Agent Based Models in CASA

A Decision Support System for Evacuation using Agent-Based Simulation to evaluate the Kings Cross Redevelopment

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Overview

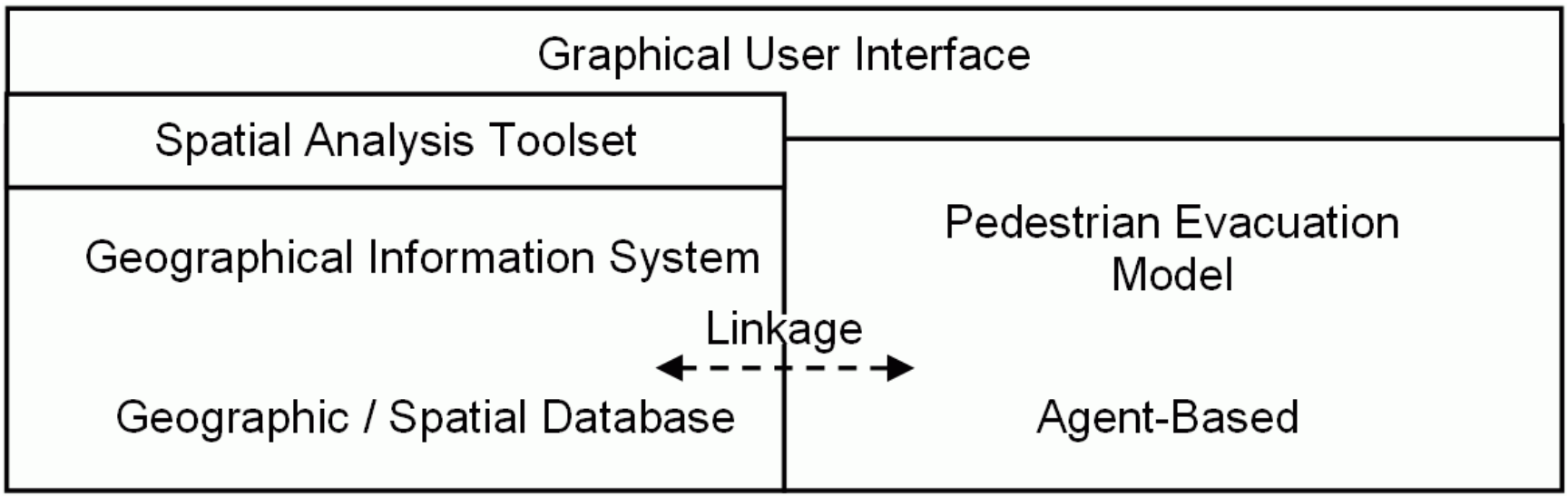
- Outline
  - Research partners, Context, Project outline
- KXSDSSES
  - Research Deliverables
- Research Objectives
    - Implementation or Development
    - ArcGIS Evacuation Demo
- Conclusions

Project Outline

- Research Partners
  - Camden PCT
- Context
  - CCA 2004
- Why?
  - 9/1, Madrid, Bali, etc
  - London - July 2005
  - KX Redevelopment - 2007 & Beyond

KXSDSSES

- Aim
  - Prototype SDSS



Research Deliverables

- Primary
  - Quantitative and qualitative evaluation of pedestrian emergency egress from a (or multiple) location(s) within or adjacent to the three rail facilities at London King's Cross
- Secondary
  - Spatial assessment...
    - Ambulance loading point; etc
    - Possible helicopter landing site
    - Rendezvous point for personnel

Research Objectives

1) Evaluation of pedestrian evacuation modelling principles;
2) Review of pedestrian modelling applications & development environments;
3) Implementation or Development of a agent-based pedestrian evacuation model;
4) Link GIS and pedestrian evacuation model;
5) Geographic / Spatial database of KX;
6) Spatial analysis tools; and a
7) GUI.

Research Objectives

1) Evaluation of pedestrian evacuation modelling principles;
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4) Link GIS and pedestrian evacuation model;
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Past & Current Evacuation Models

- 33 Models
  - Past and Present
  - Building Evacuation only
  - Reviews by Friedman, 1992; Thompson, 1994; Gwynne and Galea, 1997; Galea et al., 2003; Kuligowski, 2003; Olenick and Carpenter, 2003; RSSB, 2003.
- Five generations of models (Galea, 2004)
- Categorise by approach and level of sophistication
  - 4 criteria

Development Environments

- Evaluation Criteria
  - Representation of space
  - Ease of programming
  - Size of community (using & familiar with language)
- Current Development Environments
  - Swarm – comprehensive ABM package
  - Repast, Ascape, CORMAS – fewer programming skills

Research Objectives Cont'd

1) Evaluation of Pedestrian evacuation modelling principles;
2) Review of pedestrian modelling applications & development environments;
3) Implementation or Development of a agent-based pedestrian evacuation model;
4) Linkage between GIS and pedestrian evacuation model;
5) Geographic / Spatial database of KX;
6) Spatial analysis tools; and a
7) GUI.

Linkage

- Coupling
  - Loose
  - Moderate
  - Tight
- Integration / Embedding
  - Modelling Centric
  - GIS Centric
- Trade offs!

Implementation or Development

- My Programming Skills
- Time
- Benefits
- Capabilities
- Sophistication required

?

Cost -
Availability -
Integration -
Validation -
Black Box -