Real-time Pedestrian Modelling: Implementing the Ensemble Kalman Filter for an Agent-Based Model

Keiran Suchak — 200888140

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Abstract

This is the abstract.

Contents

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Notes

- What is data assimilation?

- What is the Ensemble Kalman Filter?

- What are Agent-Based Models?

- How do people model pedestrians?

- EnKF: options for generating observations:

  - External (the old way):
    * observations come from a previous run of the model
    * therefore, they are independent
    * the problem here is that the ensemble members probably have been set with the wrong entrances and exits for agents
    * this is likely more realistic, ie when modelling people we ultimately won't know where they intend to go
    * but I don't think that we can overcome this without parameter estimation DA.

  - Internal (the new way):
    * observations come from the `base_model`
    * all ensemble members are deep copies of the `base_model`
    * consequently, they have the same parameters and initial conditions
    * the problem with this is that is not realistic
    * but we're going to do it anyway (for now)

Chapter 1

Introduction

This is the introduction.

Chapter 2

Literature Review

This is the literature review.

There has been some work on this stuff (Ward et al. 2016, Wang & Hu 2015).

Chapter 3

Method

This is the method.

Chapter 4

Results

These are the results.

Chapter 5

Conclusion

This is the conclusion.

Bibliography

Wang, M. & Hu, X. (2015), 'Data assimilation in agent based simulation of smart environments using particle filters', *Simulation Modelling Practice and Theory* **56**, 36–54.

Ward, J. A., Evans, A. J. & Malleson, N. S. (2016), 'Dynamic calibration of agent-based models using data assimilation', *Royal Society open science* **3**(4), 150703.