

Lesson 1: Introduction to Geospatial Analytics

**Dr. Kam Tin Seong
Assoc. Professor of Information Systems**

**School of Computing and Information Systems,
Singapore Management University**

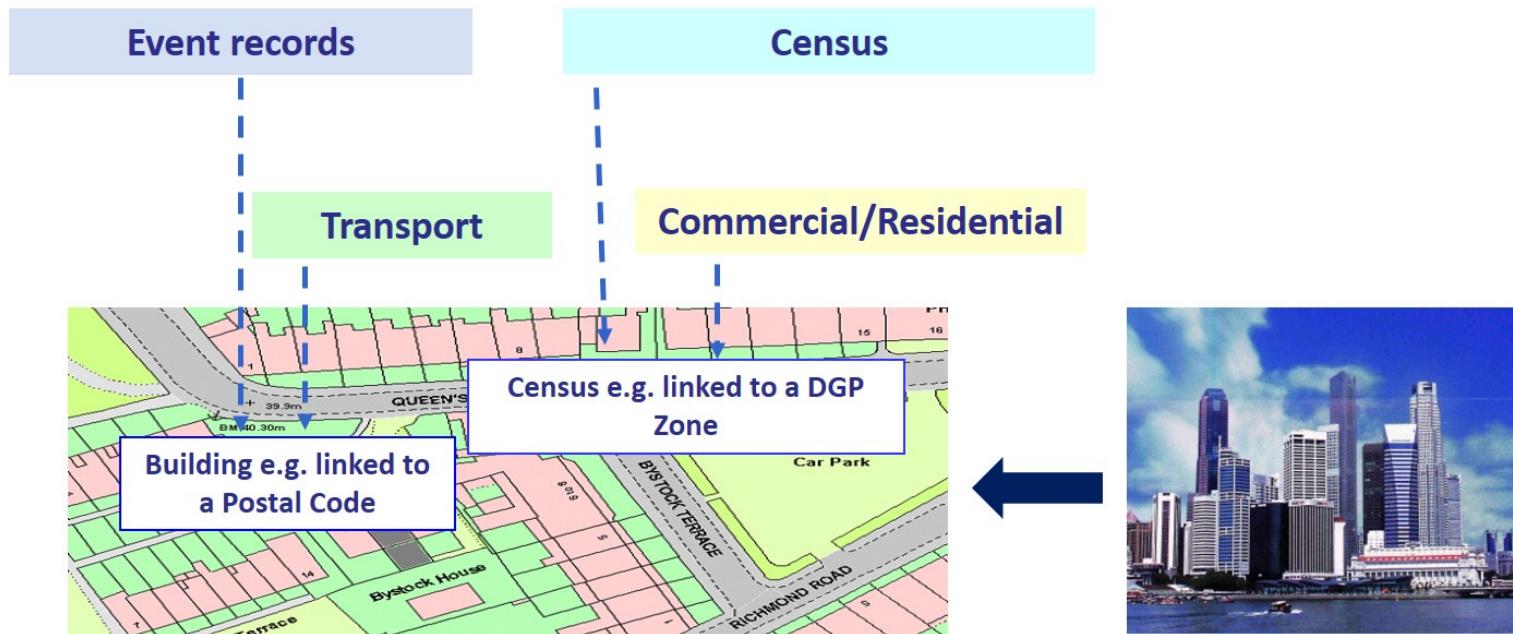
2020/04/25 (updated: 2021-08-16)

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- Demystifying Geospatial Analytics
- Motivation of Geospatial Analytics
- The Role of Geospatial Analytics
- Geospatial Analytics and Social Consciousness

Demystifying Geospatial Analytics

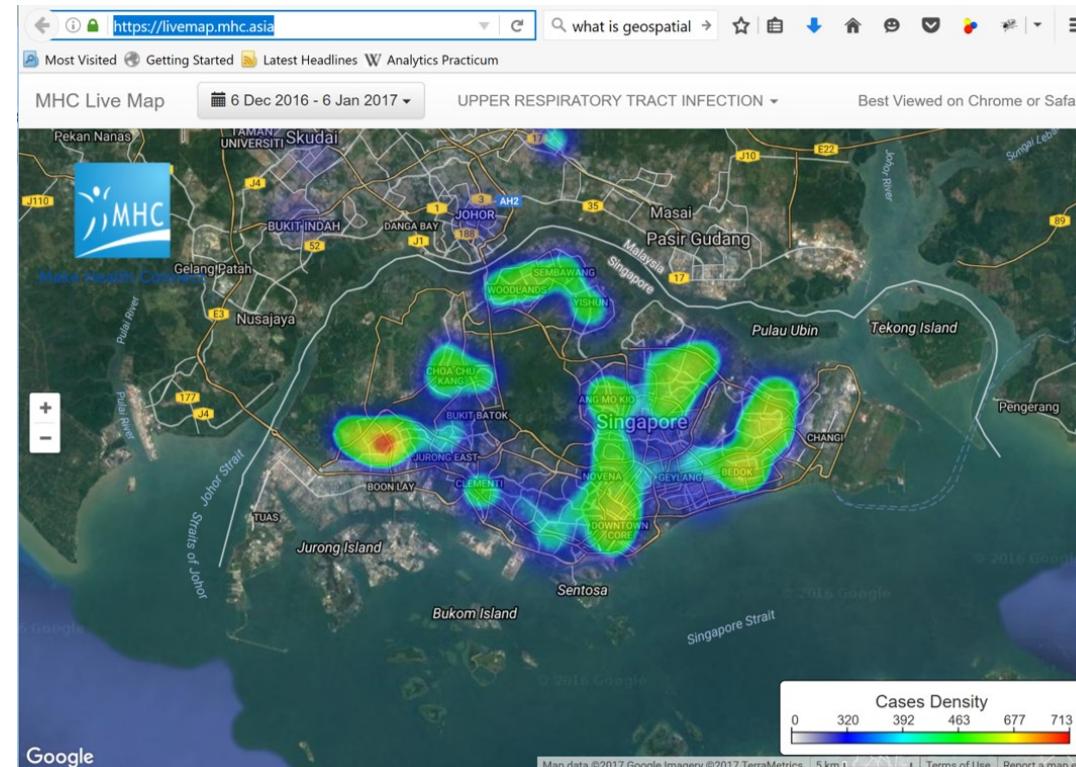
- A **Geographical Information System (GIS)** is a toolkit for creating, managing, analysing, visualising, and sharing data of any kind according to where it's located.



Geospatial analytics is more than a GIS

Demystifying Geospatial Analytics

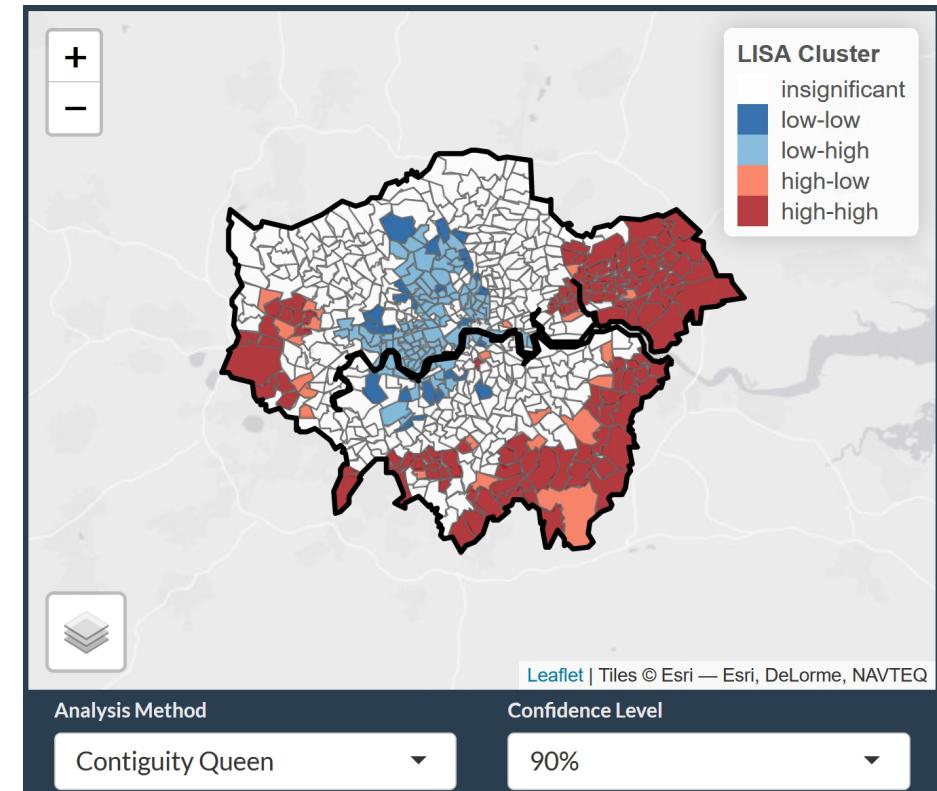
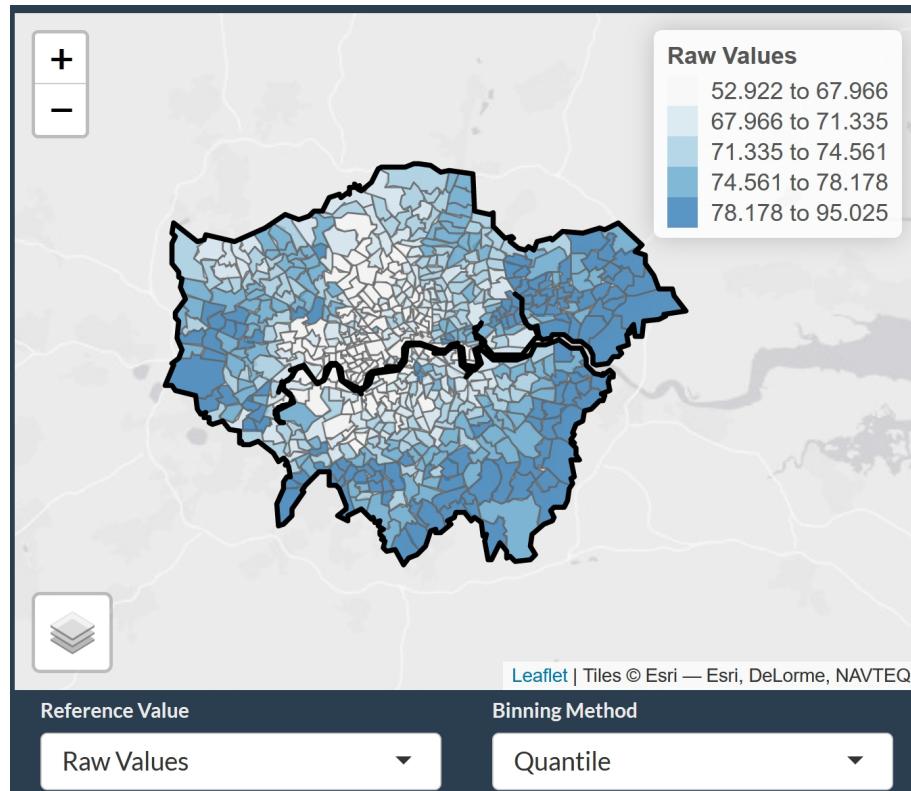
- Geospatial analytics is more than data visualisation



Source: <https://livemap.mhc.asia/> and the real geospatial analytics https://wiki.smu.edu.sg/1213t2is415g1/IS415_2012-13_Term2_Assign2_Derek.Lee

Demystifying Geospatial Analytics

- Geospatial analytics is more than just mapping



Source: <https://isss608.shinyapps.io/shiny/>

Motivation of Geospatial Analytics

- About 80% of all data maintained by organisations around the world has a location component.

(Source: BusinessWeek Research Services, 2006)

B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD		
1	Country	Exchange	Name	ForEx	Symbol	ISIN	GEDOL	ChenBe	Moegle	MoypU	Industry	Supercar	1 Day Chg	1Wkch C	2Wkch C	1 Month	2 Month	3 Month	1 Day Chg	1 Day Chg	1Wkch C	1Wkch C	2 Wkch C	1 Month	1 Month	2 Month	2 Month	3 Month		
2	AT	VIE	EuroGrp	EUR	EDCT.VI	AT000001334931	12.25	35-03	3E+03	Financial Banks		22.65	-25	19.95	14.62	-16	15.3	-0.064	-0.068	-0.052	0.0016	0.2415	0.2657	0.4453	0.7121	0.3256	0.3754	0.05		
3	AT	VIE	Raffaello	EUR	RBIB.VI	AT0000010047	21.21	15-03	3E+03	Financial Banks		22.65	-25	19.95	14.62	-16	15.3	-0.064	-0.068	-0.052	0.0016	0.4508	0.5017	0.3256	0.3754	0.05				
4	AT	VIE	youngstar	EUR	VOES.VI	AT000001434340	3.93	15-03	3E+03	Financial Banks		10.11	30.47	11.19	12.4	15.22	15.05	-0.026	-0.028	-0.053	-0.074	-0.12	-0.101	-0.206	-0.173	-0.353	-0.3			
5	AT	VIE	WiseEuro	EUR	WBES.VI	AT000001669332	5.93	5E-03	3E+03	Financial Banks		6.15	5.6	5.5	6.37	10.06	11.3	-0.036	-0.038	0.0505	0.0622	0.0762	0.1019	-0.097	-0.08	-0.41	-0.389	-0.5		
6	AT	VIE	latorex	EUR	ICEL.VI	AT0000010074	23.2	3E-08	3E+03	Industrial	Coatings		21.22	21.48	21.43	22.3	25.68	21.84	0.0533	0.0508	0.0581	0.0591	0.0786	0.1029	0.054	-0.097	-0.064	0.062		
7	AT	VIE	Auditor	EUR	ANDV.VI	AT000001817004	23.3	3E-08	3E+03	Industrial	Industries		21.47	21.51	19.79	24	23.3	19.15	0.0787	0.0784	0.0767	0.0592	0.0702	0.1957	-0.067	0.0494	-0.006	0.0289	0.27	
8	AT	VIE	Vigorex	EUR	VBEX.VI	AT000001006303	1.59	15-03	3E+03	Industrial	Plastics		20.47	20.7	19.8	20.4	20.43	20.43	-0.026	-0.028	0.0505	0.0508	0.0581	0.0591	0.0786	0.1029	0.054	-0.097	-0.064	0.062
9	AT	VIE	CAVAC	EUR	OMV.VI	AT000001455149	25.2	4E-09	3E+03	Oil & Gas	Oil & Gas		24.29	23.84	21.23	23.72	22.39	10.12	0.0517	0.0502	0.057	0.0543	0.197	0.2106	0.2557	0.3441	0.344			
10	AT	VIE	Teknolo	EUR	TELA.VI	AT000001455309	11.4	4E-09	3E+03	Telecoms	Telecoms		10.66	10.43	10.43	3.35	11	10.3	0.0437	0.0474	0.0667	0.0534	0.102	0.157	0.0364	0.0737	0.309			
11	AT	VIE	Yurberd	EUR	VEBEV.VI	AT0000014661607	28.53	2E-09	3E+03	Utilities	Utilities		23.36	23.32	23.52	25	23.97	23.56	-0.013	-0.016	-0.044	-0.0643	0.0546	0.1182	0.1930	-0.046	-0.072	-0.5		
12	AT	VIE	Atmos	EUR	ATRIV.VI	AT000001751864	2.27	5E-09	3E+03	Financial	Real Estate		2.02	2.02	2.15	1.47	2.10	2.59	-0.022	-0.024	0.1238	0.0396	0.0558	0.1289	0.0442	0.6843	0.0413	0.1501	-0	
13	AU	ASX	Bridge	AUD	BENX.AX	AU000001509126	8.3	2E-03	3E+03	Financial	Banks		7.92	7.4	6.3	6.84	10	11	0.0241	0.0348	0.1058	0.0395	0.3	0.473	0.374	0.3737	-0.181	-0.035	-0.20	
14	AU	ASX	Success	AUD	SURAX.AX	AU000001550204	6	8E-03	3E+03	Financial	Banks		5.14	6.17	5.4	5.2	7.5	8.3	-0.023	-0.022	0.0448	0.0497	0.1111	0.1501	0.358	0.5785	-0.2	0.237	-0.2	
15	AU	ASX	Neurotex	AUD	NEUAX.AX	AU000001007244	20.1	4E-09	3E+03	Financial	Banks		21.09	19.79	19.35	20.1	20.3	20.3	-0.044	-0.045	0.057	0.0596	0.1002	0.1473	0.2522	0.601	0.620	-0.07		
16	AU	ASX	Alpha	AUD	BOGAX.AX	AU000001007244	8.44	15-03	3E+03	Financial	Banks		7.71	7.71	7.64	7.4	8.45	8.63	-0.044	-0.045	0.057	0.0596	0.1002	0.1473	0.2522	0.601	0.620	-0.07		
17	AU	ASX	Armatix	AUD	ANZAX.AX	AU000001665556	15.75	3E+00	3E+03	Financial	Banks		16.75	15.95	16.02	13.05	13.27	15.25	-0.049	-0.049	0.0448	0.0512	0.102	0.157	0.2447	0.3091	0.3715	0.032		
18	AU	ASX	Victrix	AUD	WEBCO.AX	AU000001507146	13.03	2E-09	3E+03	Financial	Banks		13.18	10.95	11.32	16.65	15.54	16.53	-0.003	-0.002	0.0171	0.0171	0.0226	0.3324	0.34					
19	AU	ASX	Connex	AUD	CBAAX.AX	AU000001520103	34.73	3E-01	3E+03	Financial	Banks		35	35.08	31	25.3	25.8	28.3	-0.008	-0.007	-0.01	-0.0114	0.0203	0.2417	0.3054	0.3079	0.2391	0.4875		
20	AU	ASX	Bluesco	AUD	BSLAX.AX	AU000001533232	2.37	2E-09	3E+03	Basic Mfg	Basic Industries		2.74	2.55	2.25	2.3	3.32	3.47	-0.078	-0.078	0.0028	0.0023	0.0422	0.2516	0.103	0.2238	-0.212	-0.171	-0.2	
21	AU	ASX	CSR Ltd	AUD	CSRX.AX	AU000001523864	1.26	2E-03	3E+03	Basic Mfg	Basic Industries		1.27	1.15	1.17	1.02	1.425	1.75	-0.05	-0.05	0.048	0.0422	0.0295	0.3614	0.1765	0.3890	-0.162	-0		
22	AU	ASX	Illico	AUD	UXJAX.AX	AU000001533232	1.26	2E-03	3E+03	Basic Mfg	Basic Industries		1.27	1.15	1.17	1.02	1.425	1.75	-0.05	-0.05	0.048	0.0422	0.0295	0.3614	0.1765	0.3890	-0.162	-0		
23	AU	ASX	Orion	AUD	OTRAX.AX	AU000001533232	3.03	15-03	3E+03	Basic Mfg	Basic Industries		4.1	4.2	4.2	4.25	4.44	4.47	-0.01	-0.01	-0.074	-0.05	-0.04	0.0005	0.0005	0.0005	0.0005	0.0005		
24	AU	ASX	Almanac I	AUD	ANCA.AX	AU000001534582	2.26	2E-03	3E+03	Basic Mfg	Basic Industries		2.01	2.05	2.05	1.8	2.43	2.39	-0.055	-0.054	-0.054	-0.044	-0.044	0.2483	0.3102	0.3502	0.4001	-0.05		
25	AU	ASX	Norwest	AUD	NCMXX.AX	AU000001537101	22.22	3E-09	3E+03	Basic Mfg	Basic Industries		21.11	21.11	21.11	19.95	20.93	20.93	-0.054	-0.054	-0.054	-0.044	-0.044	0.2483	0.3102	0.3502	0.4001	-0.05		
26	AU	ASX	BHP Billiton	AUD	BHPAX.AX	AU000001344635	31	2E-09	3E+03	Basic Mfg	Basic Industries		31	31	31	31	31	31	-0.04	-0.04	-0.04	-0.04	-0.04	0.2483	0.3102	0.3502	0.4001	-0.05		
27	AU	ASX	Litar	AUD	LQLAX.PG	0000081535536	1.26	2E-09	3E+03	Financial	Financial Services		1.26	1.15	1.14	1.15	1.23	1.23	-0.04	-0.04	-0.04	-0.04	-0.04	0.2483	0.3102	0.3502	0.4001	-0.05		
28	AU	ASX	Fortescue	AUD	FMDAX.AX	AU000001508525	3.01	2E-09	3E+03	Financial	Financial Services		3.01	2.99	2.98	2.99	3.01	3.01	-0.04	-0.04	-0.04	-0.04	-0.04	0.2483	0.3102	0.3502	0.4001	-0.05		
29	AU	ASX	Palmer	AUD	PDMAX.AX	AU000001566346	1.26	2E-09	3E+03	Financial	Financial Services		1.26	1.15	1.14	1.15	1.23	1.23	-0.04	-0.04	-0.04	-0.04	-0.04	0.2483	0.3102	0.3502	0.4001	-0.05		
30	AU	ASX	Redback	AUD	PLPLAX.AX	AU000001537204	1.26	2E-09	3E+03	Financial	Financial Services		1.26	1.15	1.14	1.15	1.23	1.23	-0.04	-0.04	-0.04	-0.04	-0.04	0.2483	0.3102	0.3502	0.4001	-0.05		
31	AU	ASX	Orion Ltc	AUD	ORLAX.AX	AU000001453001	1.26	2E-09	3E+03	Financial	Financial Services		1.26	1.15	1.14	1.15	1.23	1.23	-0.04	-0.04	-0.04	-0.04	-0.04	0.2483	0.3102	0.3502	0.4001	-0.05		
32	AU	ASX	Lightyear	AUD	LEIAX.AX	AU000001531287	1	2E-09	3E+03	Financial	Financial Services		1	1	1	1	1	1	-0.087	-0.087	0.0282	0.3282	0.2363	0.3195	0.3506	0.3181	-0.2			
33	AU	ASX	BoralLtx	AUD	BBLAX.AX	AU000001528670	3.2	2E-09	3E+03	Financial	Financial Services		4.2	4.2	4.2	4.25	4.44	4.47	-0.01	-0.01	-0.074	-0.05	-0.04	0.0448	0.1772	0.3102	0.3502	-0.05		
34	AU	ASX	Jones Rt	AUD	JHJAX.AX	AU000001542376	4.2	2E-09	3E+03	Financial	Financial Services		4.2	4.2	4.2	4.25	4.44	4.47	-0.01	-0.01	-0.074	-0.05	-0.04	0.0448	0.1772	0.3102	0.3502	-0.05		
35	AU	ASX	Lord Lva	AUD	LLCAX.AX	AU000001532004	6.49	3E-09	3E+03	Financial	Financial Services		6.49	6.49	6.49	6.49	6.49	6.49	-0.034	-0.034	0.0164	0.1772	0.3102	0.3502	0.4001	-0.05				
36	AU	ASX	Denver	AUD	DOVAX.AX	AU000001542376	4.45	1E-09	3E+03	Financial	Financial Services		4.45	4.45	4.45	4.45	4.45	4.45	-0.034	-0.034	0.0164	0.1772	0.3102	0.3502	0.4001	-0.05				
37	AU	ASX	United G	AUD	UGDAX.AX	AU000001532004	3.67	3E-09	3E+03	Financial	Financial Services		3.67	3.67	3.67	3.67	3.67	3.67	-0.034	-0.034	0.0164	0.1772	0.3102	0.3502	0.4001	-0.05				
38	AU	ASX	Perpetual	AUD	PRTAX.AX	AU000001542376	3.64	3E-09	3E+03	Financial	Financial Services		3.64	3.64	3.64	3.64	3.64	3.64	-0.034	-0.034	0.0164	0.1772	0.3102	0.3502	0.4001	-0.05				
39	AU	ASX	ASX1 Ltd	AUD	ASXAX.AX	AU000001502225	3.65	5E-09	3E+03	Financial	Financial Services		3.65	3.65	3.65	3.65	3.65	3.65	-0.034	-0.034	0.0164	0.1772	0.3102	0.3502	0.4001	-0.05				
40	AU	ASX	AMP Ltd	AUD	AMPAX.AX	AU000001502225	4.7	9E-09	3E+03	Financial	Financial Services		4.7	4.7	4.7	4.7	4.7	4.7	-0.023	-0.023	0.0164	0.1772	0.3102	0.3502	0.4001	-0.05				
41	AU	ASX	Macquarie	AUD	MQGAX.AX	AU00000152877C	27.05	8E-09	3E+03	Financial	Financial Services		25.48	23.8	20.0	25.39	25.39	25.39	-0.08	-0.08	0.028	0.3438	0.4197	0.5449	0.0408	0.3732	-0.0			
42	AU	ASX	Macquarie	AUD	MQGAX.AX	AU00000152877C	27.05	8E-09</td																						

Motivation of Geospatial Analytics

- Geospatial information in Smart Nation

Thursday, Jan 8, 2015

THE STRAITS TIMES / Singapore

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Singapore needs to be 'smart city' to stay ahead:
PM

PUBLISHED ON NOV 24, 2014 11:13 AM

191 68 0 39



The need for Singapore to be a "smart nation", using the latest technology to benefit the country, goes beyond just making life better for the people, said Prime Minister Lee Hsien Loong at the launch of the Smart Nation initiative on Monday. -- PHOTO: ST FILE

One major initiative will be to let people access maps and build up geospatial databases by contributing information such as animal sightings, traffic incidents or the best mee pok eateries.

See more at: <http://www.straitstimes.com/news/singapore/more-singapore-stories/story/new-3d-map-collate-local-knowledge-part-smart-nation-pro#sthash.aUxbyCei.dpuf>

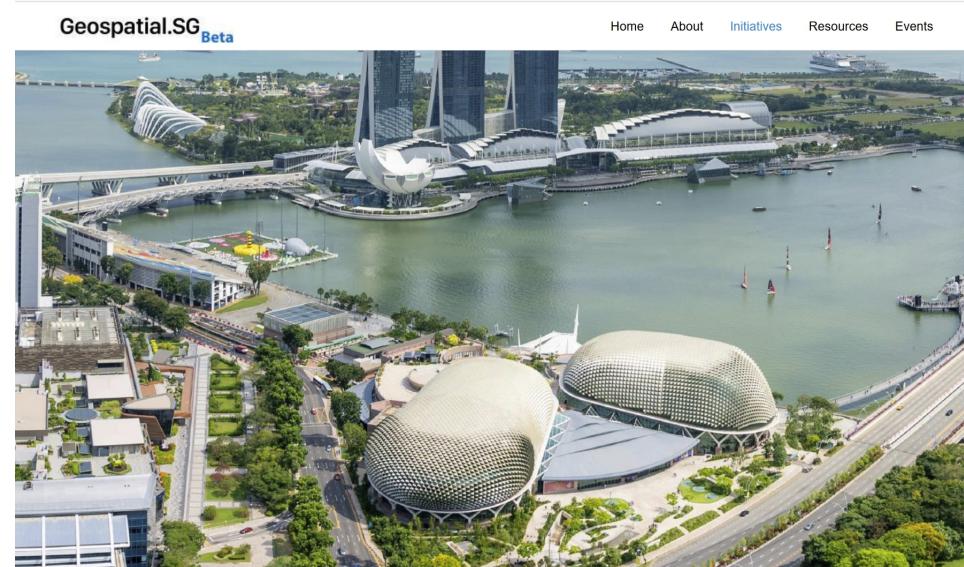
Motivation of Geospatial Analytics

- The explosion in the availability of open geospatial data from both the public and private sectors at national and international levels



Motivation of Geospatial Analytics

- The national geospatial master plan



Singapore Geospatial Master Plan

The Singapore Land Authority (SLA), in partnership with the Government Technology Agency (GovTech), leads the Singapore Geospatial Master Plan to maximise the impact of geospatial information and technology for the economy and the wider society.

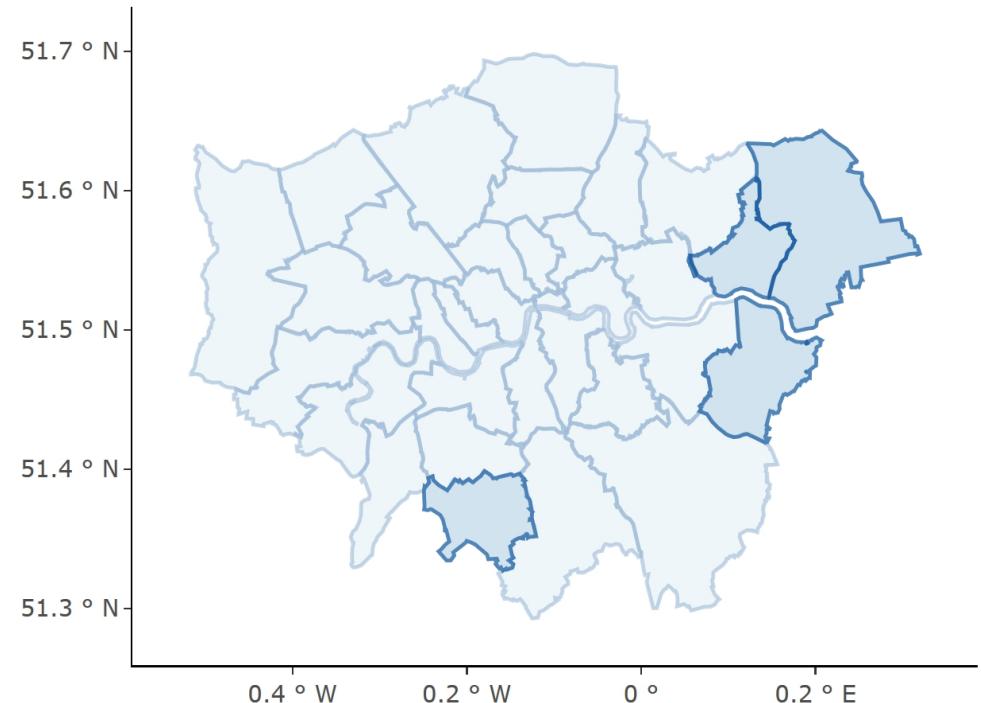
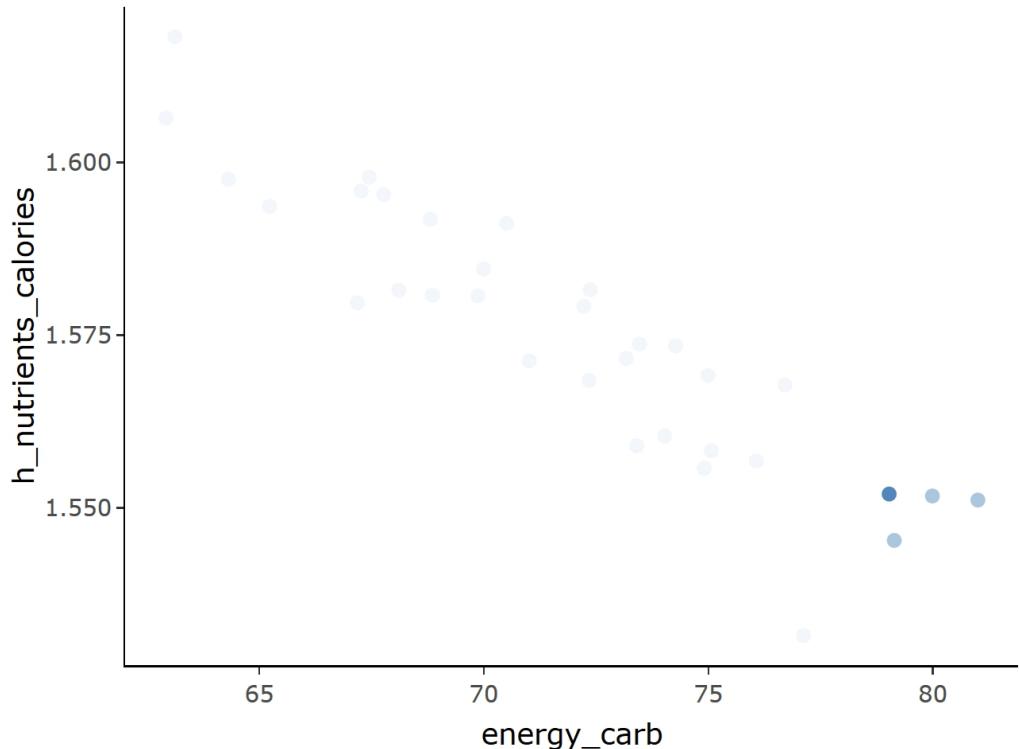
Vision: A Geospatial-Powered Singapore.

Mission: Empowering the Industry, People and Government with Geospatial Information and Technology to Enhance Decision-making, Create Opportunities and Lead Better Lives.

Source: <https://geospatial.sg/initiatives#masterplan>

The role of Geospatial Analytics

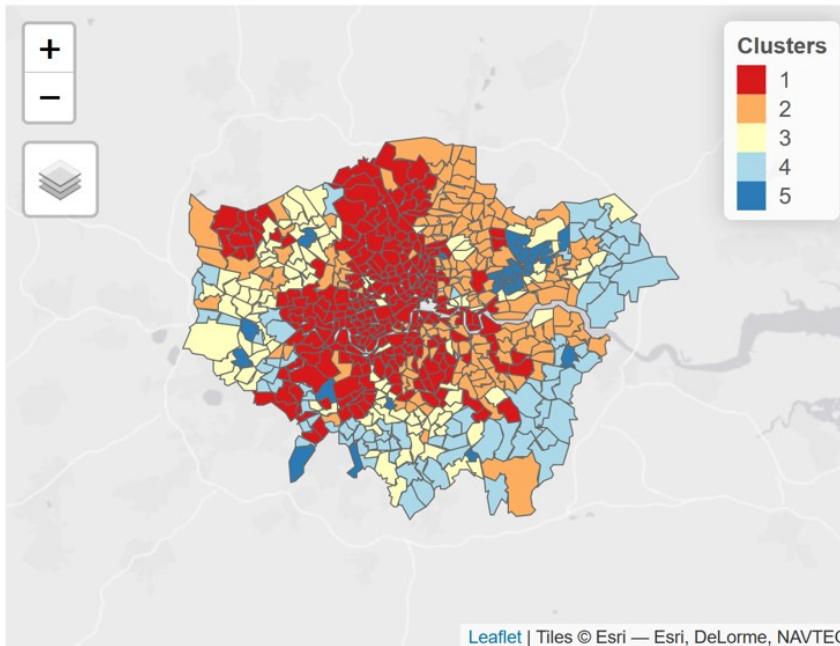
- Uncovering insights not found in statistical graphs and tables.



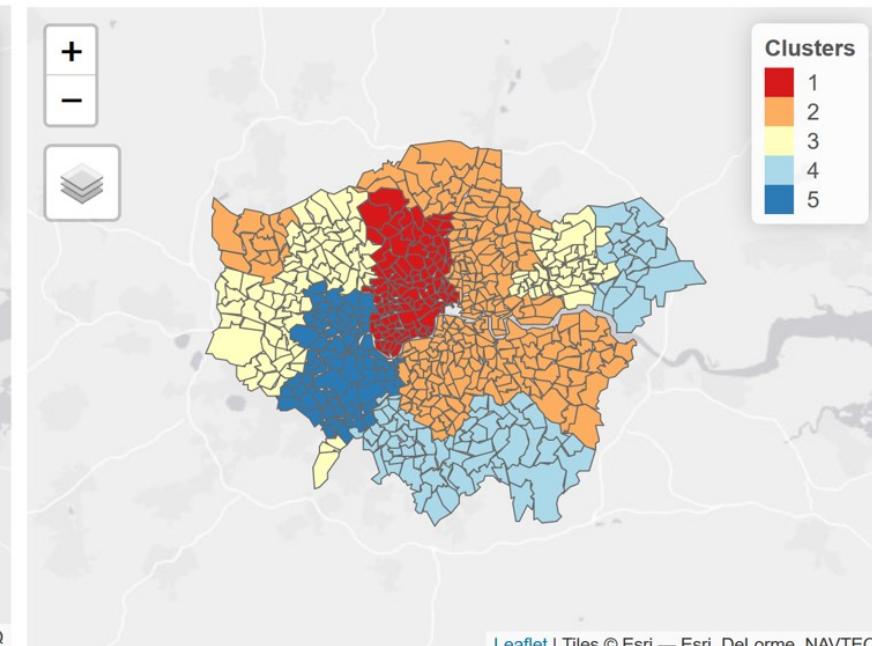
Source: <https://isss608.shinyapps.io/shiny/>

The role of Geospatial Analytics

- To reveal the untapped property of spatial contiguity in geographic knowledge discovery in databases.



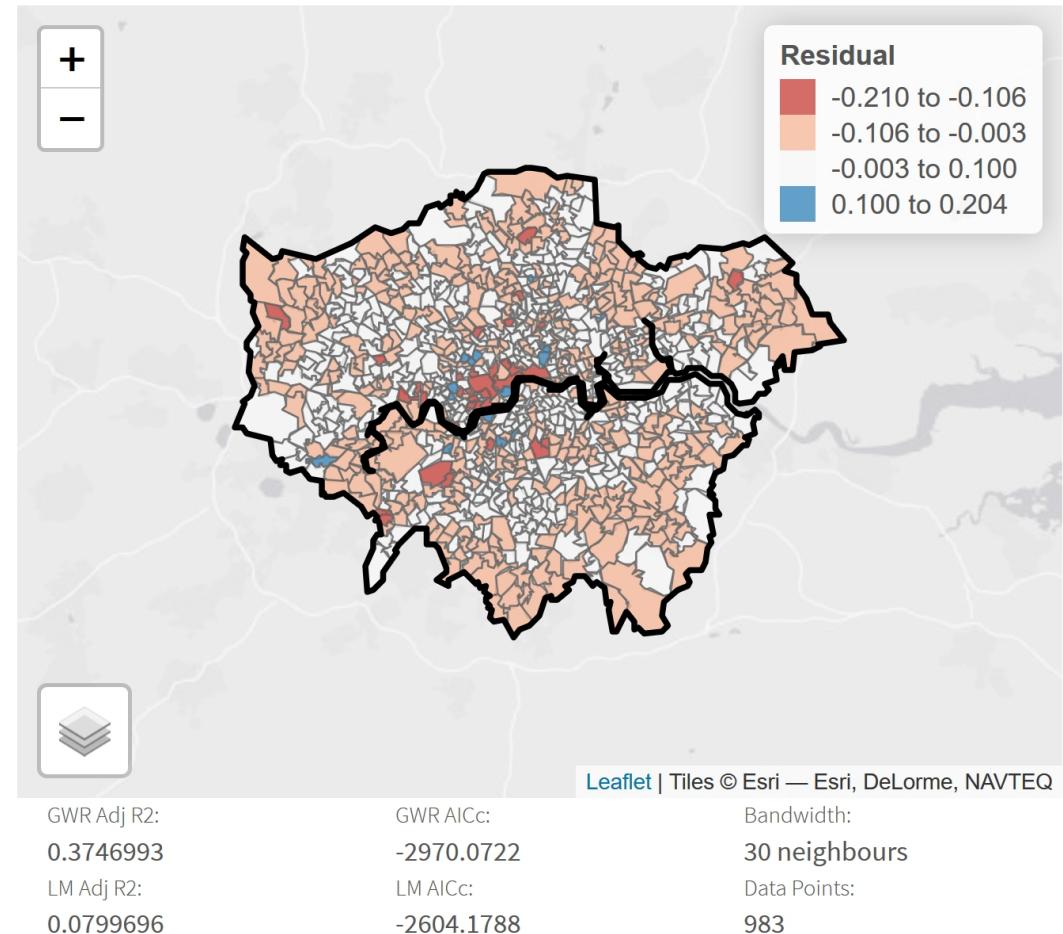
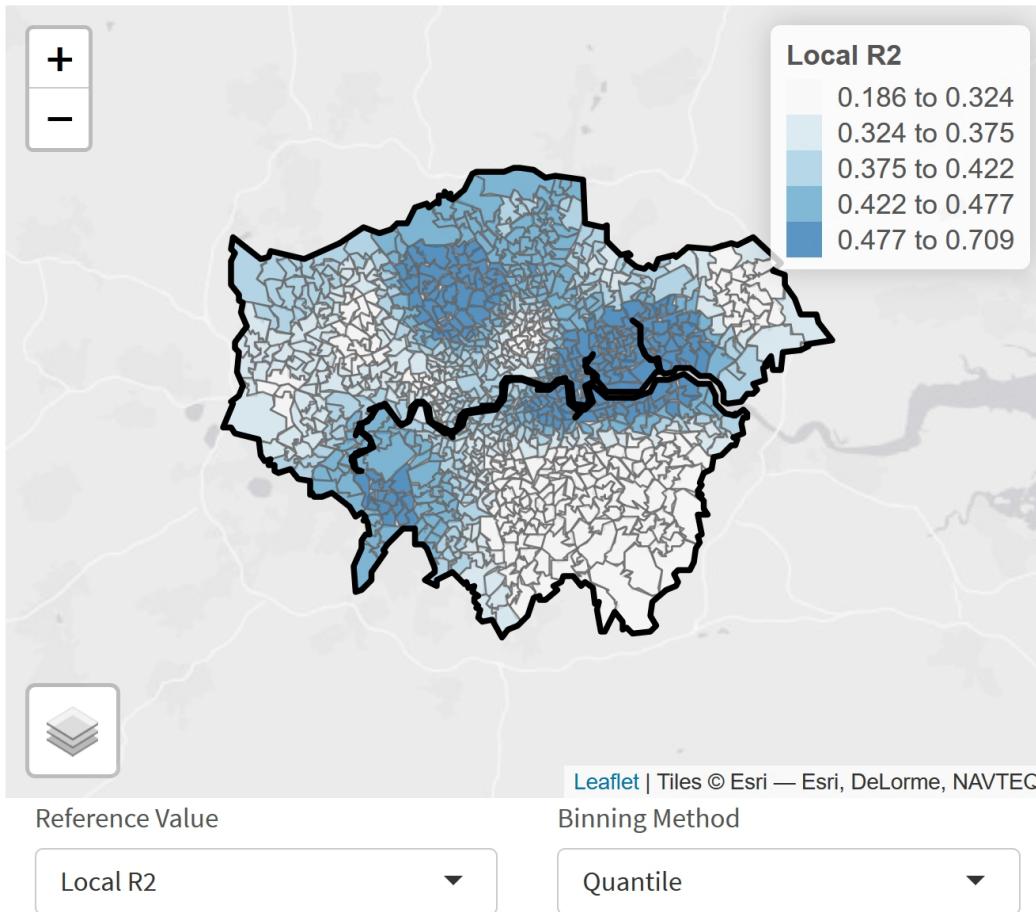
Hierarchical clustering



Spatially constrained clustering

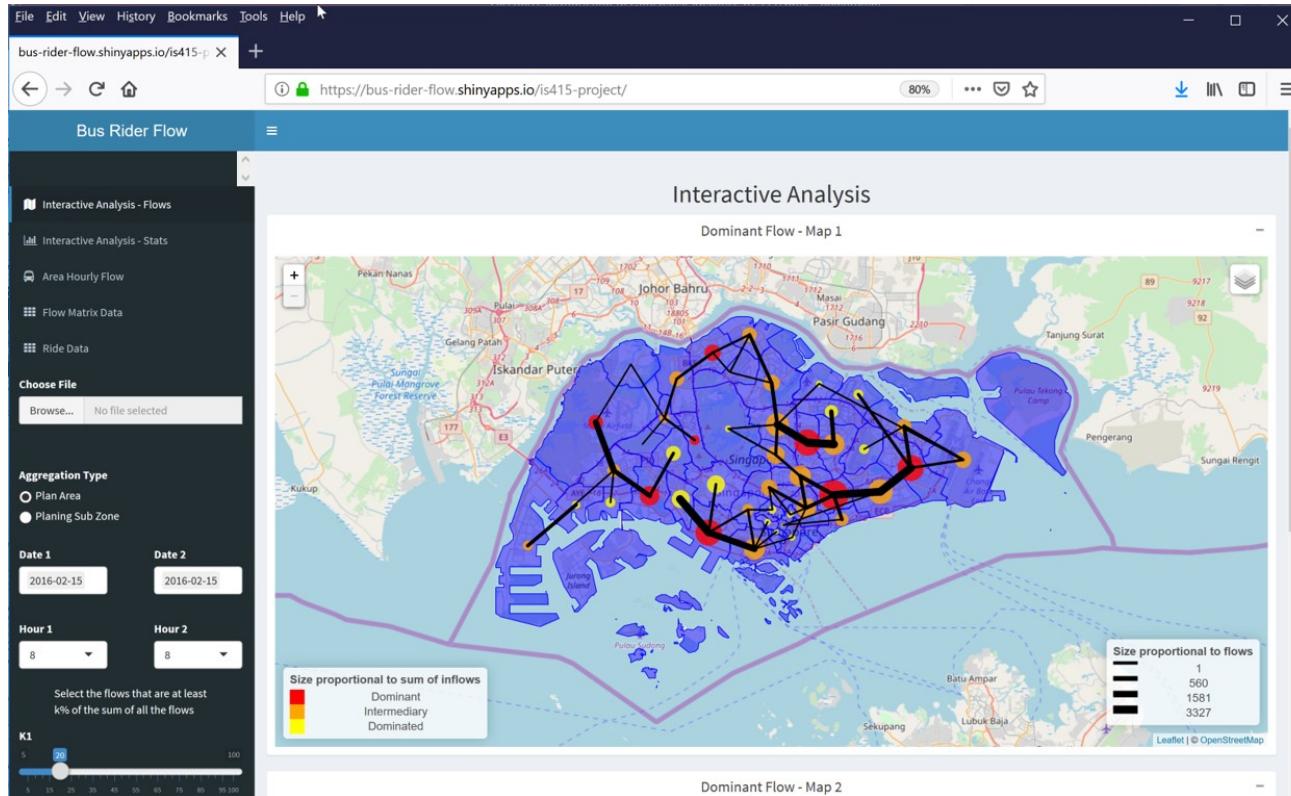
The role of Geospatial Analytics

- To uncover the complexity of the real world relationship.



The role of Geospatial Analytics

- To model spatial interactions and flows.



Source: https://wiki.smu.edu.sg/17t2is415g1/IS415_TeamJSR_Project

Geospatial Analytics and Social Consciousness

The true power of geospatial analytics is to provide decision makers and planners with data-driven and process information for better problem solving and more efficient use of resources.

