Data-driven urban planning and policymaking

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How can data help us manage urbanisation?





- 1. Learn
- 2. Plan
- 3. Regulate





Can we identify areas of economic deprivation by analysing the flow of people?



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Zipf's gravity model

$$F_{i,j}^{est} = g \frac{m_i m_j}{d_{i,j}^2}$$
 $G_i^{\mu} = \frac{1}{k_i} \sum_{j \in S_i} |F_{i,j}^{est} - F_{i,j}|$
 $G_i^{\sigma} = \sqrt{\sum_{j \in S_i} (F_{i,j}^{est} - F_{i,j})^2}$

Classifiers of top IMD quartiles(some) Results

	Precision	Sensitivity	Specificity
Composite	.805	.733	.810
Income	.705	.729	.733
Employment	.694	.701	.718
Health	.779	.736	.648
Housing	.779	.662	.818
Crime	.761	.756	.769
Liv. Env.	.902	.793	.928
Education	.644	.723	.615

C. Smith, D. Quercia and L. Capra. "Finger On The Pulse: Identifying Deprivation Using Transit Flow Analysis". In 16th ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW). San Antonio, Texas. February 2013

- Follow-ups
 - Developing countries
 - Flow of information (telco data)

Robustness

C. Smith-Clarke, A. Mashhadi and L. Capra. "Poverty on the Cheap: Estimating Poverty Maps Using Aggregated Mobile Communication Networks". In 32nd ACM Conference on Human Factors in Computing Systems (CHI). Toronto, Canada. April 2014

Benchmarks

C. Smith-Clarke and L. Capra. "Beyond the baseline: Establishing the value in mobile phone based poverty estimates". In 25th International World Wide Web Conference (WWW 2016). Montreal, Canada. April 2016







3. Regulate



Can we quantitatively evaluate urban form theories using open and crowd-sourced data?

Oxford Circus

Daford Street

2. Plan

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anafard Serve

Euston Square

B506

Cover

Tottenham Court Road

Warren Street

- Theories
 - Street network
 - Housing
 - Functions

Method

- Compute metrics per unit of analysis
- Regression analysis
 - economic deprivation, well-being, life
 expectancy, child obesity, gang crime
- Validation
 - Greater London, Birmingham, Greater Manchester, Liverpool, Leeds, Newcastle

(some) Results



A. Venerandi, G. Quattrone, L. Capra, D. Quercia and D. Saez-Trumper. "Measuring Urban Deprivation from User Generated Content". In 18th ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2015). Vancouver, BC, Canada. March 2015

A. Venerandi, G. Quattrone, L. Capra. "Guns of Brixton: which London neighborhoods attract criminal groups?". In 2nd EAI International Conference on IoT in Urban Space (UrbIoT 2016). Tokyo, Japan. May 2016.

2. Plan

3. Regulate



Can we support data-driven policy-making, to help regulate p2p economy services?

- Can we support data-driven policy-making, to help regulate p2p economy services?
 - Under what conditions is there Airbnb presence?
 - How does Airbnb presence grow over time?

Method

- Compute metrics per unit of analysis
- Modelling
 - Airbnb offerings, demand, price
- Validation
 - Greater London
 - Austin, Los Angeles, New York City, New Orleans, Oakland, San Diego, San Francisco, Seattle

			2012		2013		2014		2015
	Indip. var	<i>p</i> -val	eta	p-val	eta	<i>p</i> -val	eta	p-val	β
Hotel	Hotel A		0.00		-0.02	**	-0.09		-0.08
Geography	Dist	***	-0.32	***	-0.19	*	-0.12	*	-0.13
Attractiveness	4sq	***	0.20		0.12		-0.06		-0.11
	TrnspScr		-0.07		-0.09		0.05		0.02
	AttrPOIs		0.06		0.04		-0.04		-0.01
Demographics	YoungDen	***	0.27	***	0.32	***	0.31	**	0.24
	Income		0.05	***	-0.21	***	-0.42	***	-0.62
	Employment	**	-0.12		-0.02		0.07		0.06
	Ethnics	***	0.17	**	0.12		0.01		0.02
	Bohemian		-0.03		-0.01		0.00		-0.01
	MeltingPox	**	-0.09	**	-0.12		-0.03		-0.02
	Education		0.07		0.05		-0.10	**	-0.25
Housing	LivEnvir		0.06		0.03		0.03		-0.01
	GreenSpace		-0.02		0.01		0.01		0.00
	DwCTFtoH		0.03	*	0.13	**	0.21		0.07
	Houses Ratio		-0.07		-0.13		0.02		-0.15
	OwndDwelRatio		-0.11	***	-0.32	***	-0.64	***	-0.59
	MedHPrice	***	0.20	*	0.13		0.04		0.04
	PropsSld		0.05		0.03	***	0.19	***	0.20
	Adjusted R-squared		0.84		0.80		0.70		0.54
	Moran's test		0.03		0.02		0.04		0.05

G. Quattrone, D. Proserpio, D. Quercia, L. Capra and M. Musolesi. "Who benefits from the "sharing" economy of Airbnb?". In 25th International World Wide Web Conference (WWW 2016). Montreal, Canada. April 2016

Learn Plan Regulate

#getTheRightData #getTheDataRight