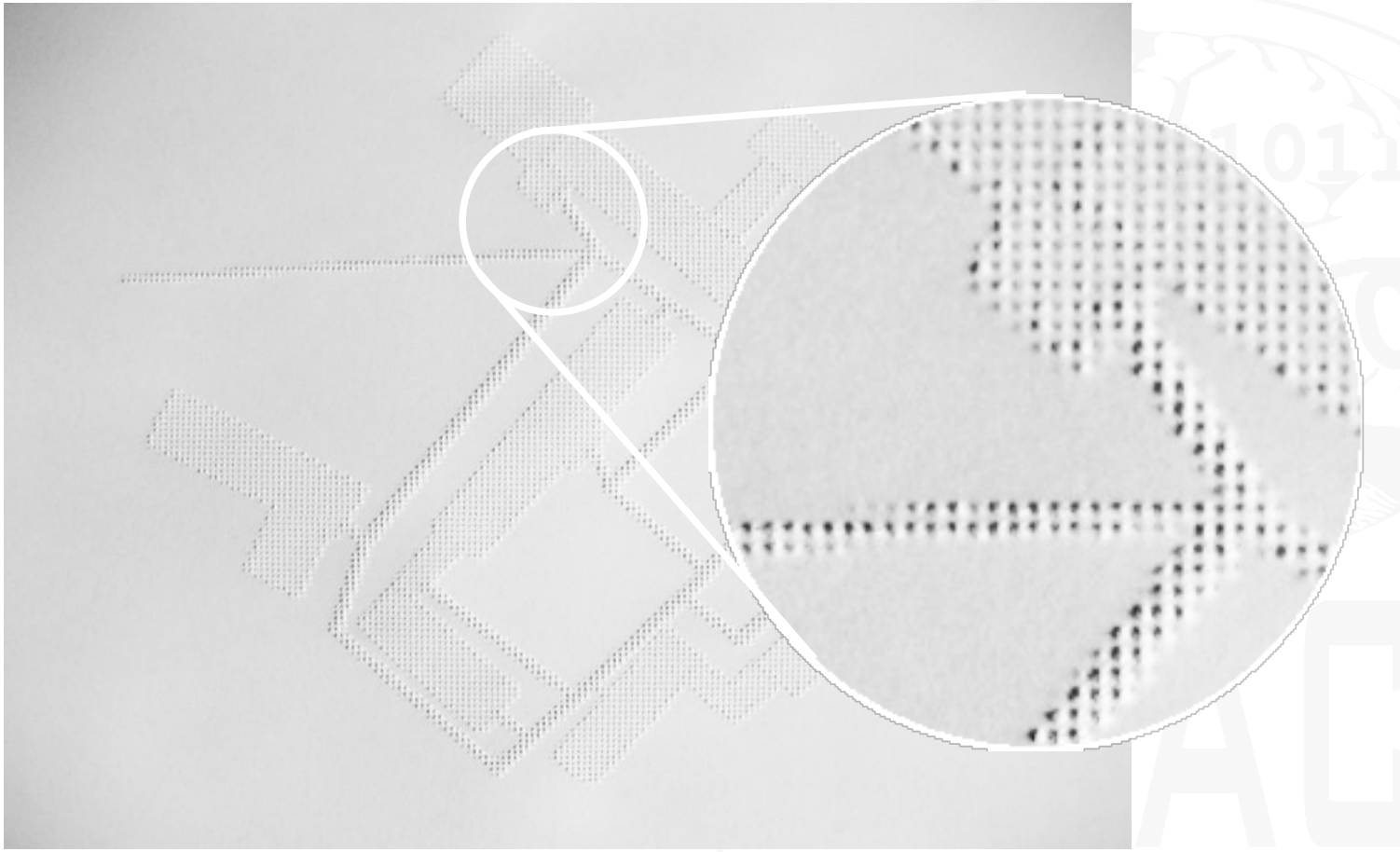
Doctoral Colloquium @ Spatial Cognition 2008
Freiburg, September 19, 2008

Introductory Example – A Visual Map



Introductory Example – A Tactile Map

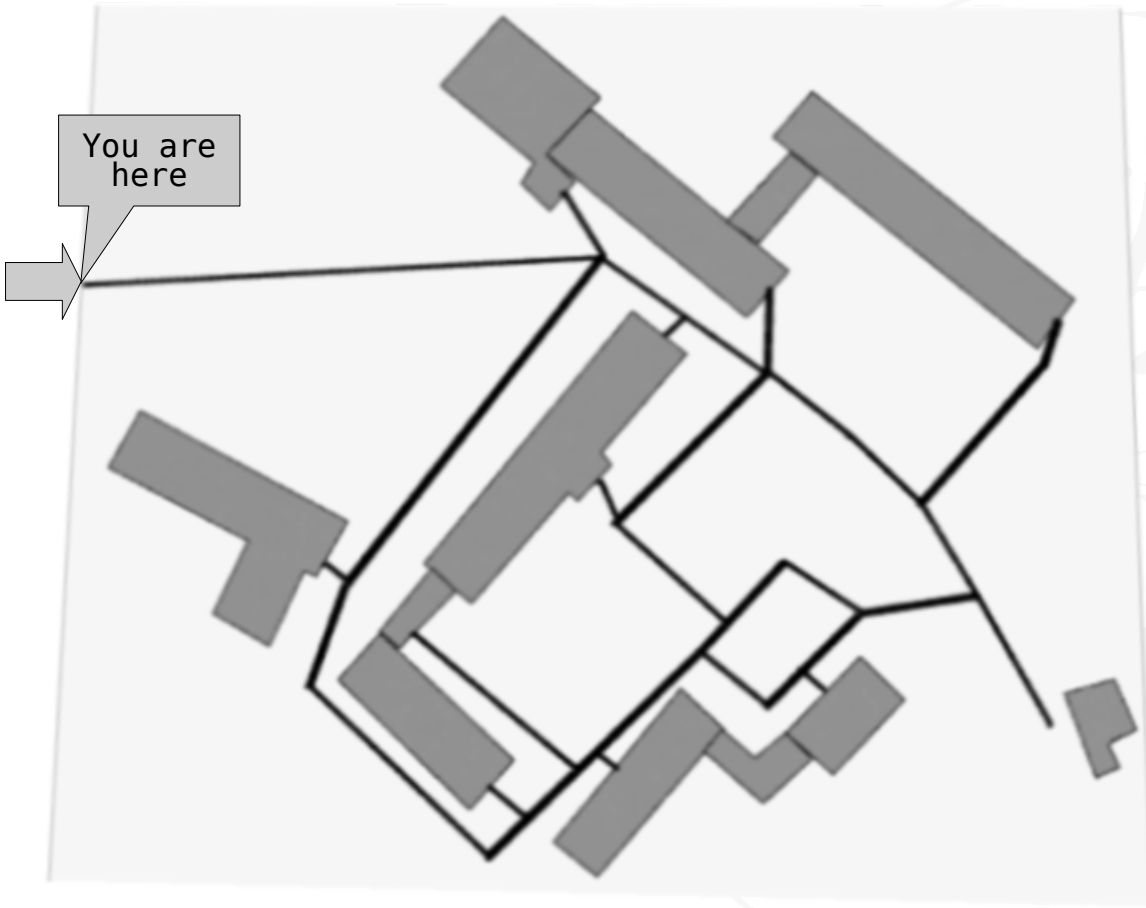


Sub-Goal and First Research Questions

- Sub-Goal: System of Design Conventions for tactile maps
  - Designed to fit cognitive abilities of visually impaired persons (VIPs)
  - Usefull and usable reproductions for VIPs
- Plan
  - Test perceivability of tactile concepts
  - Test interpretation of these concepts
- First Research Question

  “What encoding for concepts in tactile maps is intelligable for people who have some experience with concepts used in visual maps?”
  (e.g. You-Are-Here point)

A Visual You Are Here Map



Research Methods

- Qualitative informal interviews
  - with blind users
  - with experts in developing tactile graphics
- Quantative formal user testing
  - Subjects: blind-folded sighted persons
  - Procedure: training & testing
  - Measures: Speed of finding entry point + perceived usability / ease of use
  - Experiments with tactile maps
    - raised vs. flat YAH symbol
    - distinct vs. usual YAH symbol
    - verbal instructions vs. flat YAH symbol
    - tactile guiding line vs. flat YAH symbol

First Findings from Informal Interviews

- Reading is uncommon, training required
- No standard interpretation of maps
- Recommendations
  - Symbol's shape should induce meaning
  - Height encoding of symbols

Expected First Results from First Formal User Tests

- Concepts for finding the YAH point
  - Suitability of raised symbols
  - Suitability of language
  - Suitability of guiding lines

Future Research Agenda

- Final goal:
  - concept of representing spatial knowledge incorporating language & tactile information to support the wayfinding abilities of visually impaired persons and their communication with sighted people
- Upcoming Research Topics:
  - Modelling: Minimum level of correspondence between representations in multimodal maps
  - Explorative study: Principles of interaction between visually impaired and sighted people
  - Factors that influence the frequency of maps in an area (“Systems of maps”)

Thank You for Your Attention

Time for questions...

Be up-to-date about maps for visually impaired persons at
www.maps4vips.info

Get in contact with me via
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Experiment Design

- Between subjects design
- Tactile map with “standard” YAH symbol as base line
- Conditions
  - map with raised standard YAH symbol
  - map with distinguished YAH symbol
  - languages explains location of YAH point
  - language & guiding line reference YAH point
- Metrics
  - quantitative: time to find YAH point
  - qualitative: easy-of-use statements
- Open Questions to elicit unconsidered concepts

Potential Application

- Support survey knowledge to VIPs for individual wayfinding in
  - outdoor environments
    - parks
    - zoos
    - campuses
    - ...
  - indoor environments (buildings)
    - shopping mals
    - schools, colleges etc.
    - governmental agencies
    - ...
  - BUT: indoor ≠ outdoor, so transfer is questionable