



# Modeling Tourist Movement Using Lévy Flight

GEOG 8294 Spatiotemporal Modeling & Simulation

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## Importance

- Local government & companies: tourism management
- Future tourists: travel recommendation



## Challenges

- Complex
- Hard to describe patterns using raw data

**One of the efficient method to understand movement patterns and processes is to use simulation models.**

# Methodology



**Conceptual  
Model**



**Data  
Collection**



**Model  
Parameterization**



**Code  
Implementation**

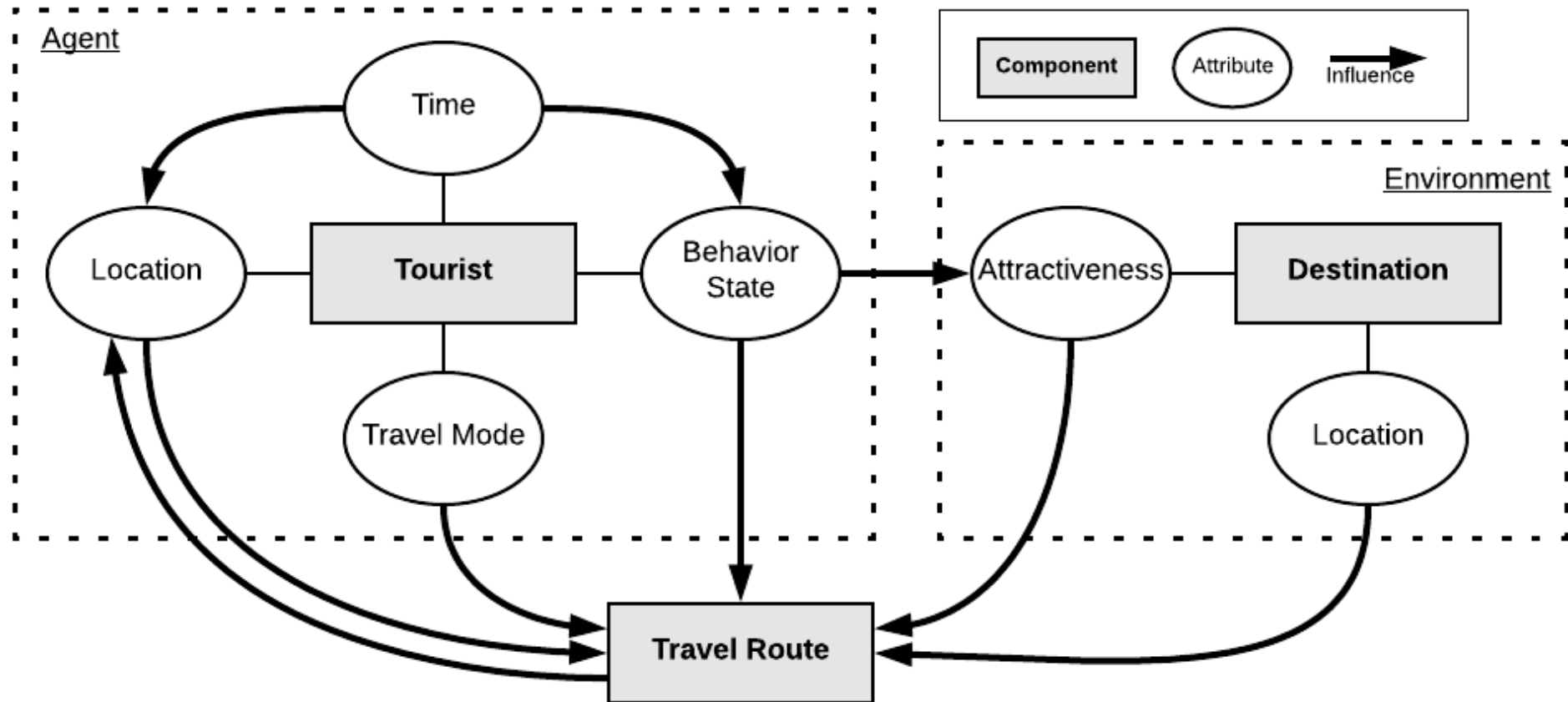


**Sensitivity  
Analysis**



**Model Implementation**

# Conceptual Model





# Model Implementation I

## Data Collection

Study area: City of Toronto - **boundary**



### Hotels

Toronto Open Data  
– Commercial  
residential area

A	B	C	D	E	F
record_id	id	owner	latitude	longitude	datetime
16	31949470885	97136542@N07	43.6131	-79.556	2016-12-26 14:15
86	17082080708	79552295@N00	43.6095	-79.5548	2015-04-25 19:05
246	31325901655	77063209@N07	43.6002	-79.545	2016-11-29 16:32
247	30503327954	77063209@N07	43.6002	-79.5445	2016-11-29 16:31
283	30861156306	149077145@N07	43.6144	-79.5312	2016-11-10 9:53
284	30261642763	149077145@N07	43.6144	-79.5312	2016-11-10 9:53



# Model Implementation I

## Data Collection

Study area: City of Toronto - **boundary**



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# Model Implementation II

## Parameterization



### Input by users

- Time steps tourists travel per day
- Length of the trip
- Travel mode



### Movement model

- Levy flight model
- A power law distribution (exponent value and coefficient)
- Truncation (step size limit)

Use actual movement observations  
to parameterize

# Work in Progress



**Conceptual  
Model**



**Data  
Collection**



**Model  
Parameterization**



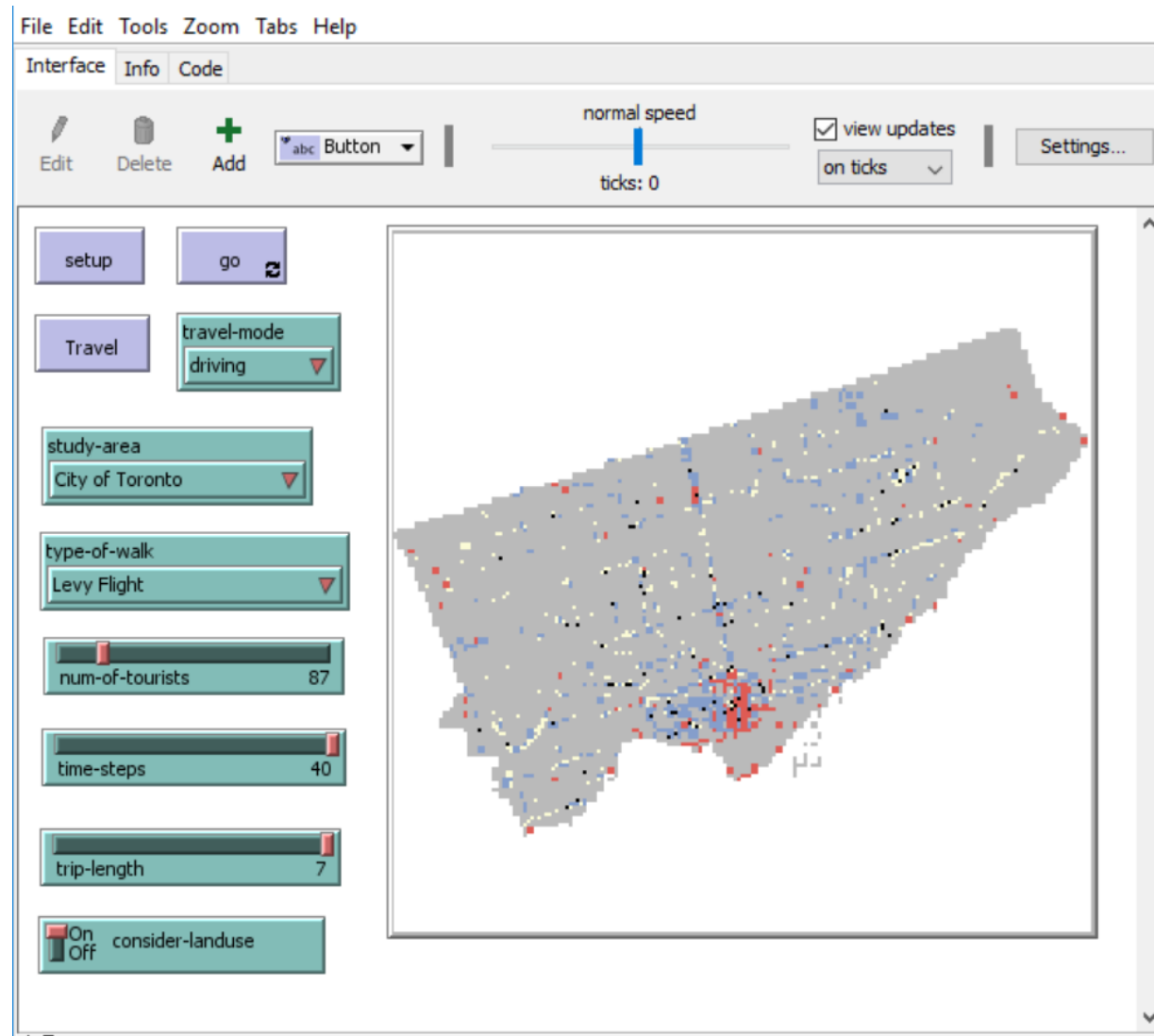
**Code  
Implementation**



**Sensitivity  
Analysis**

Use actual movement  
observations to parameterize  
the movement model.

# Outcomes



# Future Extensions



**Consider number of tourist attractions**



**Combine road network**



**Include more influencing factors**

- Age
- Purpose