

# From Visual Schematic to Tactile Schematic Maps

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## Agenda

- Review of schematization concepts proposed for Small Display Visual Maps
- Similarities between Small Display Visual Maps and Tactile Environment Maps
- Investigation of the applicability of concepts from Small Display Visual Maps to the Tactile Environment Maps

## Small Display Visual Maps and Schematization

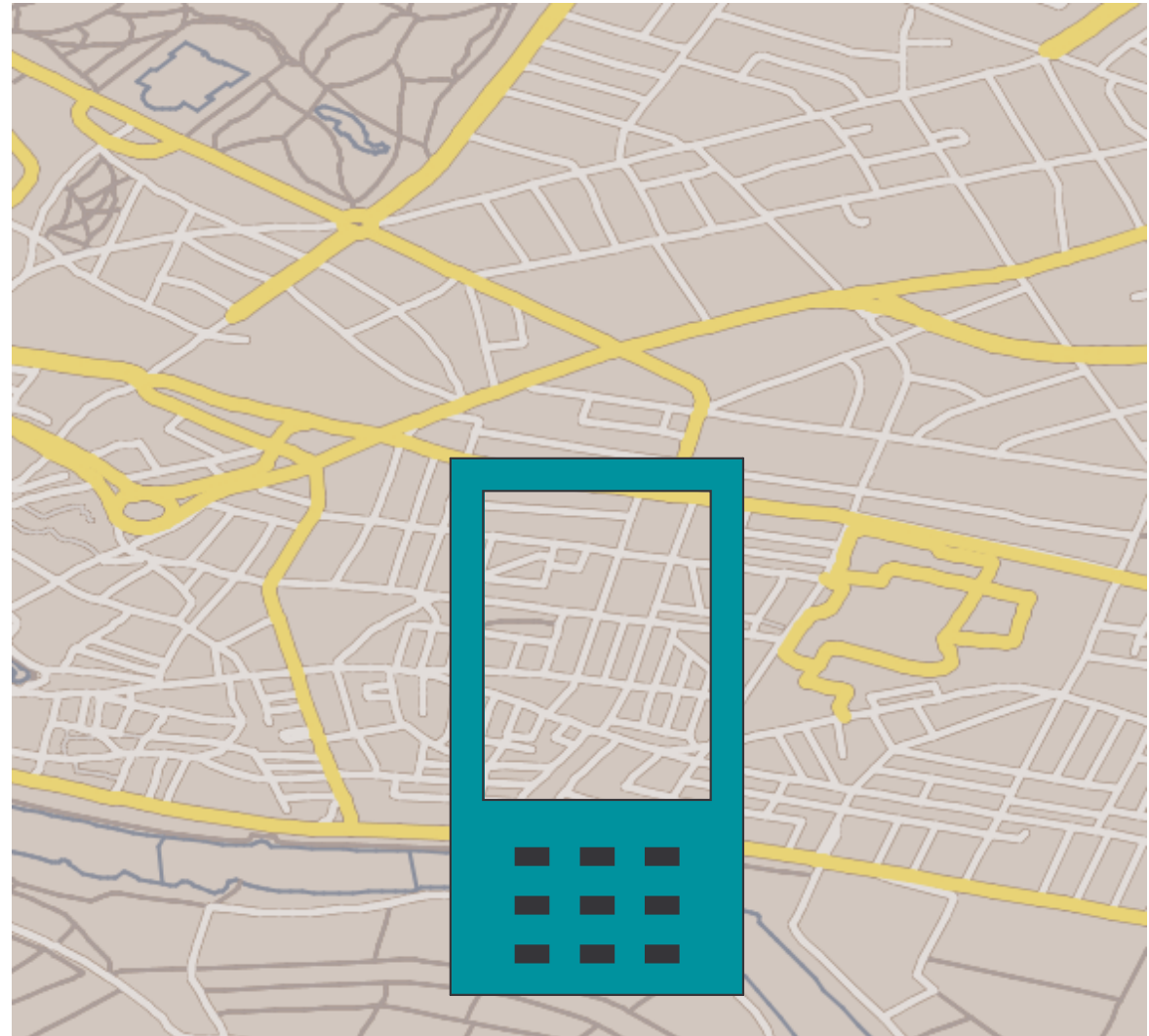
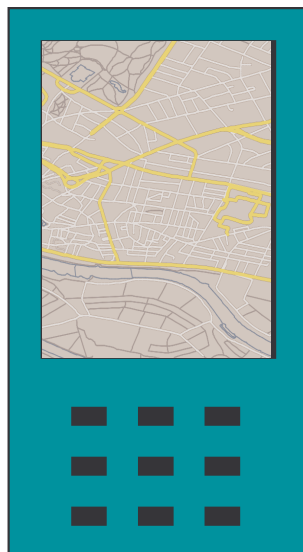
- Navigation with GPS based computational wayfinding systems
- Presentation of visual maps on small (interactive) displays to support wayfinding tasks (i.e. route based)
- Small displays pose challenges to usage of maps

# Geographic Information on Small Displays

Small Displays

Scaling

Panning



## Small Display Visual Maps and Schematization

- Navigation with GPS based computational wayfinding systems
- Presentation of visual maps on small (interactive) displays
- Small displays pose challenges to presentation
- Need for systematic *schematization* of maps
- Schematic Maps
  - capture the abstraction of space that is pertinent in human spatial cognition
  - focus on relevant features for a task and leave out unneeded details

## Schematization Example



## Review: LineDrive (Agrawala & Stolte, 2001)

- Adapt the scale of route elements to the corresponding wayfinding activity
  - Segments with low activity are schematized/shortened
  - Segments with high activity are detailed





## Review: Focus Map (Zipf & Richter, 2002)

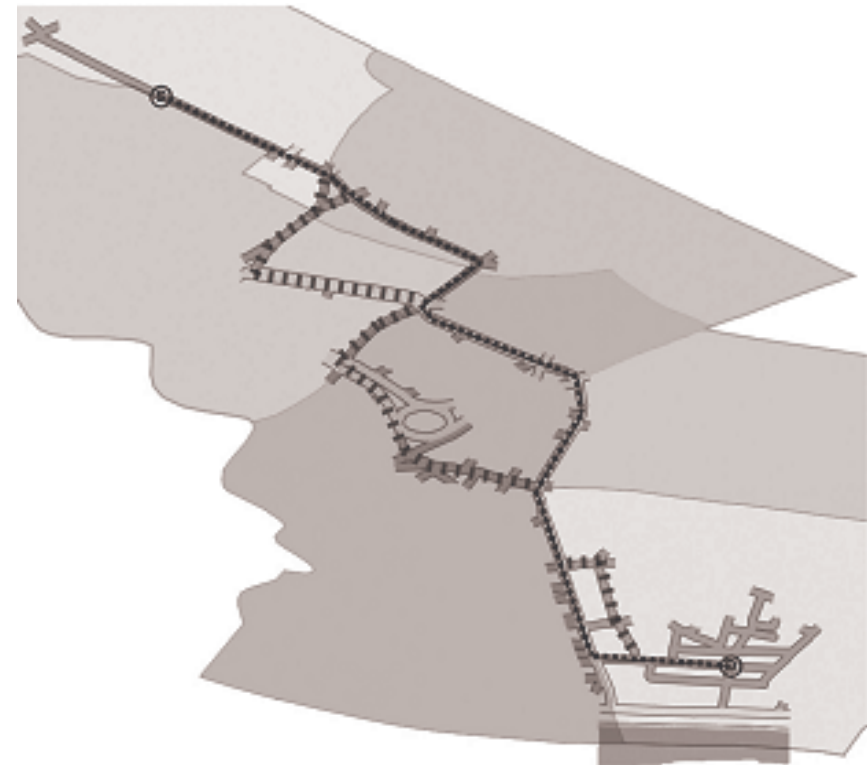
- Adapt the visual prominence of map features depending on their proximity to the route
  - Close segments are shown
  - Segments far away are faded out





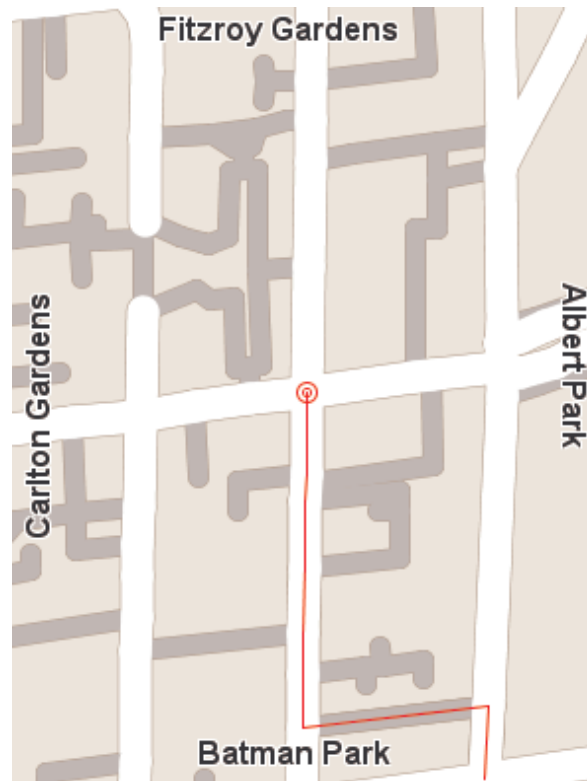
## Review: Route Aware Map (Schmid, Richter, Peters, 2010)

- Show main route and alternative routes from an origin to a destination to support correction of routing errors



## Review: YAH<sup>x</sup> Map (Schmid et al., 2010)

- Adapt the map to prior knowledge by leaving out details in the regions visited before
- Use stable frame of reference with salient landmarks



## Review: ZoneZoom (Robbins et al., 2004)

- Use a discrete recursive zoom functionality to access details on constant scales



## Summary of Schematizations in Small Display Visual Maps

Name of Map	Concept (Überarbeiten: Argumentation)
LineDrive	Shorten Segments – better: Activity Based
Focus Map	Adjust to Distance
Route Aware Map	Show Alternatives
YAH <sup>x</sup> Map	Consider Prior Knowledge Show stable Frame of Reference
ZoneZoom	Provide Static Relations
Halo & Wedges	Show Stable FoR
μMap	Consider Prior Knowledge

## Tactile Environment Maps

- Map entities represented by tactually prominent entities
- Used for pre-trip survey knowledge acquisition
- Problem with tactile maps: Low resolution
- Solution: Schematization!?

## The Relation of Small Display Visual Maps and Tactile Environment Maps

- Characteristics of problem space are similar
  - Low resolution: 20dpi & Display size: A4 or A3
  - High resolution: >72dpi & Display size: some inches<sup>2</sup>
- Usage is different:
  - Route vs. Survey
  - Path following vs. path finding
  - Predefined goal vs. dynamic goal assignement
- Transfer of solutions from Small Display Visual Maps to Tactile Environment Maps are considered

## Considerations About the Applicability of Concepts in TEM

Concept	Result of Considerations
Shorten Segments	☺ Metric information often not needed
Adjust to Distance	☹ Fading out might be confusing
Show Alternatives	☹ Might confuse because of lacking survey
Consider Prior Knowledge	☺ Abstraction of known parts could free space for more details about unknown parts
Show Stable Frame of Reference	☺ Global landmarks could ensure between-map consistency and reference
Provide Static Relations	☺ Defined transitions between maps could add allignment support



## Summary

- Review of concepts for schematization for Small Display Visual Maps
- Introspective consideration of transferring those concepts to Tactile Environmental Maps:
  - Shorten Segments
  - Consider Prior Knowledge
  - Show Stable Frame of Reference
  - Provide Static Relations
- Further experimental investigations need to be done to ground the theoretical considerations

Thank you!  
Questions?

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