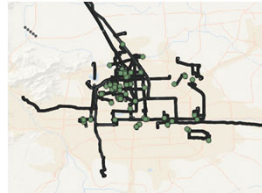


## Summary

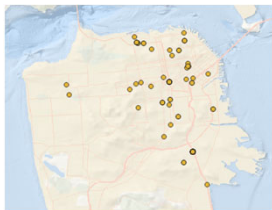
Existing real-world human mobility datasets are very limited in size, coverage and representativeness. For example, one of the largest and most commonly used datasets of individual human location trajectories, Geolife, captures fewer than two hundred individuals. The figure on the right shows the busiest day, 2009-02-14, in Geolife having 26 active users and having 94 observed check-ins. As can be seen this data is too sparse to represent the population of Beijing, China and to find meaningful patterns of human mobility. To help fill this gap, this data and resources paper leverages an existing data generator based on fine-grained simulation of individual human patterns of life to produce large-scale trajectory, check-in, and social network data. We ran simulations for more than 936 hours to capture more than 22 billion trajectory locations, more than 423 million check-ins, and more than 1.7 billion social links. The total data size exceeds 1.5 TB. The compressed data is available for download on the Open Science Framework (OSF) or can be regenerated locally.



Geolife Data: Busiest Day (26 Users)

## Motivation

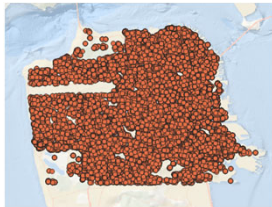
- Real-world mobility data are very sparse



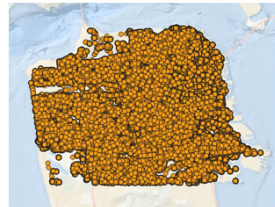
Brightkite's busiest day (2008-05-25)  
24 users and 255 check-ins



Gowalla's busiest day (2010-01-18)  
69 users and 710 check-ins



POL simulation on 2020-01-01  
10K agents and 53,343 check-ins

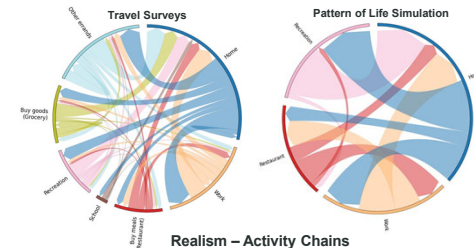
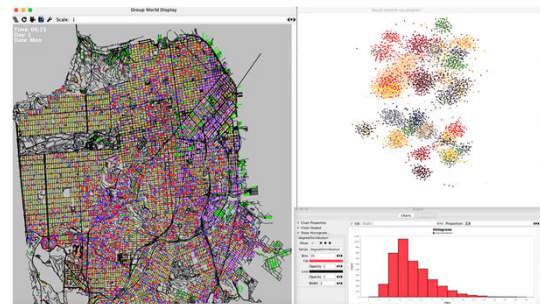
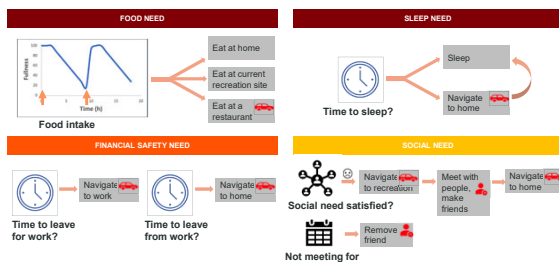
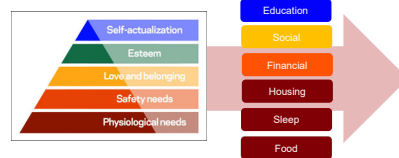


POL simulation on 2020-01-01  
10K agents and 2,880,000 location observations

## Pattern of Life Simulation

- Agent-based model
- Based on Maslow's Hierarchy of Needs and the Theory of Planned Behavior
- Implemented needs include Food, Sleep, Financial Safety and Love
- Generates locations, check-ins and social network data
- Implemented using the Multiagent Simulation on Networks (MASON) Toolkit in Java

### MASON Agent-Based Model



## Generated Data

Download	Settings		Check-Ins		Social Links		Trajectory Points		Runtime	
	Map	#Agents #Days	Count	Size(MB)	Count	Size(MB)	Count	Size(GB)	(hours)	
GMU:	George Mason University Campus area	1,000 450	2,442,934	175	9,788,020	269	129,600,000	9	3.16	
	1,000 3,630	19,109,109	1,433	85,828,108	2,457	1,045,440,000	71	22.33		
	1,000 7,230	37,952,610	2,764	171,906,382	4,812	2,082,240,000	141	46.12		
	3,000 450	7,369,221	532	30,203,582	872	388,800,000	27	11.66		
	5,000 450	12,314,442	890	56,073,810	1,637	648,000,000	45	31.96		
	10,000 450	24,168,718	1,843	123,572,434	3,788	1,296,000,000	89	49.57		
	1,000 450	2,473,475	176	9,529,160	262	129,600,000	9	3.15		
	1,000 3,630	19,325,948	1,433	81,377,850	2,252	1,045,440,000	71	23.96		
	1,000 7,230	38,370,713	2,764	162,645,920	4,505	2,082,240,000	141	47.22		
	3,000 450	7,666,739	552	27,204,936	785	388,800,000	27	14.8		
NOLA:	French Quarter of New Orleans	1,000 450	12,839,165	926	49,217,712	1,432	648,000,000	45	21.62	
	1,000 3,630	38,370,713	2,764	162,645,920	4,505	2,082,240,000	141	47.22		
	3,000 450	7,666,739	552	27,204,936	785	388,800,000	27	14.8		
	5,000 450	12,839,165	926	49,217,712	1,432	648,000,000	45	21.62		
	10,000 450	25,731,468	1,945	97,549,684	2,969	1,296,000,000	89	53.87		
	1,000 450	2,481,774	176	9,169,470	252	129,600,000	9	6.25		
	1,000 3,630	19,404,487	1,433	80,419,112	2,252	1,045,440,000	71	47.5		
	1,000 7,230	38,526,948	2,464	161,632,490	4,505	2,082,240,000	141	91.71		
	3,000 450	7,610,274	545	27,333,644	789	388,800,000	27	22.73		
	5,000 450	12,816,339	919	44,525,826	1,297	648,000,000	45	39.57		
ATL:	Atlanta City Center	1,000 450	2,507,220	178	8,663,638	238	129,600,000	9	7.22	
	1,000 3,630	19,662,213	1,433	74,305,732	2,448	1,045,440,000	71	54.86		
	1,000 7,230	39,063,687	2,867	149,298,832	4,198	2,082,240,000	141	103.7		
	3,000 450	7,651,106	547	26,694,044	771	388,800,000	27	28.54		
	5,000 450	12,938,737	927	50,027,578	1,454	648,000,000	45	53.89		
	10,000 450	25,792,051	1,945	97,457,318	2,867	1,296,000,000	89	85.51		
	SFCO:	San Francisco	1,000 450	2,507,220	178	8,663,638	238	129,600,000	9	7.22
		1,000 3,630	19,662,213	1,433	74,305,732	2,448	1,045,440,000	71	54.86	
	Total	84,000	50,640	423,609,105	30,812	1,736,701,132	50,285	22,360,320,000	1,527	936.83

## Reproduction

