



Research Consortium in Speckled Computing

# Navigating Though a Speckled World

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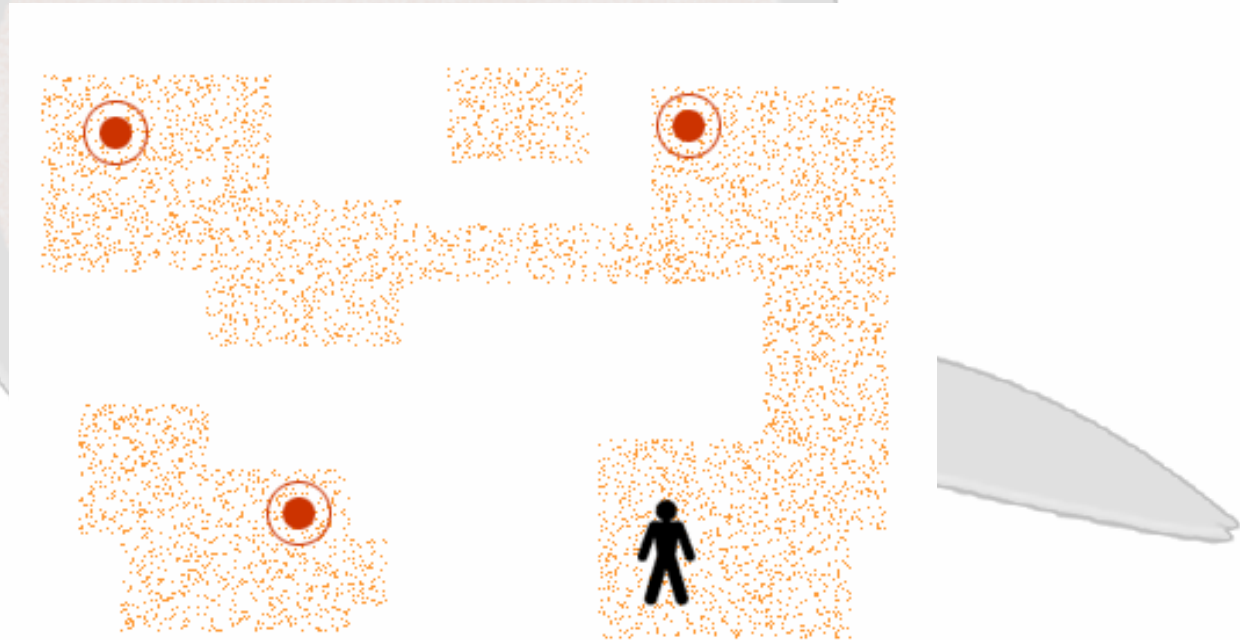
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# Application Domain

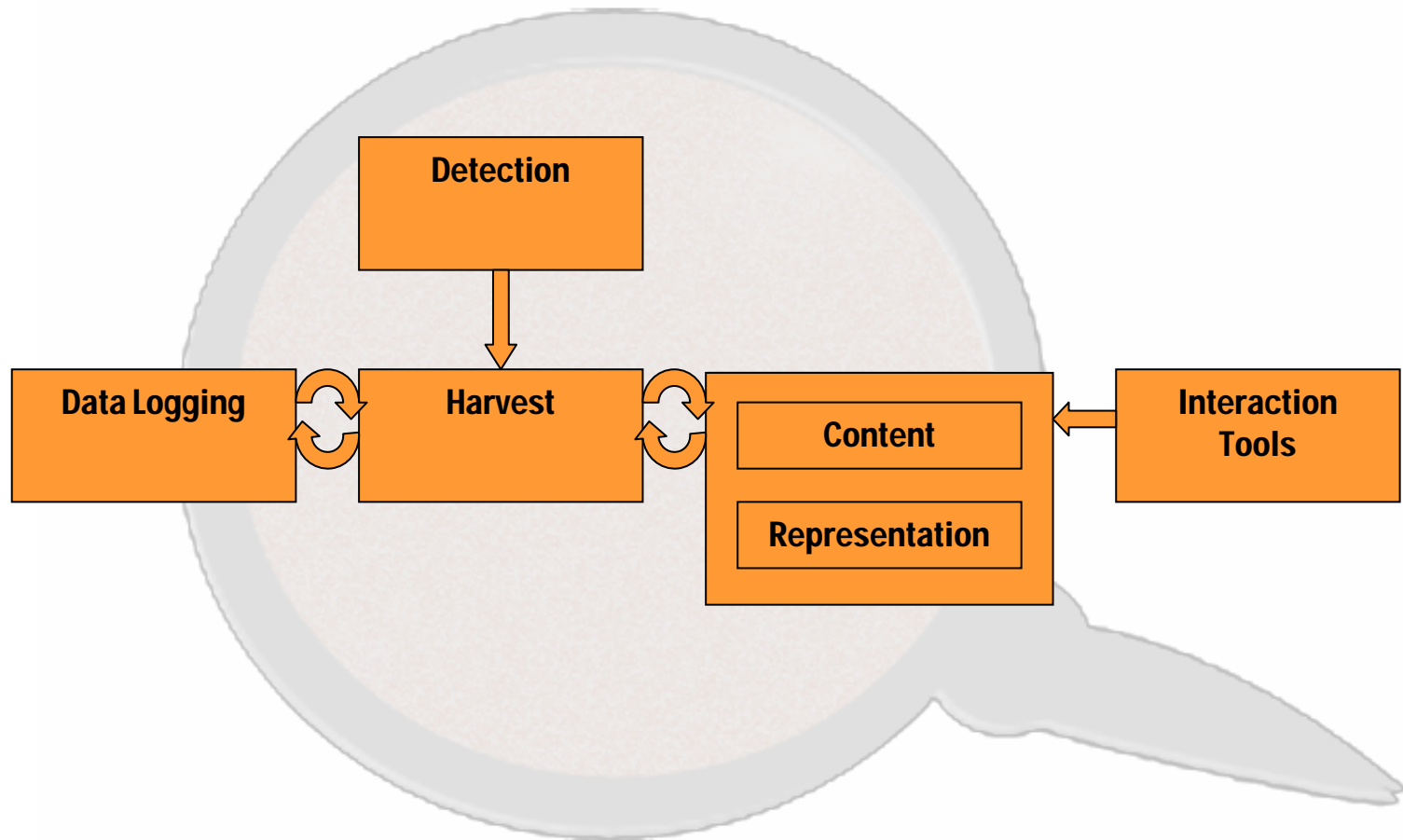
- Immersed within a SpeckNet
- Sensor Readings – Points of Interest
- Direct Human-Interaction



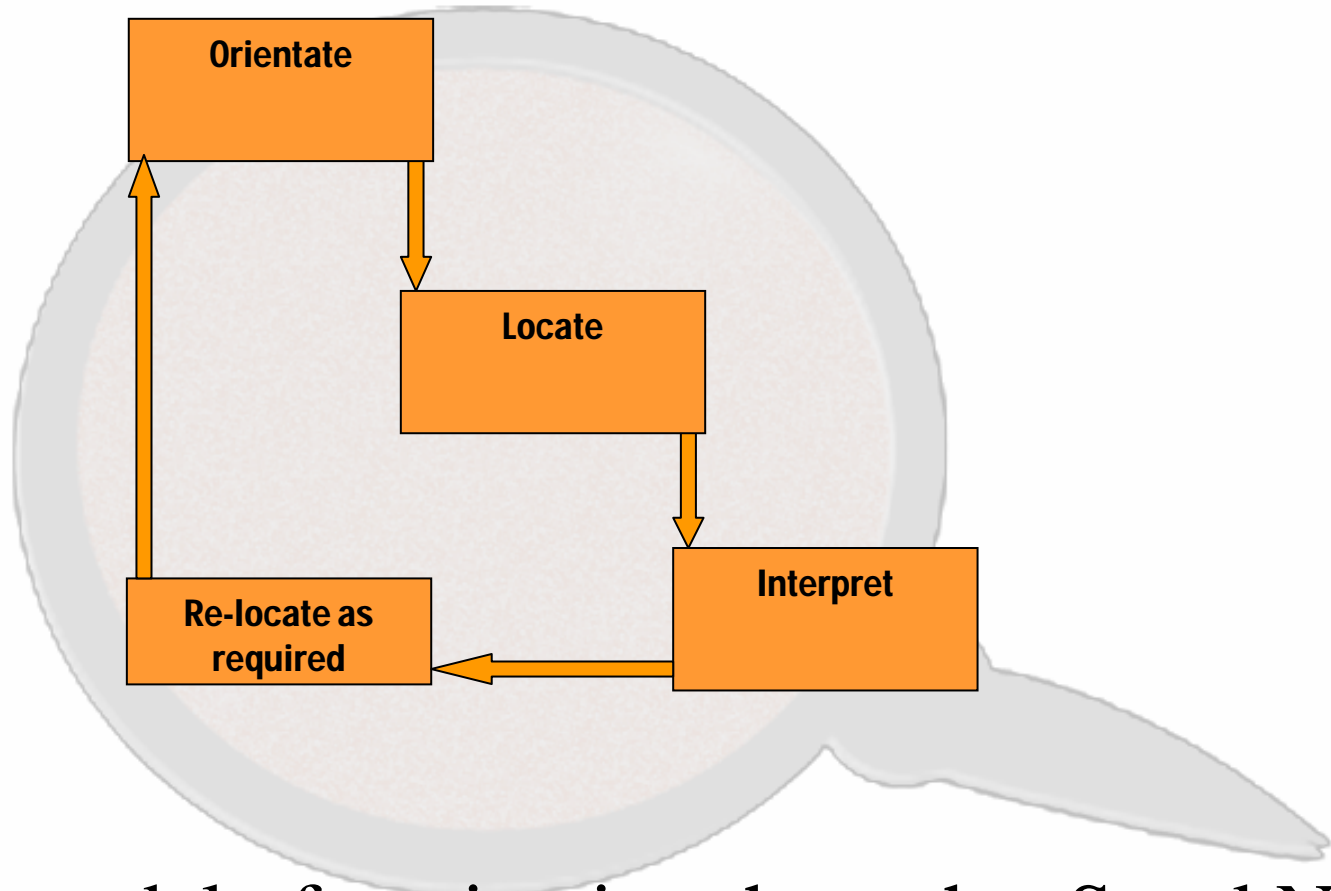
# Three Studies

- Specktator
  - Virtual pets from Speck devices
- Virtual Warehouse
  - Guiding to points of interest
- AR HouseFinder
  - Information visualisation in augmented reality

# Theoretical Model of Data-Flow



# Theoretical Model of SpeckNet Navigation



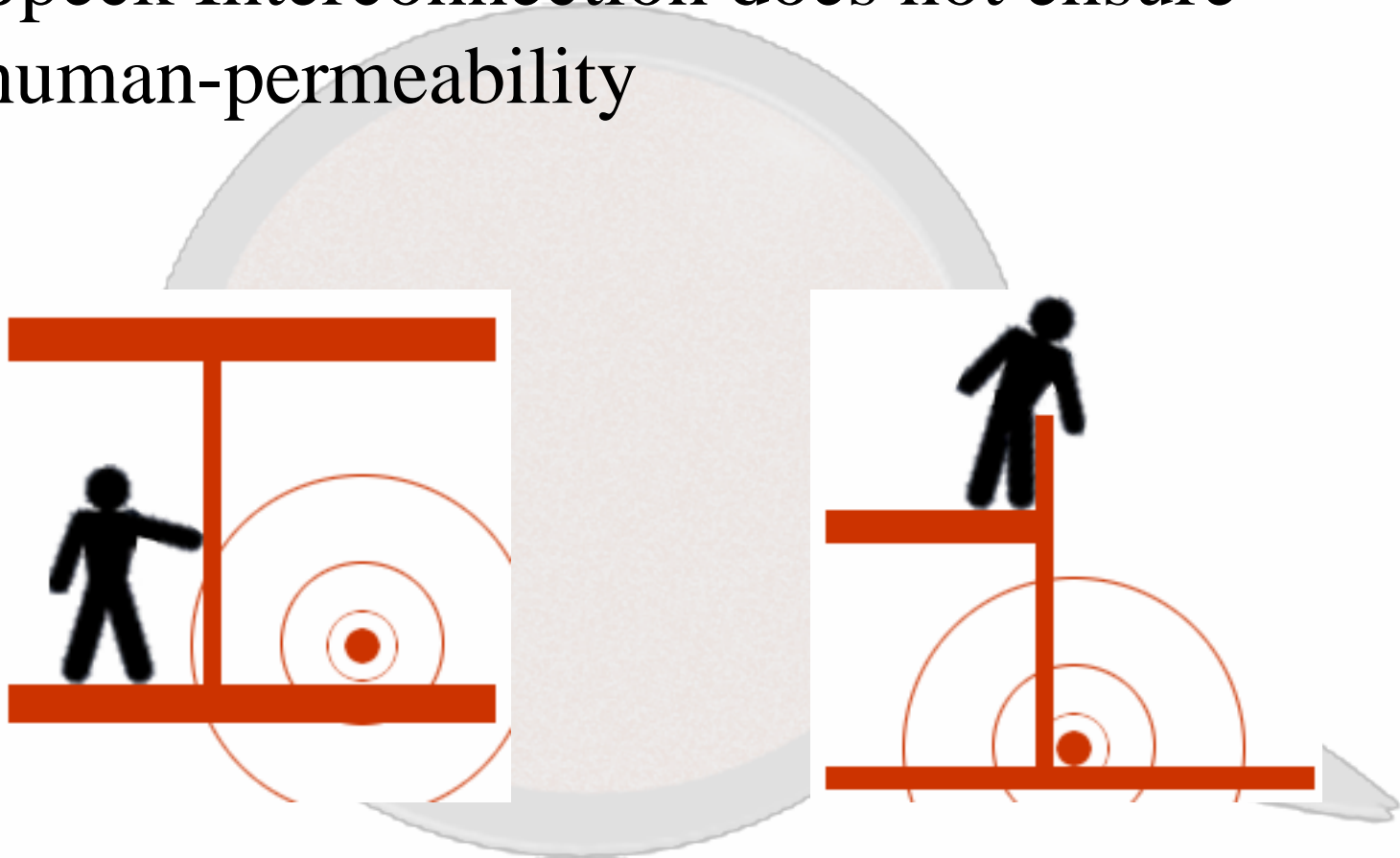
- New model of navigation through a SpeckNet

# Virtual Warehouse

- Issue:
  - How to reach the points of interest?
- Why is it an issue?
  - Direct interaction
  - System may not have full knowledge of the environment
  - User may not have full knowledge of the environment

# Virtual Warehouse

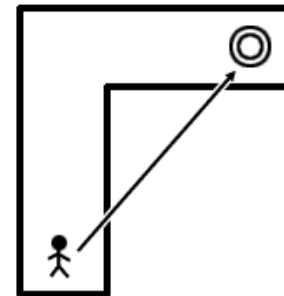
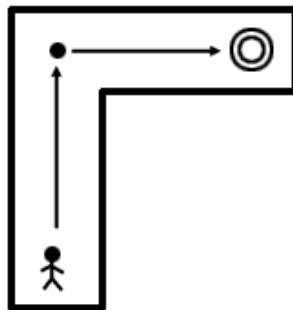
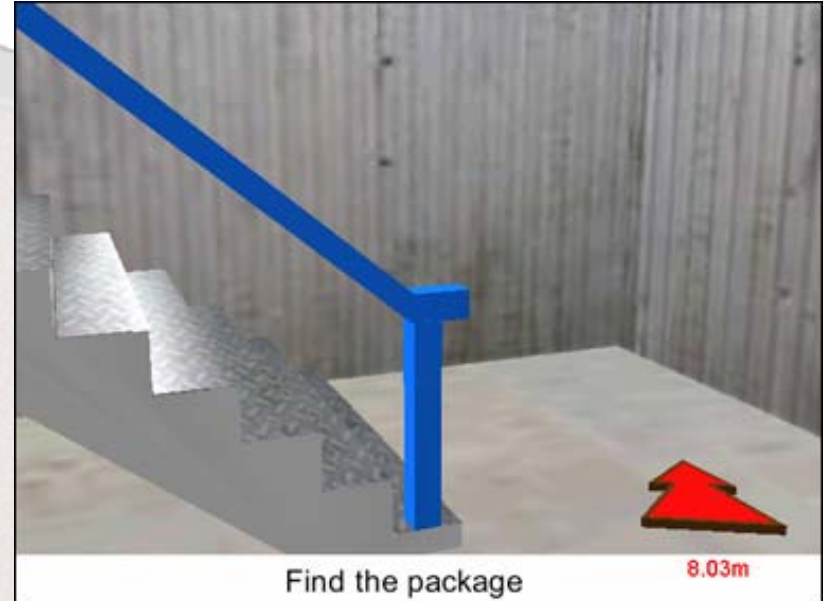
- Speck Interconnection does not ensure human-permeability



# Virtual Warehouse

- Several solutions, but all require extra resources (processing, man-hours etc)
- Study aimed to determine whether a solution is necessary and what tradeoffs there might be
- Tasks included various path lengths and both horizontal and vertical barriers

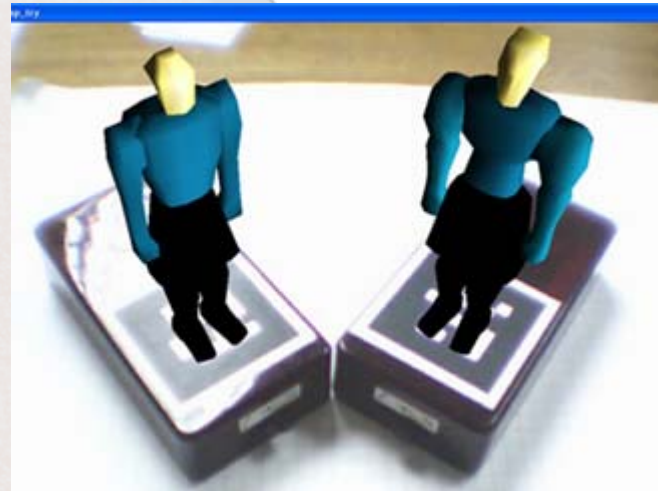
# Virtual Warehouse



# Virtual Warehouse - Conclusions




- It is possible to navigate using only relative information, but with a time penalty increasing over distance
- Misleading waypoints greatly reduce their effectiveness
- Collection times over double for split level, suggesting that a level indicator would vastly improve relative navigation

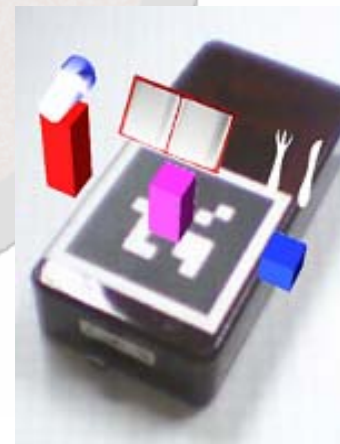
# Spektator



# Spektator

- Local sensing of activity and location awareness
- 3 variables represented
- Main conclusion that glyph representations are useful for comparing data but poor for actual values

Low	Medium	High
		



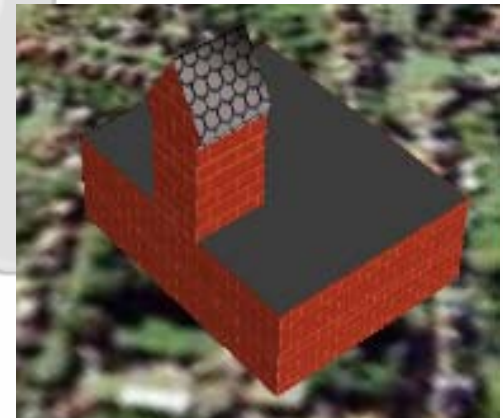
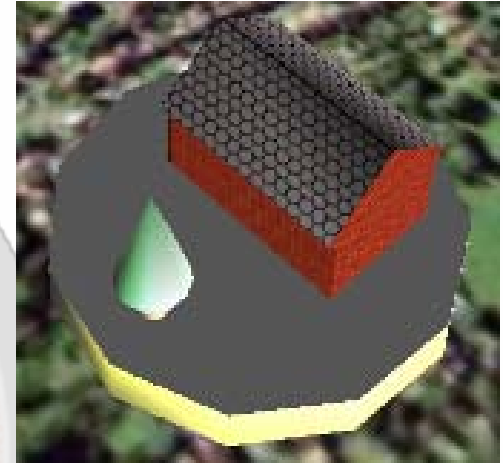
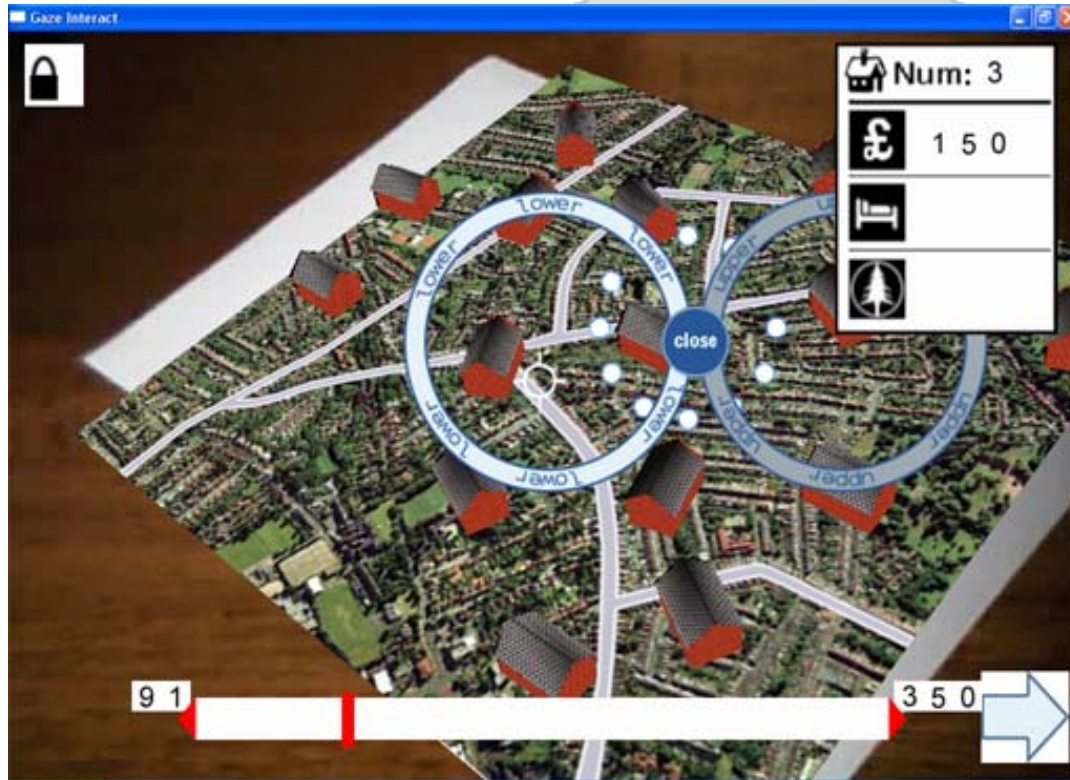
# AR HomeFinder

- Issue:
  - How to interpret the data at point of interest
- Why is it an issue:
  - Source of data may be invisible
  - May be mixed types of Specks
  - Each Speck may have multiple attributes

# AR Homefinder

- Testing Schneiderman's visualisation principles in an AR environment
- Overview: Use of glyphs
- Zoom: Physically moving camera
- Filter: Dynamic filter with traditional point-click or camera input control
- Details on Demand: Selection with traditional point-click or gaze-selection

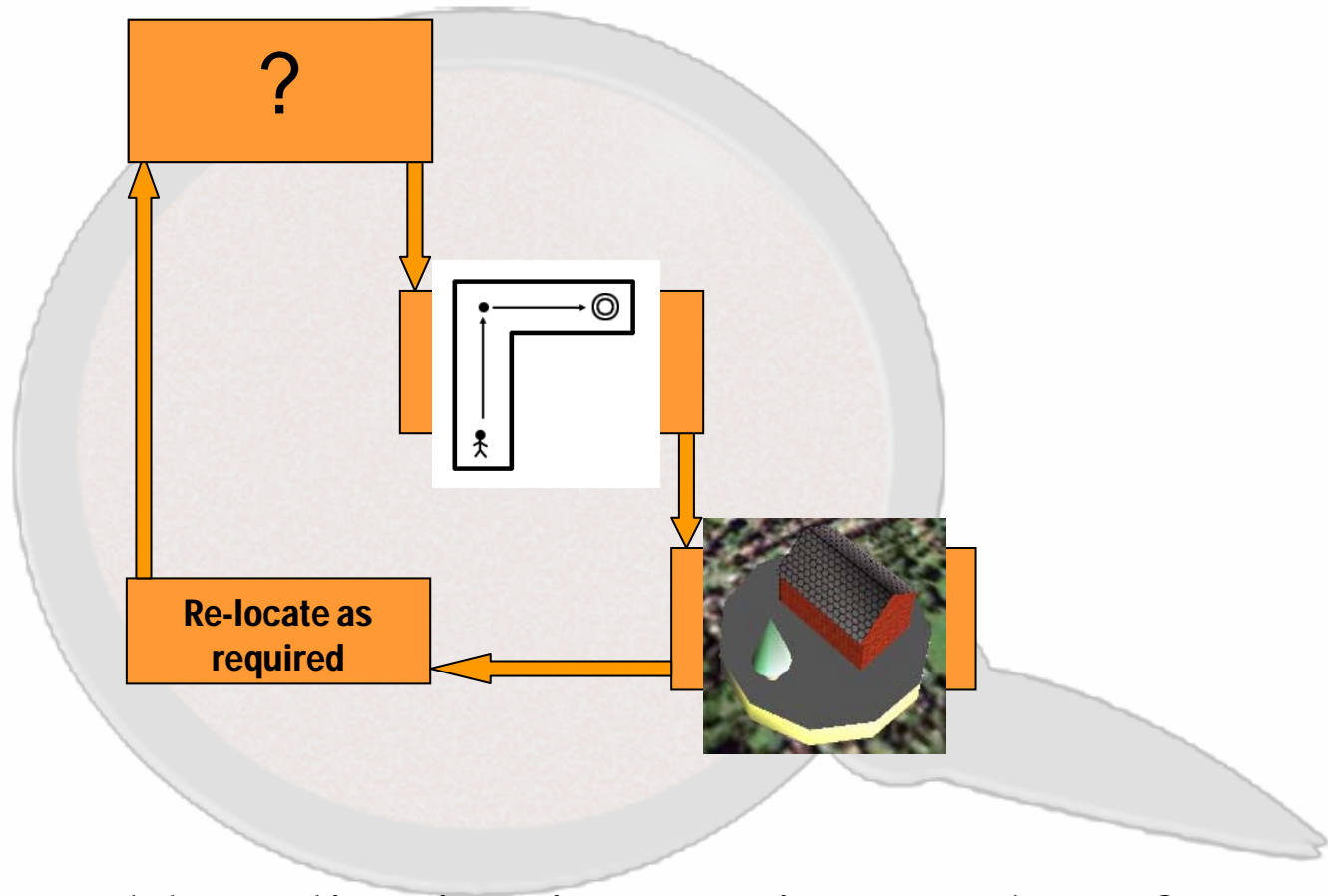
# AR Homefinder



# AR HomeFinder - Conclusions

- **Overview:** Glyphs led to an almost immediate identification of extremes and trends
- **Zoom:** More natural when the camera is not statically placed
- **Filter:** Better suited to traditional point-click
- **Details on Demand:** Gaze selection could be a suitable method with practice
- **Achieved all tasks required, but more complex data searches need to be tested**

# Future Work



- Real-world application integrating work so far