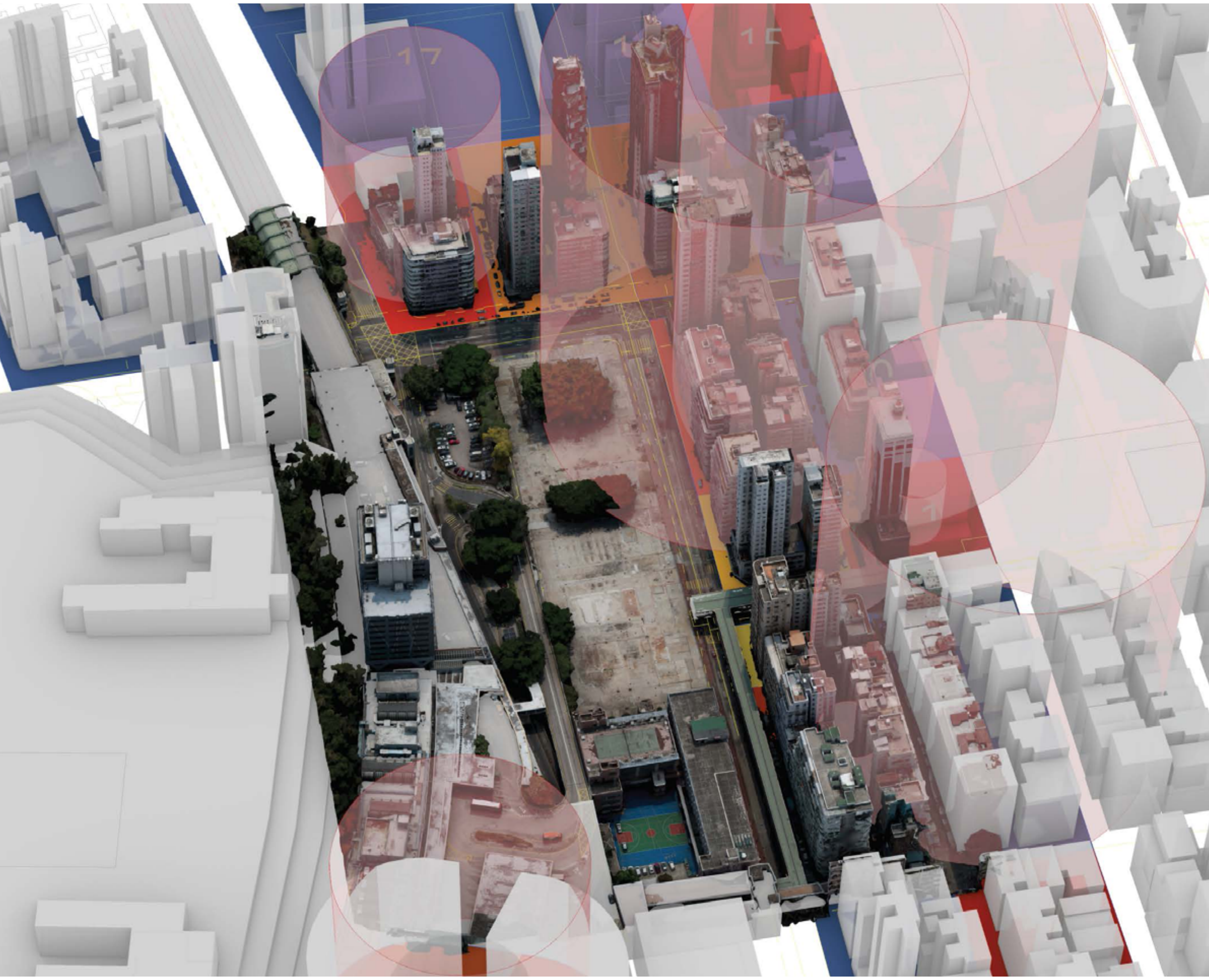
URBAN DESIGN WORKSHOP | 14 - 16 SEPT 2021 |

UAV Photogrammetry Based Generative Design

Analyzing public spaces through photogrammetry, GIS data and location-based social network (LBSN) data



FUNDED BY:

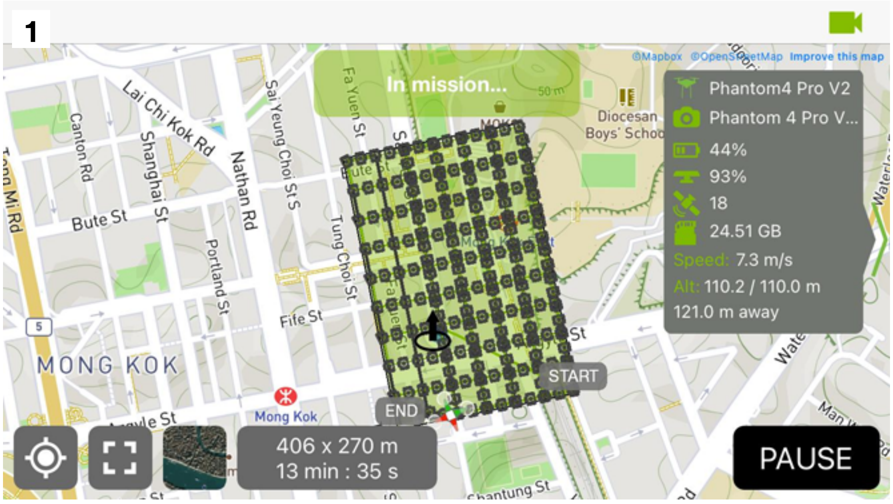
CITF 建造業創科基金

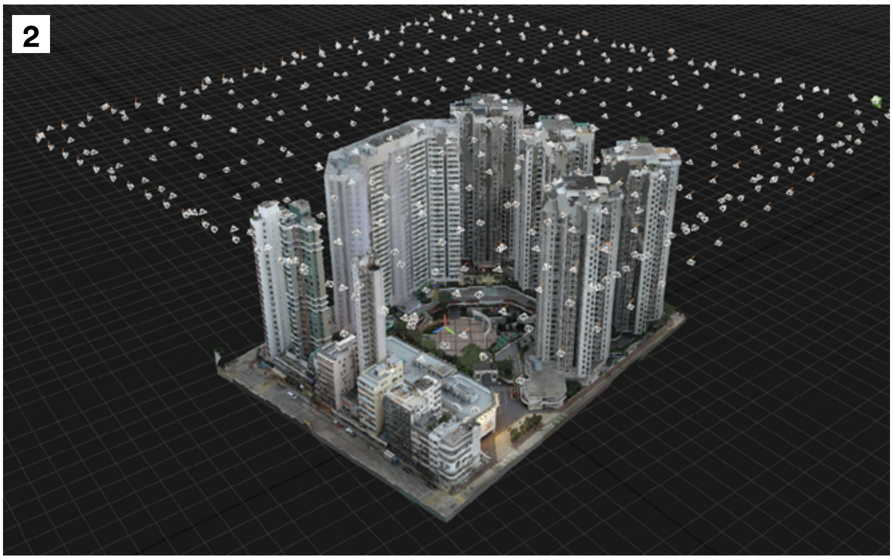
建築 中大 School of Architecture
THE CHINESE UNIVERSITY OF HONG KONG

Workshop Introduction

Unmanned Aerial Vehicles (UAV) or ‘drones’ in combination with 2D and 3D mapping software are increasingly used for a range of applications such as land surveying, agriculture, civil engineering and heritage preservation. Within architectural design education and practice, these tools are considered part of the construction stage or building maintenance processes and are so far ignored for their potential to inform new ways of understanding the urban environment.

This workshop will expose participants to a range of digital tools and methodologies to develop a multi-layered mapping system that juxtaposes location-based social networks (LBSN) data, geographic information systems data and geotagged photogrammetry models. Through analysing directly in a high-resolution modelling environment that captures the full complexity of a site, design development and testing techniques can be set up that will allow for greatly improved quality and performance of new buildings within their environment.


1
©Mapbox ©OpenStreetMap Improve this map
In mission...
50 m
Phantom4 Pro V2
Phantom 4 Pro V...
44%
93%
18
24.51 GB
Speed: 7.3 m/s
Alt: 110.2 / 110.0 m
121.0 m away
Lai Chi Kok Rd
Canton Rd
Shanghai St
Nathan Rd
Sai Yeung Choi St S
Fa Yuen St
Tung Choi St
Portland St
Bute St
Fife St
Diocesan Boys' School
MONG KOK
Mong Kok
START
END
406 x 270 m
13 min : 35 s
PAUSE

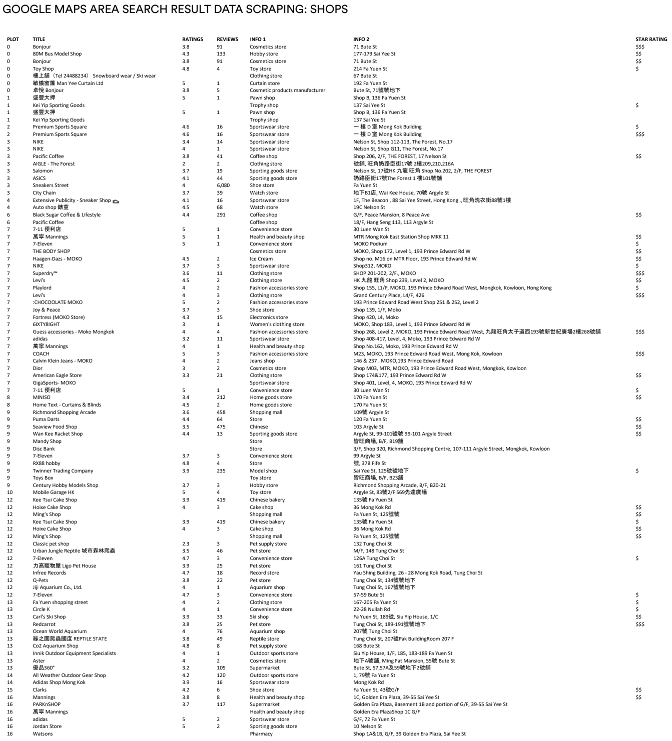


1/ Drone flight path planning in Pix4Dcapture

2/ Photogrammetry modeling in Reality Capture from geo-referenced data set

3/ Raw geotagged shop data scraped from Google Map

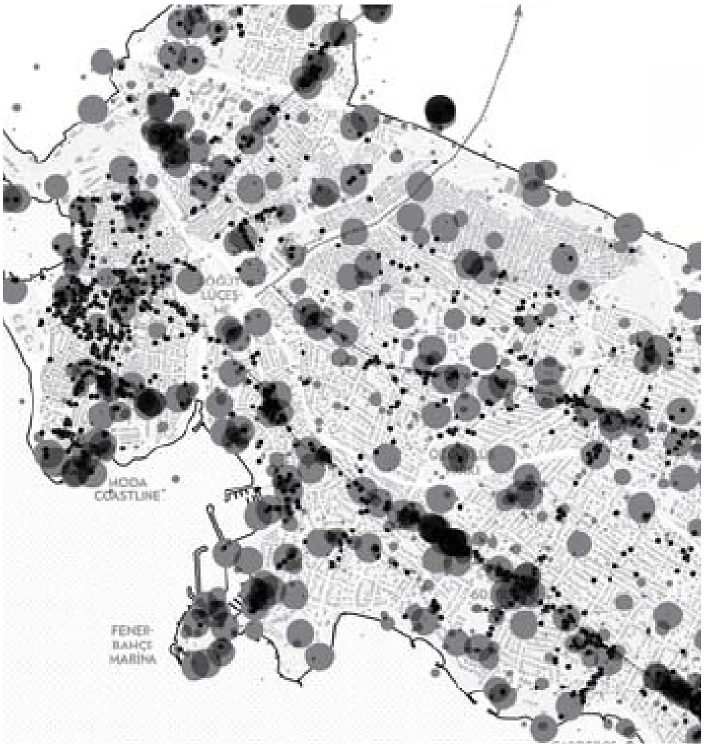
4/ Mapping of Instagram post and like numbers (by E. Ensari & B Kobas)



GOOGLE MAPS AREA SEARCH RESULT DATA SCRAPING: SHOPS

PLOT	TITLE	RATINGS	REVIEWS	INFO 1	INFO 2	STAR RATING
0	Bonjour	3.8	91	Cosmetics store	71 Bute St	$$$
0	80M Bus Model Shop	4.3	133	Hobby store	177-179 Sai Yee St	$$
0	Bonjour	3.8	91	Cosmetics store	71 Bute St	$$
0	Toy Shop	4.8	4	Toy store	214 Fa Yuen St	$
0	樓上舖（Tel 24488234） Snowboard wear / Ski wear			Clothing store	67 Bute St	
0	敏儀窗簾 Man Yee Curtain Ltd	5	1	Curtain store	192 Fa Yuen St	
0	卓悅 Bonjour	3.8	5	Cosmetic products manufacturer	Bute St, 71號號地下	
1	盛豐大押	5	1	Pawn shop	Shop B, 136 Fa Yuen St	
1	Kei Yip Sporting Goods			Trophy shop	137 Sai Yee St	$
1	盛豐大押	5	1	Pawn shop	Shop B, 136 Fa Yuen St	
1	Kei Yip Sporting Goods			Trophy shop	137 Sai Yee St	
2	Premium Sports Square	4.6	16	Sportswear store	一 樓 D 室 Mong Kok Building	$
2	Premium Sports Square	4.6	16	Sportswear store	一 樓 D 室 Mong Kok Building	$$$
3	NIKE	3.4	14	Sportswear store	Nelson St, Shop 112-113, The Forest, No.17	
3	NIKE	4	1	Sportswear store	Nelson St, Shop G11, The Forest, No.17	
3	Pacific Coffee	3.8	41	Coffee shop	Shop 206, 2/F, THE FOREST, 17 Nelson St	$$
3	AIGLE - The Forest	2	2	Clothing store	號鋪, 旺角奶路臣街17號 2樓209,210,216A	
3	Salomon	3.7	19	Sporting goods store	Nelson St, 17號HK 九龍 旺角 Shop No.202, 2/F, THE FOREST	
3	ASICS	4.1	44	Sporting goods store	奶路臣街17號The Forest 1 樓101號舖	
3	Sneakers Street	4	6,080	Shoe store	Fa Yuen St	
3	City Chain	3.7	39	Watch store	地下B1店, Wai Kee House, 70號 Argyle St	
4	Extensive Publicity - Sneaker Shop 👟	4.1	16	Sportswear store	1F, The Beacon , 88 Sai Yee Street, Hong Kong ., 旺角洗衣街88號1樓	
4	Auto shop 錶童	4.5	68	Watch store	19C Nelson St	
6	Black Sugar Coffee & Lifestyle	4.4	291	Coffee shop	G/F, Peace Mansion, 8 Peace Ave	$$
6	Pacific Coffee			Coffee shop	18/F, Hang Seng 113, 113 Argyle St	
7	7-11 便利店	5	1	Convenience store	30 Luen Wan St	
7	萬寧 Mannings	5	1	Health and beauty shop	MTR Mong Kok East Station Shop MKK 11	$$
7	7-Eleven	5	1	Convenience store	MOKO Podium	$
7	THE BODY SHOP			Cosmetics store	MOKO, Shop 172, Level 1, 193 Prince Edward Rd W	$$
7	Haagen-Dazs - MOKO	4.5	2	Ice Cream	Shop no. M16 on MTR Floor, 193 Prince Edward Rd W	$$
7	NIKE	3.7	3	Sportswear store	Shop312, MOKO	$
7	Superdry™	3.6	11	Clothing store	SHOP 201-202, 2/F., MOKO	$$$
7	Levi's	4.5	2	Clothing store	HK 九龍 旺角 Shop 239, Level 2, MOKO	$$
7	Playlord	4	2	Fashion accessories store	Shop 155, L1/F, MOKO, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong	$
7	Levi's	4	3	Clothing store	Grand Century Place, L4/F, 426	$$$
7	:CHOCOOLATE MOKO	5	2	Fashion accessories store	193 Prince Edward Road West Shop 251 & 252, Level 2	
7	Joy & Peace	3.7	3	Shoe store	Shop 139, 1/F, Moko	
7	Fortress (MOKO Store)	4.3	15	Electronics store	Shop 420, L4, Moko	
7	6IXTY8IGHT	3	1	Women's clothing store	MOKO, Shop 183, Level 1, 193 Prince Edward Rd W	
7	Guess accessories - Moko Mongkok	4	4	Fashion accessories store	Shop 268, Level 2, MOKO, 193 Prince Edward Road West, 九龍旺角太子道西193號新世紀廣場2樓268號舖	$$$
7	adidas	3.2	11	Sportswear store	Shop 408-417, Level, 4, Moko, 193 Prince Edward Rd W	
7	萬寧 Mannings	4	1	Health and beauty shop	Shop No.162, Moko, 193 Prince Edward Rd W	
7	COACH	5	3	Fashion accessories store	M23, MOKO, 193 Prince Edward Road West, Mong Kok, Kowloon	$$$
7	Calvin Klein Jeans - MOKO	4	2	Jeans shop	146 & 237 . MOKO,193 Prince Edward Road	
7	Dior	3	2	Cosmetics store	Shop M03, MTR, MOKO, 193 Prince Edward Road West, Mongkok, Kowloon	
7	American Eagle Store	3.3	21	Clothing store	Shop 174&177, 193 Prince Edward Rd W	$$
7	GigaSports- MOKO			Sportswear store	Shop 401, Level, 4, MOKO, 193 Prince Edward Rd W	
7	7-11 便利店	5	1	Convenience store	30 Luen Wan St	$
8	MINISO	3.4	212	Home goods store	170 Fa Yuen St	$$
8	Home Text - Curtains & Blinds	4.5	2	Home goods store	170 Fa Yuen St	
9	Richmond Shopping Arcade	3.6	458	Shopping mall	109號 Argyle St	
9	Puma Darts	4.4	64	Store	120 Fa Yuen St	$$
9	Seaview Food Shop	3.5	475	Chinese	103 Argyle St	$$
9	Wan Kee Racket Shop	4.4	13	Sporting goods store	Argyle St, 99-101號號 99-101 Argyle Street	$$
9	Mandy Shop			Store	皆旺商場, B/F, B19舖	
9	Disc Bank			Store	3/F, Shop 320, Richmond Shopping Centre, 107-111 Argyle Street, Mongkok, Kowloon	
9	7-Eleven	3.7	3	Convenience store	99 Argyle St	
9	RX88 hobby	4.8	4	Store	號, 37B Fife St	
9	Twinner Trading Company	3.9	235	Model shop	Sai Yee St, 125號號地下	$
9	Toys Box			Toy store	皆旺商場, B/F, B23舖	
9	Century Hobby Models Shop	3.7	3	Hobby store	Richmond Shopping Arcade, B/F, B20-21	
10	Mobile Garage HK	5	4	Toy store	Argyle St, 83號2/F S69先達廣場	
12	Kee Tsui Cake Shop	3.9	419	Chinese bakery	135號 Fa Yuen St	
12	Hoixe Cake Shop	4	3	Cake shop	36 Mong Kok Rd	$$
12	Ming's Shop			Shopping mall	Fa Yuen St, 125號號	$$
12	Kee Tsui Cake Shop	3.9	419	Chinese bakery	135號 Fa Yuen St	$
12	Hoixe Cake Shop	4	3	Cake shop	36 Mong Kok Rd	$$
12	Ming's Shop			Shopping mall	Fa Yuen St, 125號號	$$
12	Classic pet shop	2.3	3	Pet supply store	132 Tung Choi St	
12	Urban Jungle Reptile 城市森林爬蟲	3.5	46	Pet store	M/F, 148 Tung Choi St	
12	7-Eleven	4.7	3	Convenience store	126A Tung Choi St	$
12	力高寵物屋 Ligo Pet House	3.9	25	Pet store	161 Tung Choi St	
12	Infree Records	4.7	18	Record store	Yau Shing Building, 26 - 28 Mong Kok Road, Tung Choi St	
12	Q-Pets	3.8	22	Pet store	Tung Choi St, 134號號地下	
12	Jiji Aquarium Co., Ltd.	4	1	Aquarium shop	Tung Choi St, 167號號地下	
12	7-Eleven	4.7	3	Convenience store	57-59 Bute St	$
13	Fa Yuen shopping street	4	2	Clothing store	167-205 Fa Yuen St	$
13	Circle K	4	1	Convenience store	22-28 Nullah Rd	$
13	Carl's Ski Shop	3.9	33	Ski shop	Fa Yuen St, 189號, Siu Yip House, 1/C	$$
13	Redcarrot	3.8	25	Pet store	Tung Choi St, 189-191號號地下	$$$
13	Ocean World Aquarium	4	76	Aquarium shop	207號 Tung Choi St	
13	綠之園爬蟲國度 REPTILE STATE	3.8	49	Reptile store	Tung Choi St, 207號Pak BuildingRoom 207 F	
13	Co2 Aquarium Shop	4.8	8	Pet supply store	168 Bute St	
13	Innik Outdoor Equipment Specialists	4	1	Outdoor sports store	Siu Yip House, 1/F, 185, 183-189 Fa Yuen St	
13	Aster	4	2	Cosmetics store	地下A號舖, Ming Fat Mansion, 55號 Bute St	
13	優品360°	3.2	105	Supermarket	Bute St, 57,57A及59號地下2號舖	
14	All Weather Outdoor Gear Shop	4.2	120	Outdoor sports store	1, 79號 Fa Yuen St	
14	Adidas Shop Mong Kok	3.9	16	Sportswear store	Mong Kok Rd	
15	Clarks	4.2	6	Shoe store	Fa Yuen St, 43號G/F	$$
16	Mannings	3.8	8	Health and beauty shop	1C, Golden Era Plaza, 39-55 Sai Yee St	$$
16	PARKnSHOP	3.7	117	Supermarket	Golden Era Plaza, Basement 1B and portion of G/F, 39-55 Sai Yee St	
16	萬寧 Mannings			Health and beauty shop	Golden Era PlazaShop 1C G/F	
16	adidas	5	2	Sportswear store	G/F, 72 Fa Yuen St	
16	Jordan Store	5	2	Sporting goods store	10 Nelson St	
16	Watsons			Pharmacy	Shop 1A&1B, G/F, 39 Golden Era Plaza, Sai Yee St	

3



4

Course Outline

TUES 14 SEPT
10:00 - 17:00

SESSION 1 – PHOTOGRAMMETRY BASED MODELLING

- Introduction to UAV photogrammetry and drone control
- Site reconnaissance and flight path planning
- Image processing and modelling
- Site visit

WEDS 15 SEPT
14:00 - 17:00

SESSION 2 – GIS DATA ANALYSIS

- Introduction to GIS data
- GIS data mapping in Rhino/Grasshopper
- Mapping with web scraped data

THUR 16 SEPT
10:00 - 13:00

SESSION 3 – LBSN DATA ANALYSIS

- Social media data scraping
- Mapping human mobility and patterns
- Creating layered digital urban maps

Skills & Software Requirement

Basic knowledge of 3D modelling will be an advantage. We will provide a step-by-step guide for drone flying, Python scripting and Reality Capture (photogrammetry).

The workshop will be hosted by the School of Architecture, Lee Shau Kee Architecture Building, The Chinese University of Hong Kong, Ma Liu Shui. Computers and software we be made available via the Digital Lab at the School of Architecture.

Workshop Instructors

JEROEN VAN AMEIJDE

Assistant Professor
School of Architecture – Chinese University of Hong Kong

Jeroen van Ameijde is Assistant Professor at the School of Architecture, the Chinese University of Hong Kong, teaching and conducting research in architecture and urban design. He taught at the Architectural Association in London, The Bartlett, UCL, and the University of Pennsylvania, and has over ten years of experience as practicing architect, including as a director at Urban Systems Office. Jeroen's research interests focus on the intersection between urban studies and urban design, and how the analysis and planning of social, cultural and economic activities can be guided through computational methods for urban analytics and data-driven design.

JANE LING

Research Assistant
School of Architecture – Chinese University of Hong Kong

Jane Ling is a designer hailing from Hong Kong and the UK. She graduated with a Master of Architecture with honours from the Architectural Association and has worked in Tokyo, Spain, and Hong Kong. Her interest lies in work that intersects technology, art, and advocacy. She was published in AA Files 77 as part of ARO, and produced the AR exhibition showcase for Projects Review 2020.

CARSON LEUNG

Research Assistant
School of Architecture – Chinese University of Hong Kong

Carson Leung is an architectural designer and researcher. He graduated from the Architectural Association School of Architecture and has worked at several architectural practices in Hong Kong. He is currently a research assistant at the School of Architecture in the Chinese University of Hong Kong working at the intersection of 3D scanning, digital design and robotic fabrication in architecture.

KIMBERLEY LAU

Research Assistant
School of Architecture – Chinese University of Hong Kong

Kimberley Lau is an architectural designer. She is currently pursuing a Master of Architecture degree at the University of Cambridge, and formerly attended the Chinese University of Hong Kong. She has worked in local, Chinese, and Australian architectural practices. Her current research revolves floating construction, water-borne infrastructures and digital design methods.

This workshop is supported by the Hong Kong Construction Innovation and Technology Fund (CITF), and participation is offered free of charge to students and professionals in the fields of architecture, urban design, landscape architecture and urban studies.

For enquiries and applications to participate

Prof. Jeroen van Ameijde - jeroen.vanameijde@cuhk.edu.hk