Equipe Associée SIMS

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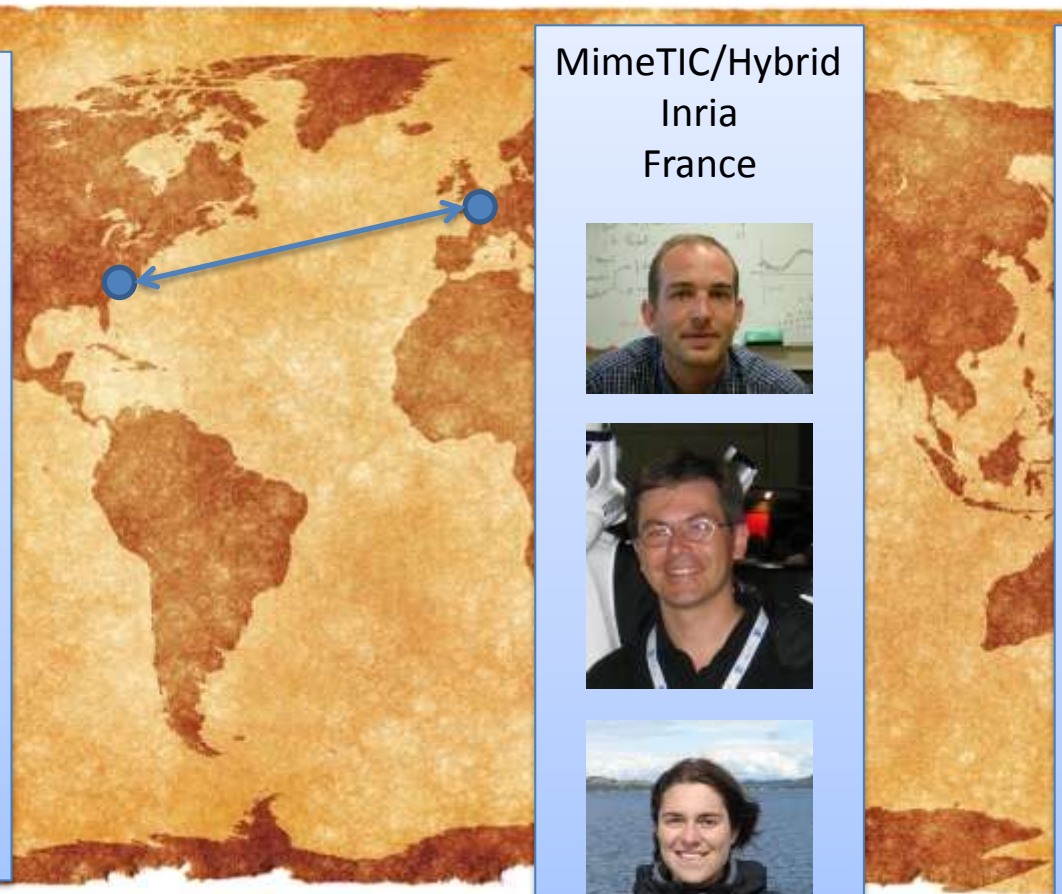
Overview

GAMMA Group
UNC
USA



MimeTIC/Hybrid
Inria
France

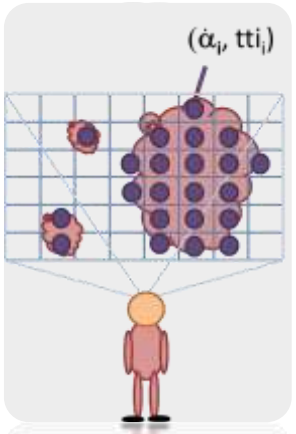
Crowd simulation

Virtual humans

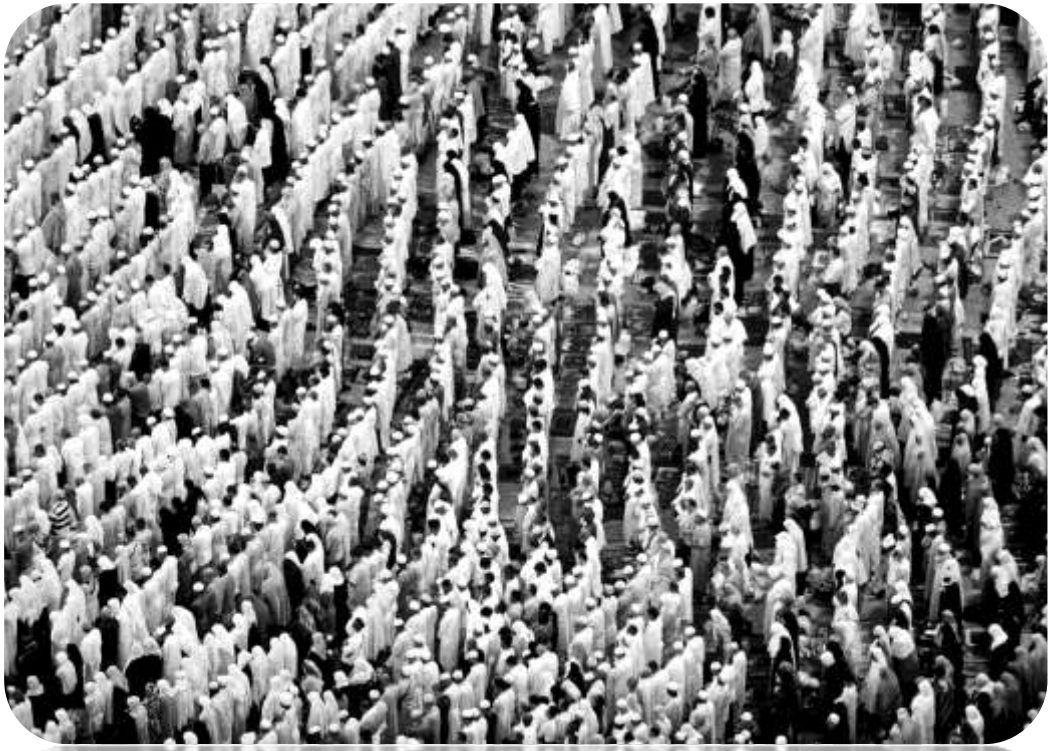
Physical simulation

Perception and interaction

- Interaction
  - Microscopic simulation
  - Agents interaction
- Perception:
  - Visual perception (and action)
  - Perceptual studies
- Outline:
  - Microscopic crowd simulation
  - Vision-based approach
  - Experimental validation

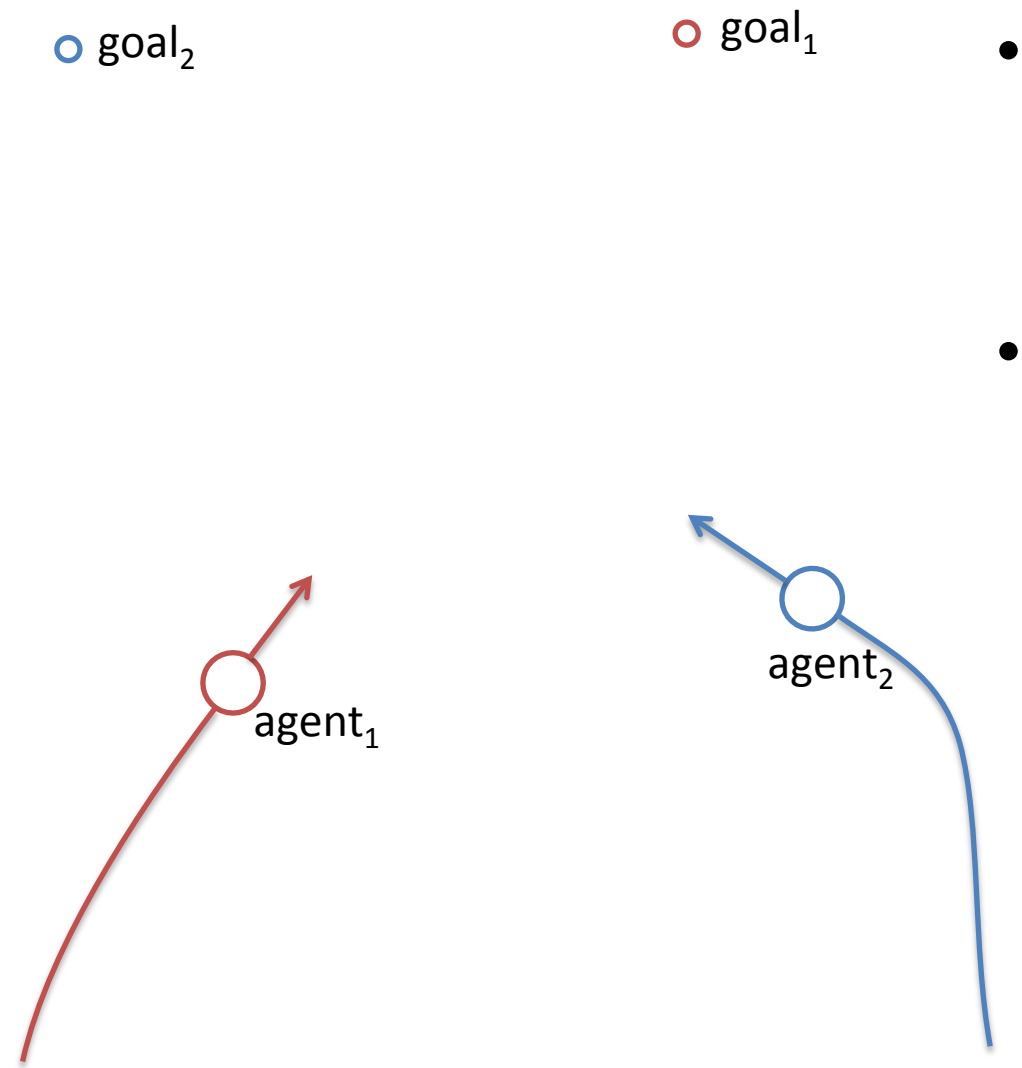


Microscopic crowd simulation



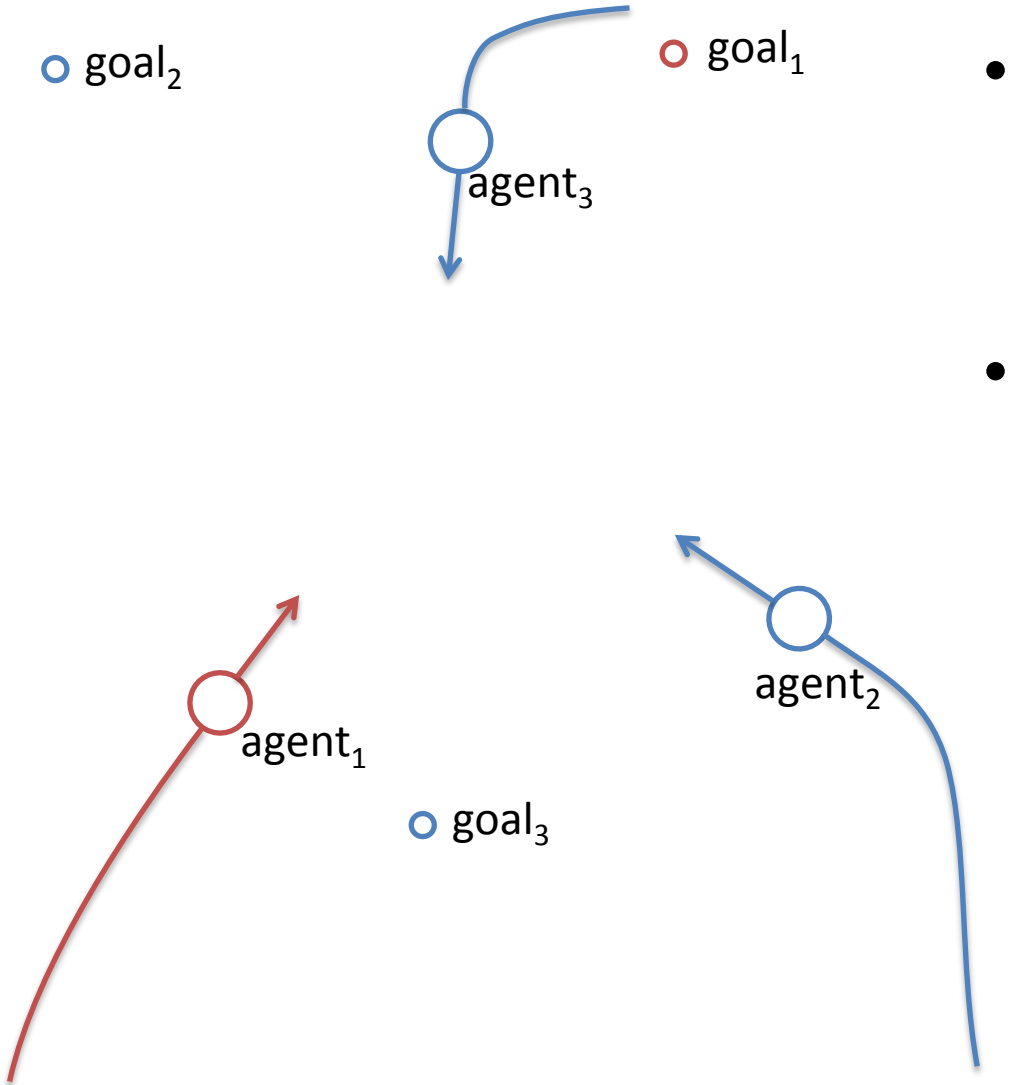
- Crowds :
  - Macroscopic
  - Microscopic
- Global patterns:
  - Emergent
  - Local interactions
- Why?
  - Behavioral mechanisms
  - Predictive simulation

What is a velocity-based model?



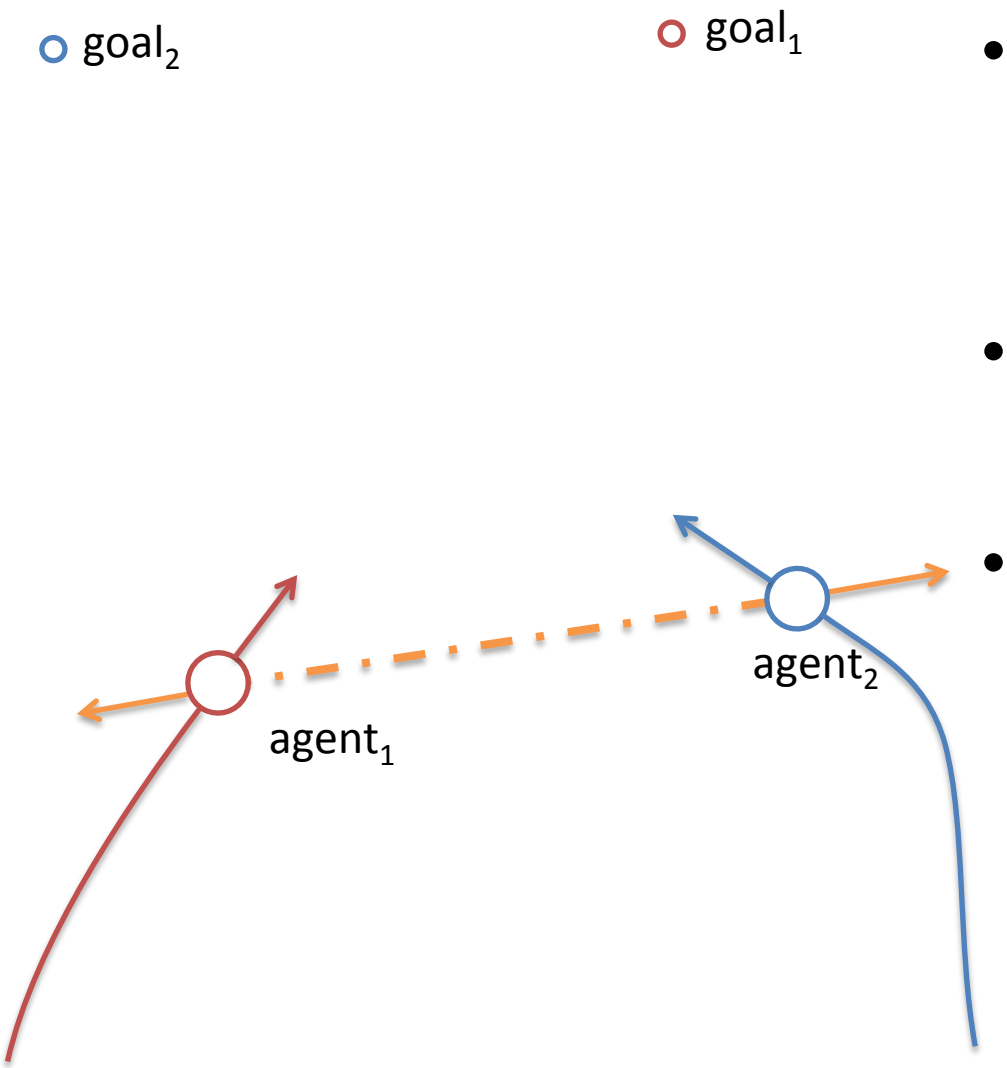
- Microscopic & continuous crowd simulation
- Model interactions between agents:
  - How does agent 1 adapt its motion to avoid collision with agent 2?

What is a velocity-based model?



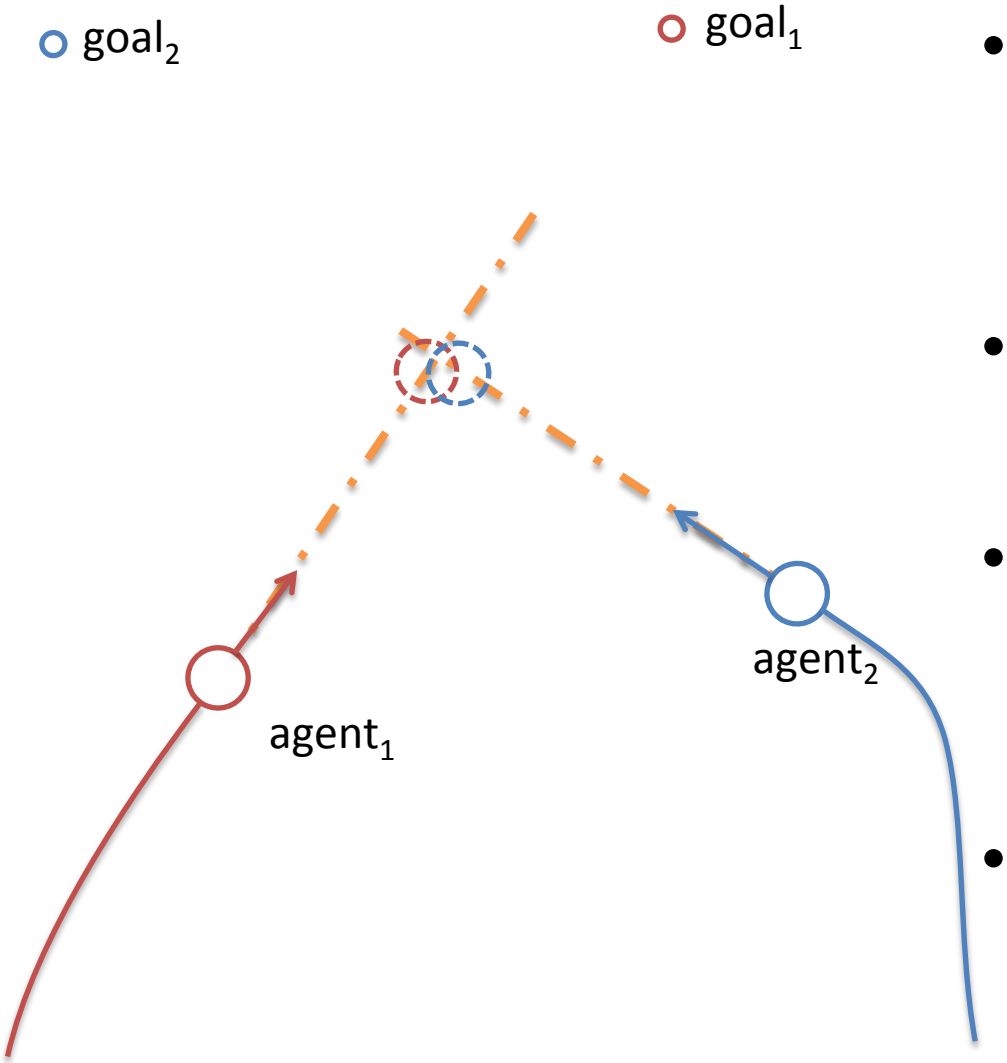
- Microscopic & continuous crowd simulation
- Model interactions between agents:
  - How does agent 1 adapt its motion to avoid collision with agent 2?
  - In combination with agent 3?

What is a velocity-based model?



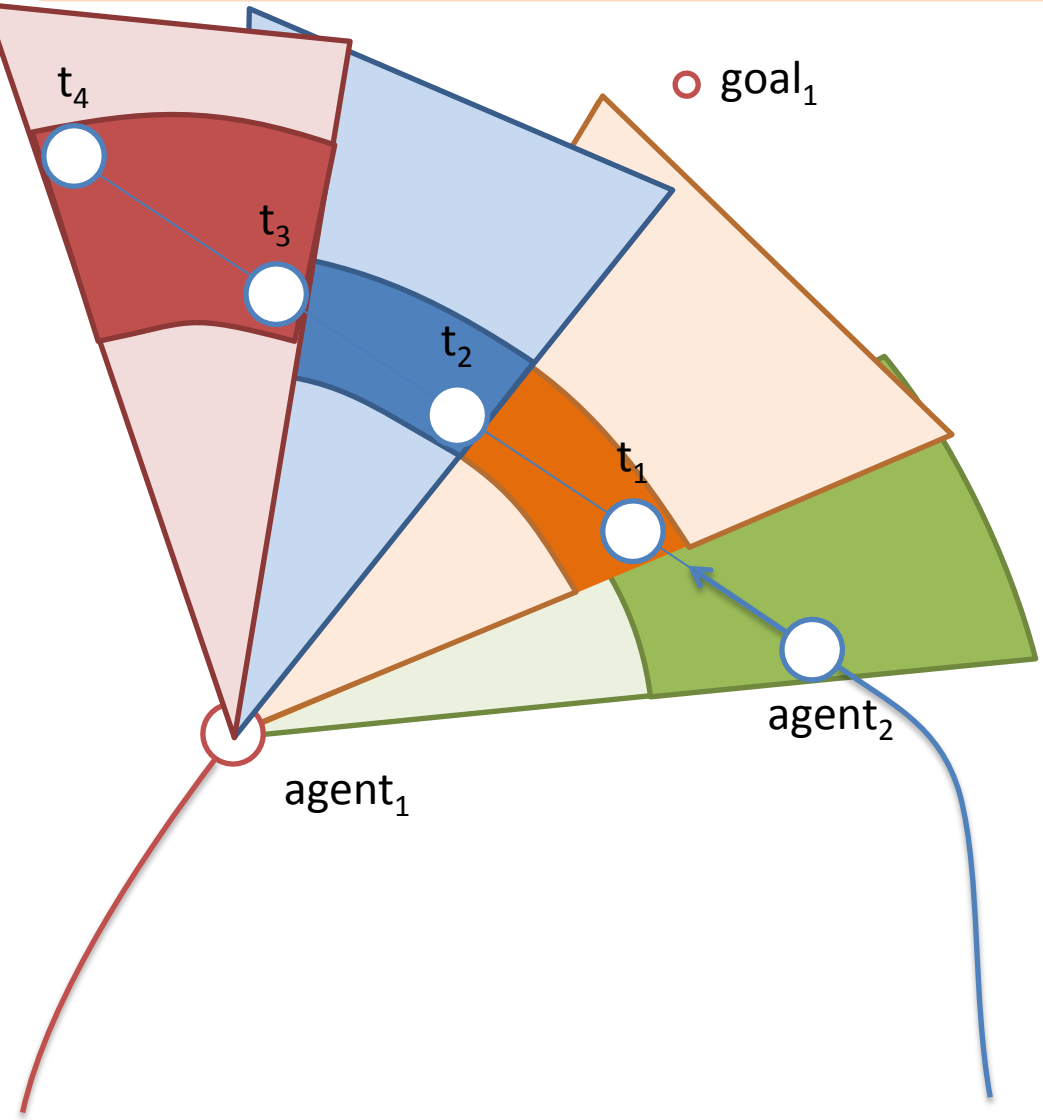
- Microscopic & continuous crowd simulation
- Model interactions between agents
- Position-based models (e.g., Social Forces - Helbing):
  $I=f(q_1,q_2)$

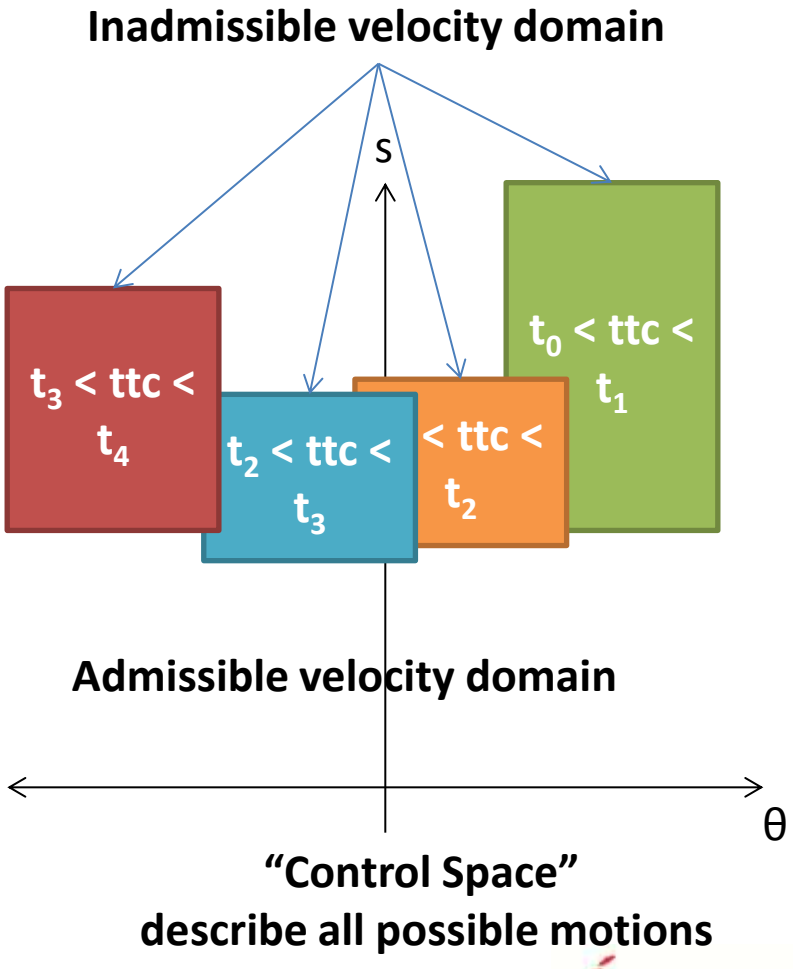
What is a velocity-based model?



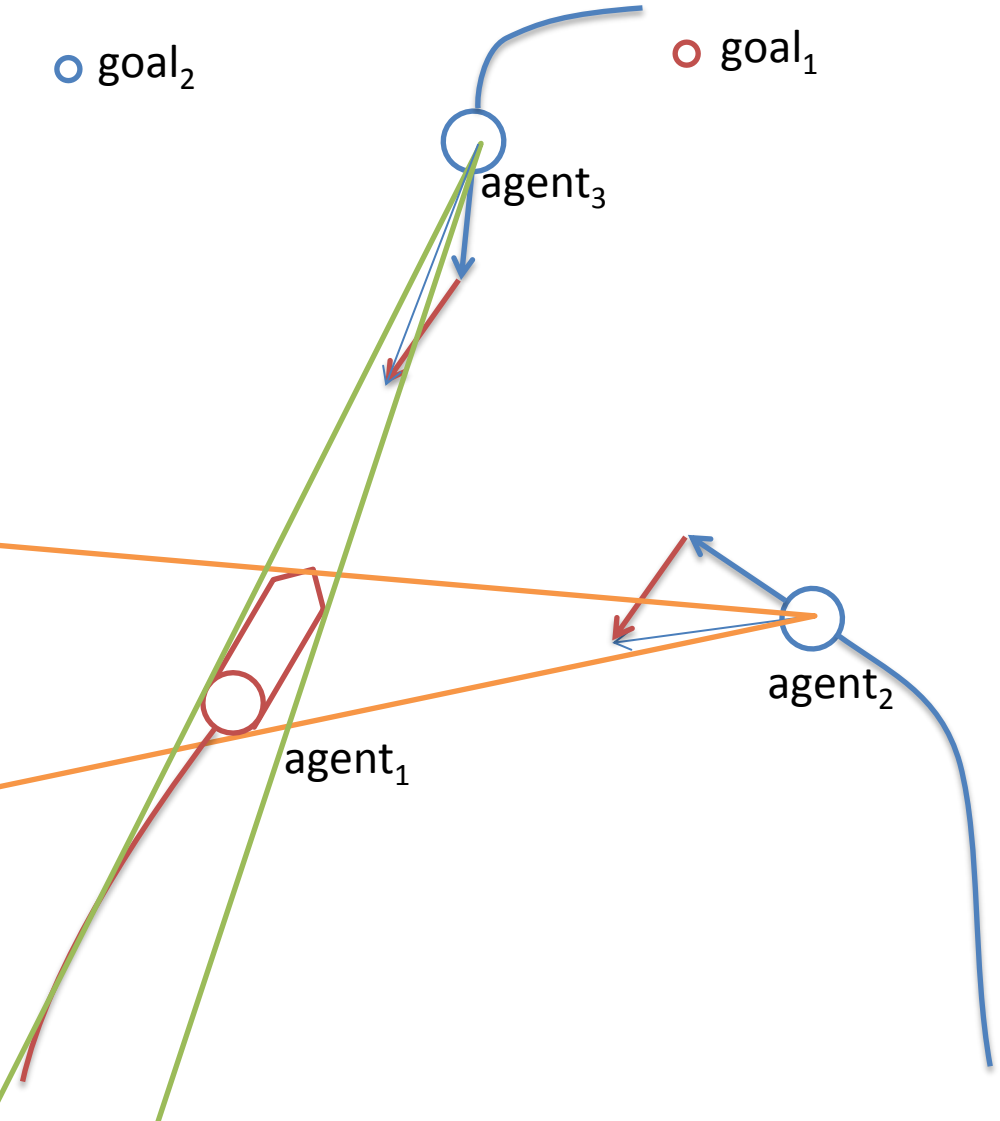
- Microscopic & continuous crowd simulation
- Model interactions between agents
- Velocity-based models suggest anticipation: $\mathbf{I=f(q_1,q_1,q_2,q_2)}$
- Compute collision velocity domains

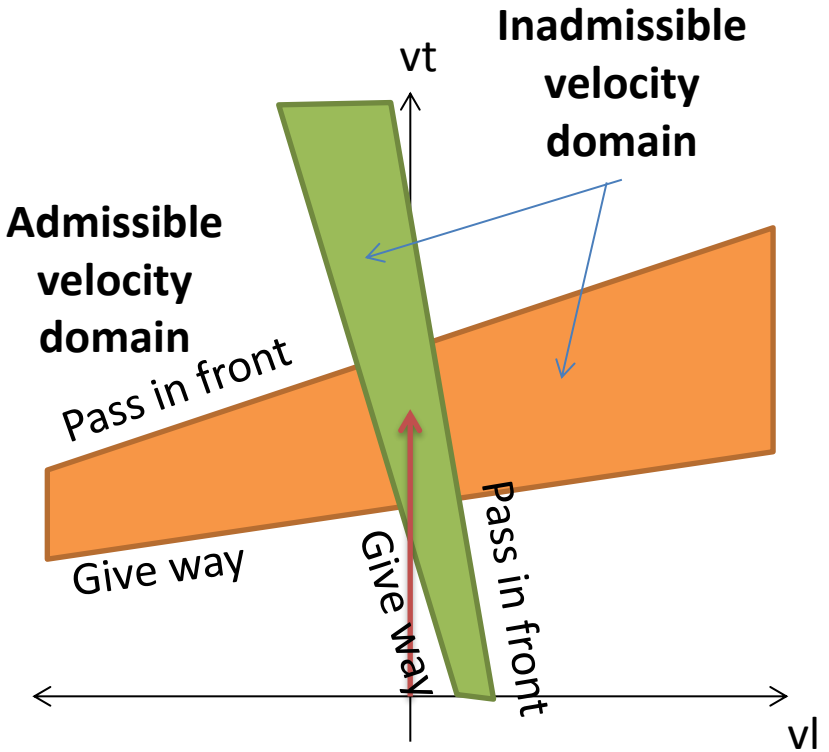
The Paris model [2007]



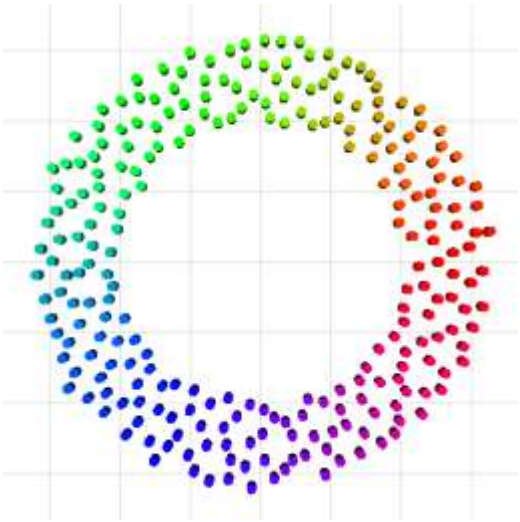


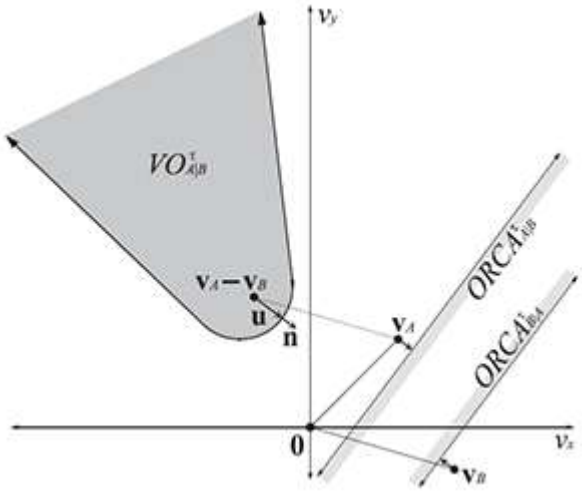
The Tangent model [2009]



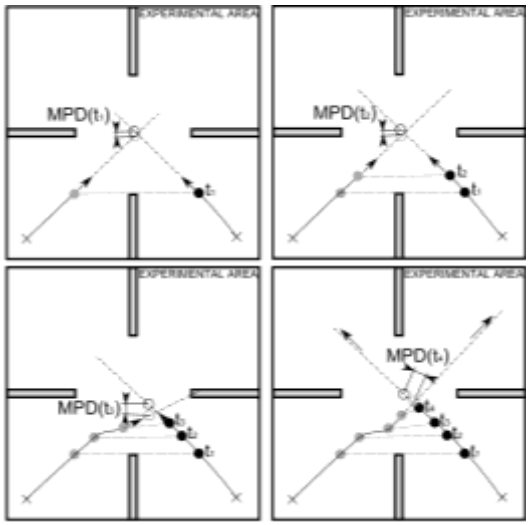


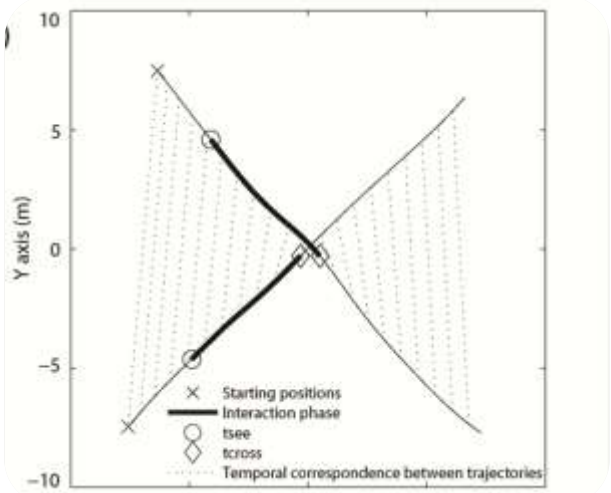
RVO developed at UNC [2008]

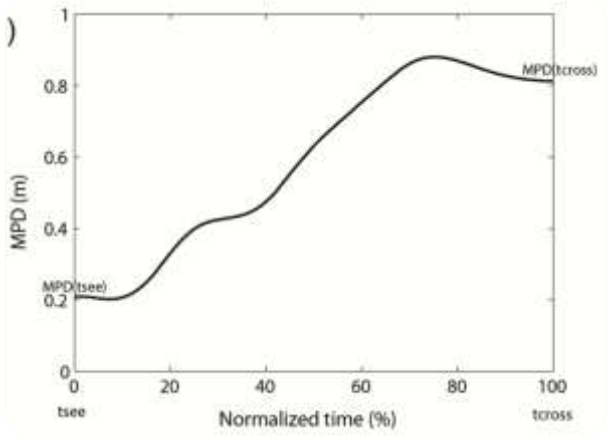


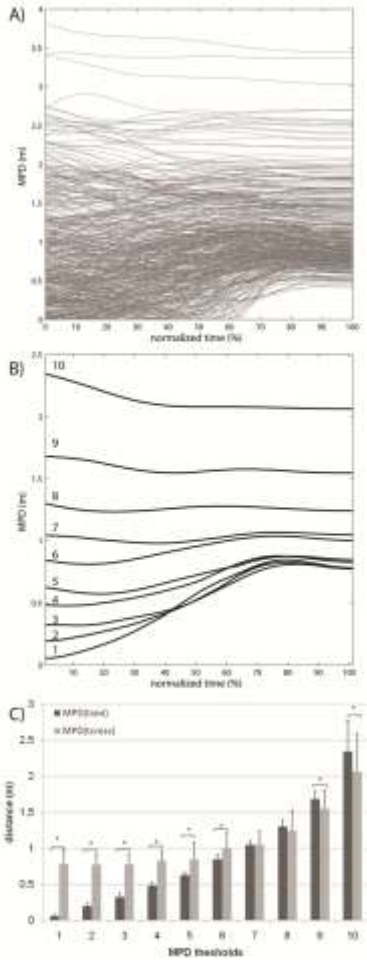


Experimental observation of anticipation

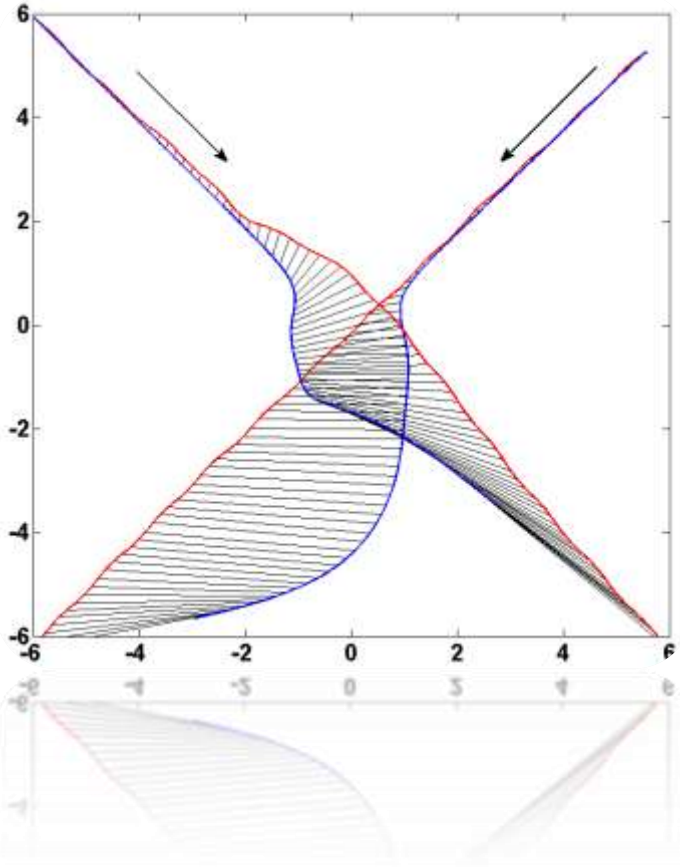


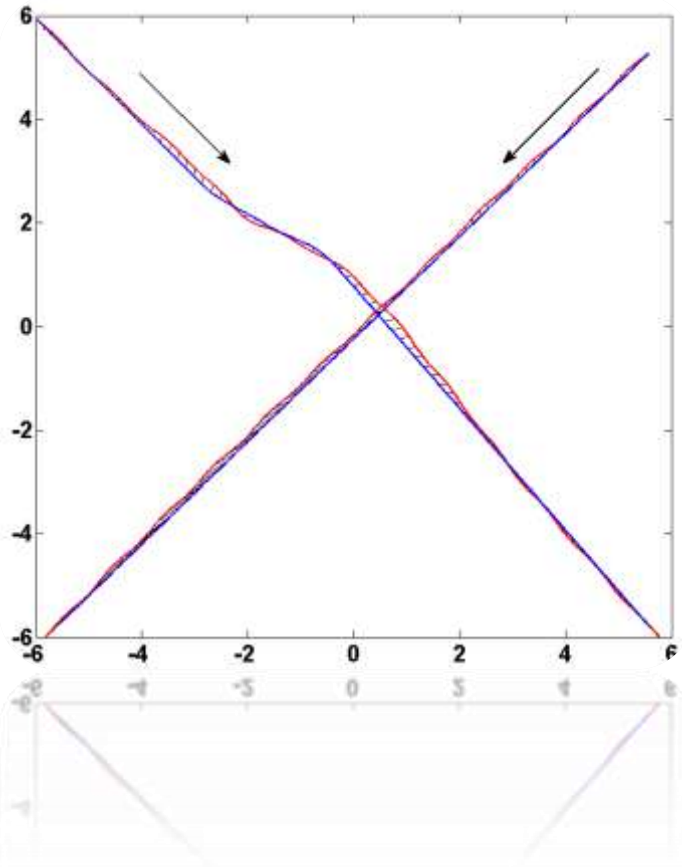






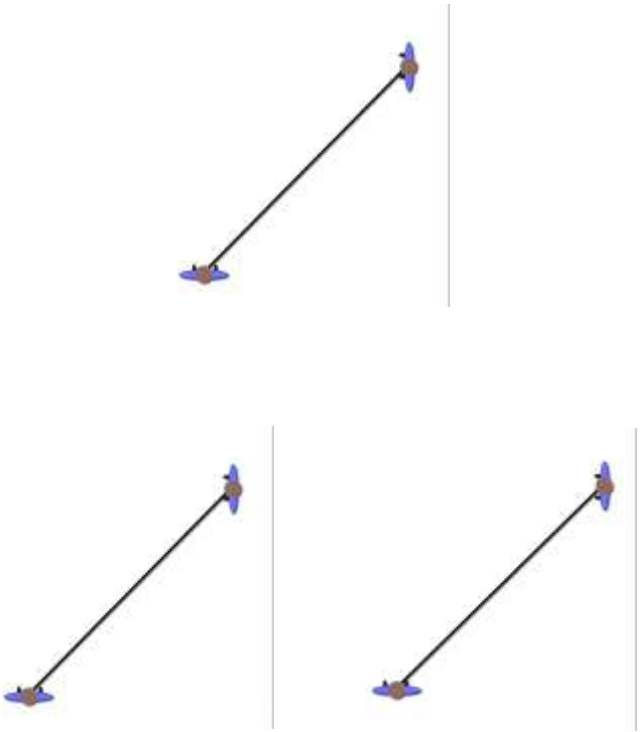
Position vs. velocity-based models

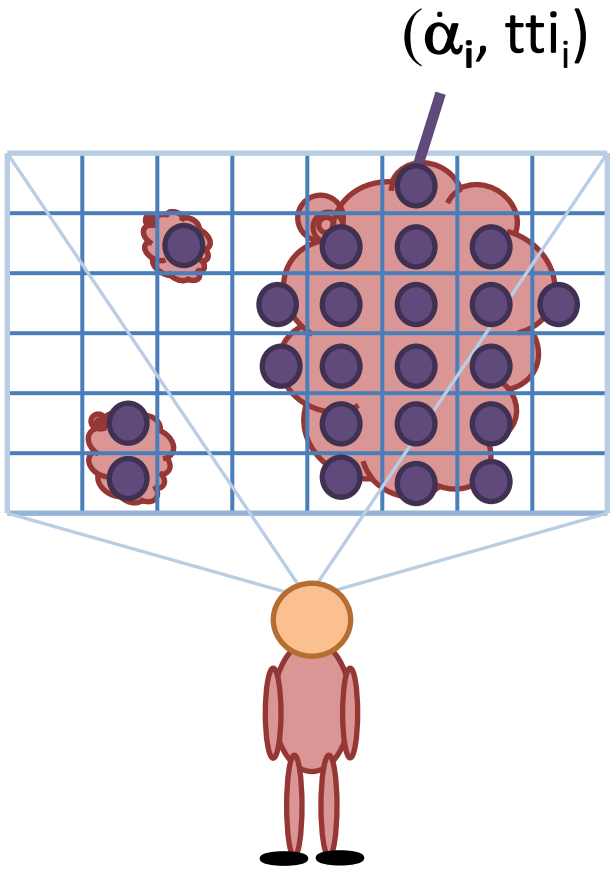




Video

Principles of synthetic vision based model





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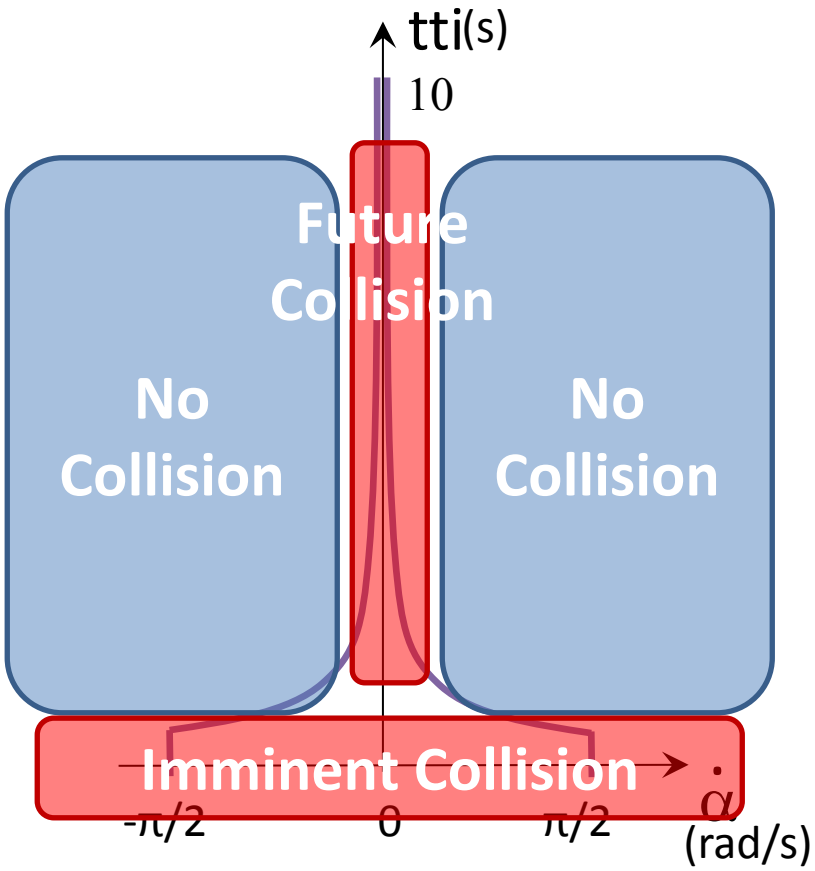
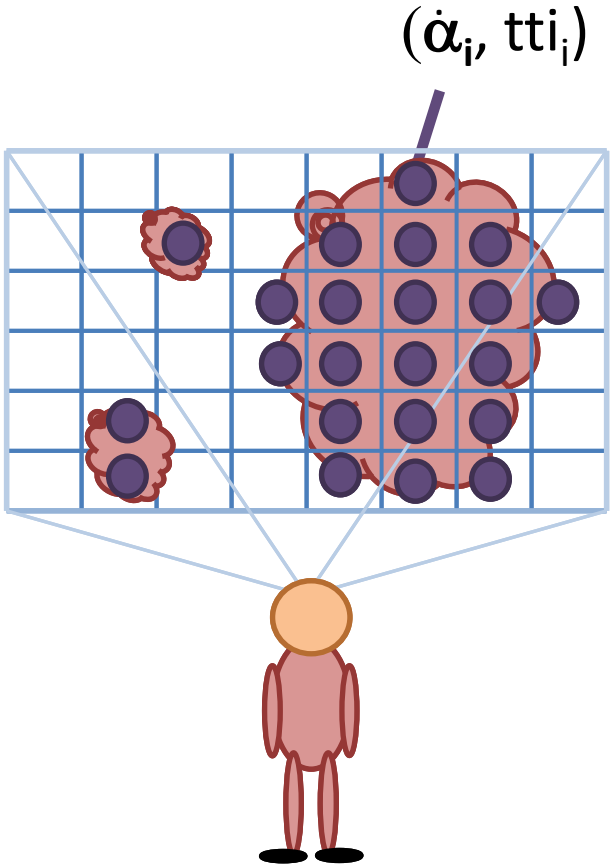
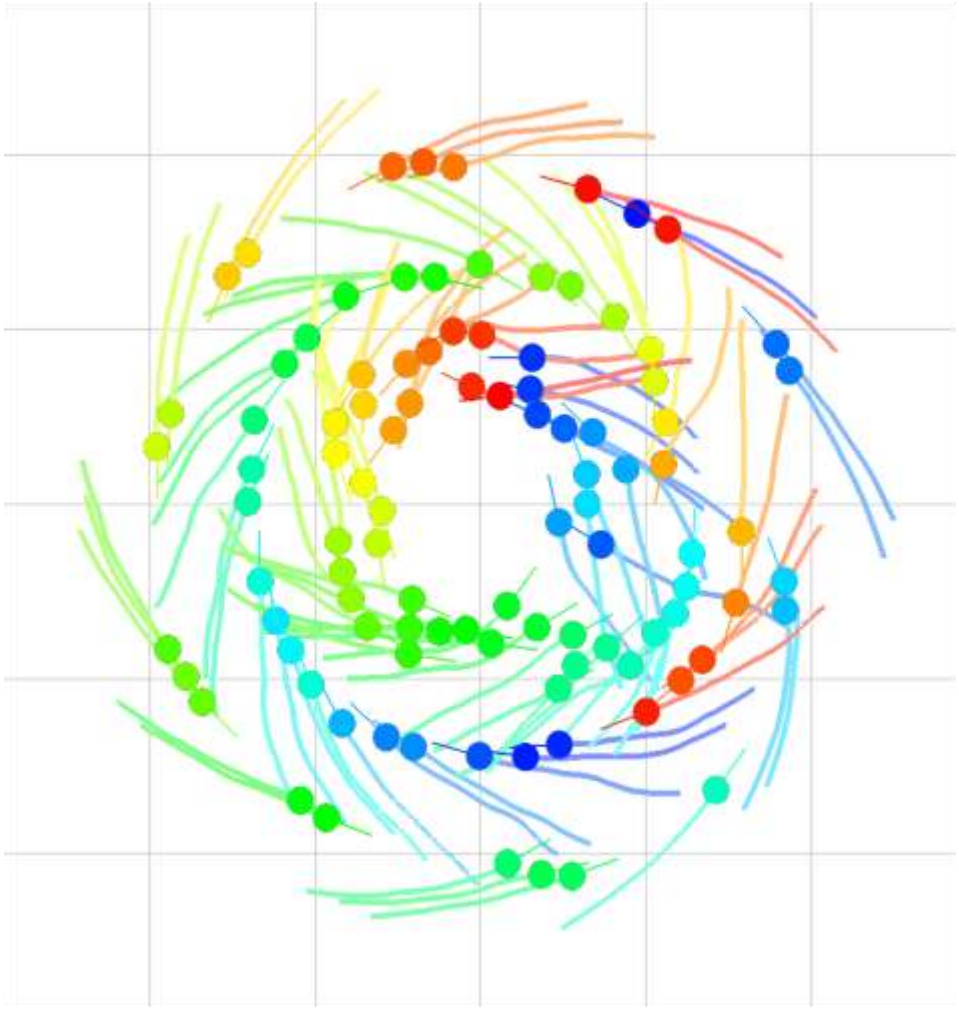


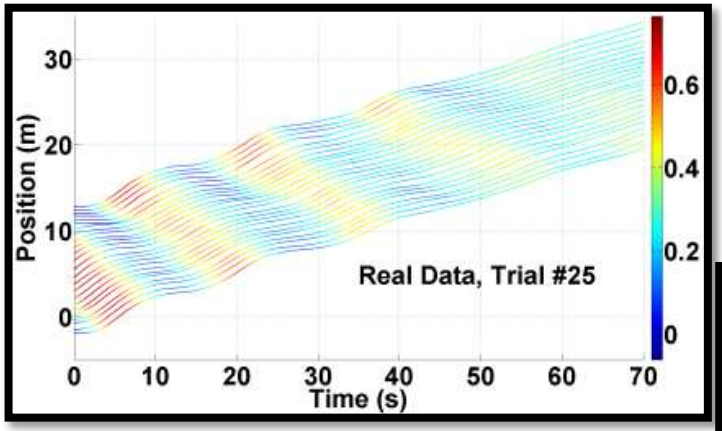


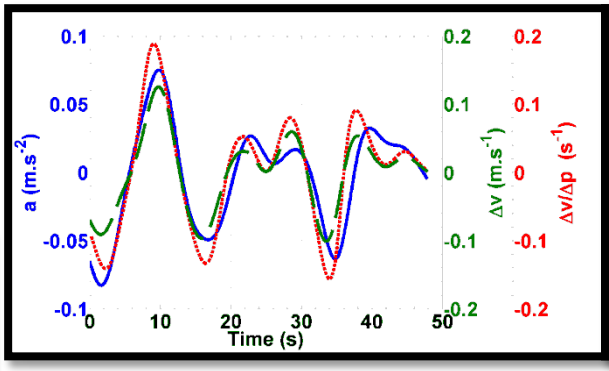
Video

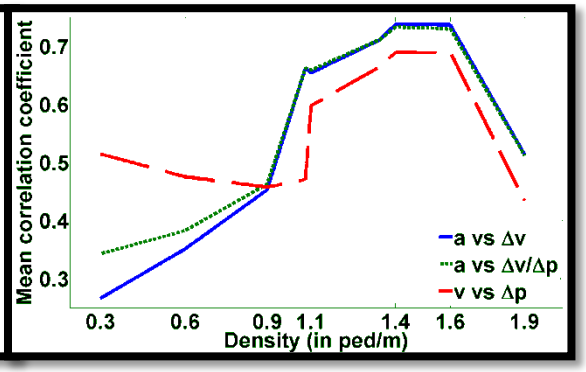


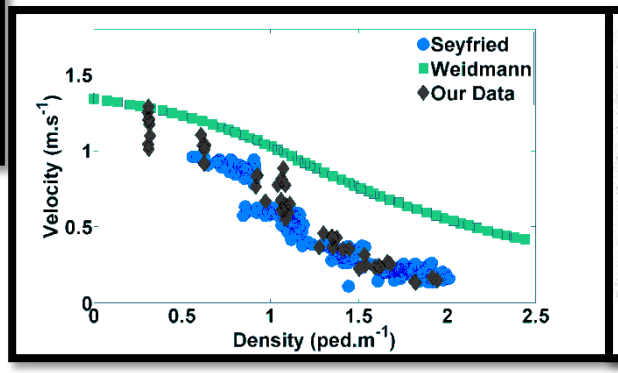
Pedigree experiments

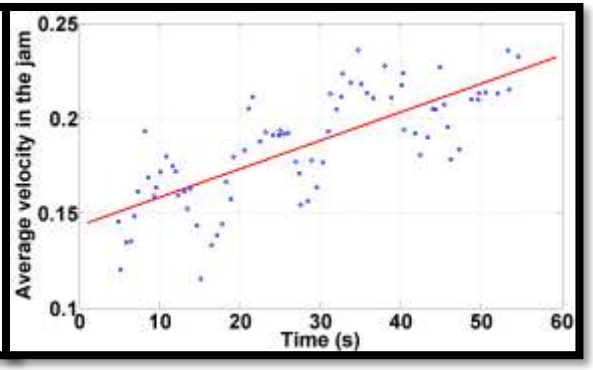
micro/macro data



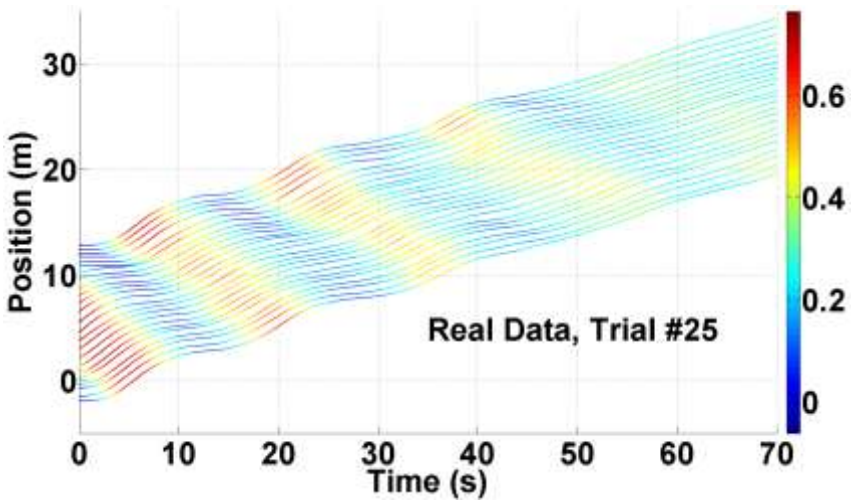


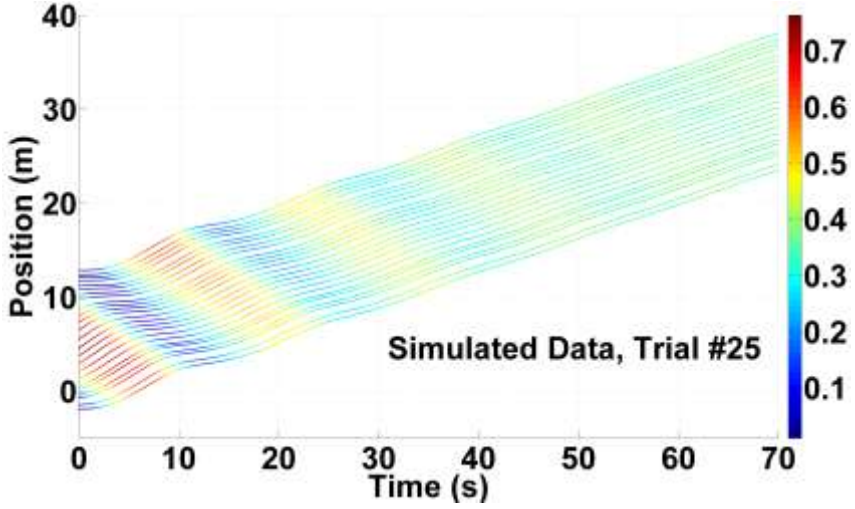






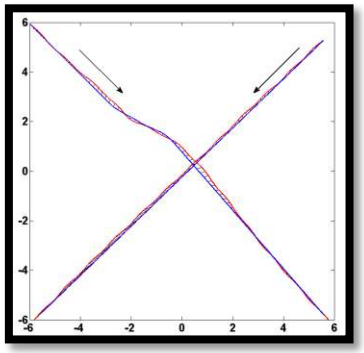
Following model [Lemercier 2012]

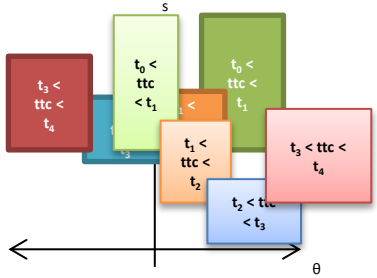


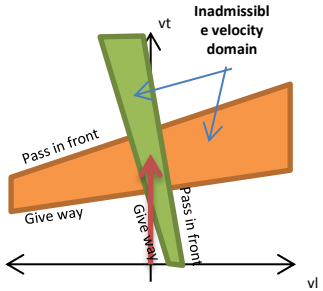


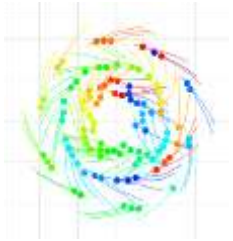
Conclusion

- Velocity-based models are (more than) promising:









- Still a lot to do !