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Title: Protest and Checkmate - breakthrough in the temporality of mapping

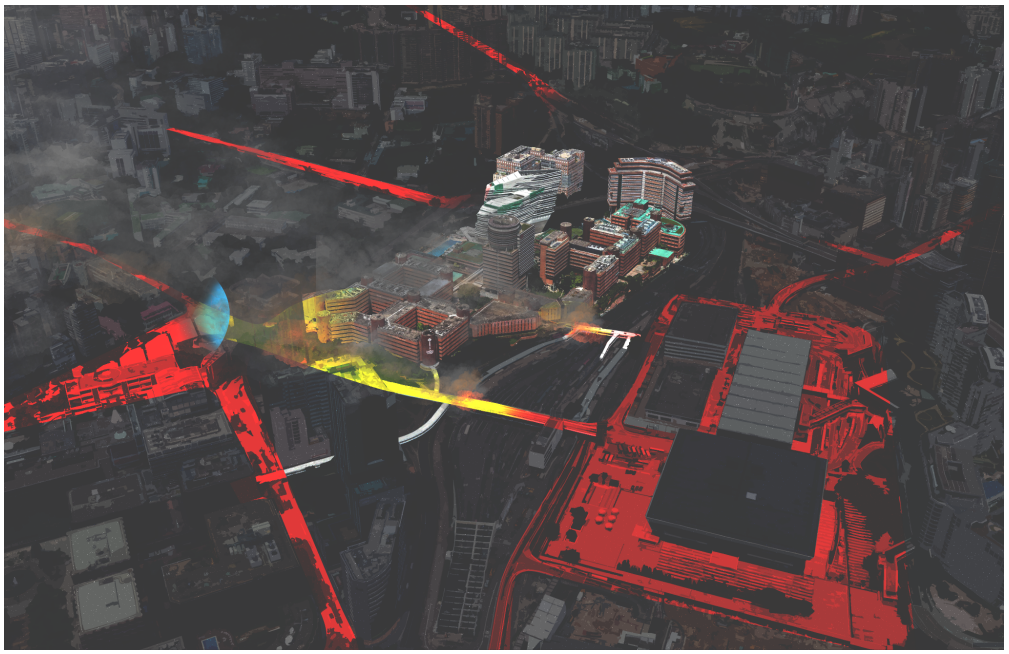

Figure 1.0 *Aerial Collage of the Siege of the Polytechnic University*. Author. 2020

Introduction: The inheritance of a compass

On an autumn night in a coastal city, smoke and burning flakes swirled up around a university and its surrounding roads. Sirens and firing sounds almost muted the conversations among the young protestors inside the campus, arousing tremendous anxiety and fear in the citizens. Most of them were watching live broadcasts at their homes, many were calling for their friends, some of them kneeled before the police to beg mercy for their children, a few of them armored themselves to charge the lockdown zone, and a minority of them were trapped in the university campus but they also stood for the uncountable future of this city - Hong Kong.

In 2019, a massive protest was ignited by the drafting of a controversial extradition law, which was criticized as a campaign by the central Chinese government to disturb the agreements made in the Sino-British Joint Declaration [Lai and Wu, 2019]. Millions of citizens swarmed up and occupied the roads to march and confront the headquarters building of the government of the Hong Kong Special Administrative Region (HKSAR). The early protests were responded to with serious force by the police in the form of tear gas, rubber bullets, and water cannons. The protestors then broke down the scale of the demonstration and sparked scattered actions in different corners of the city.

During these difficult times, vast amounts of the spatial information about the protests circulated and accumulated on the internet, including journalist reports, real-time notifications, photographs, and maps. They evolved into a set of tools to develop strategies for tackling the political turmoil, such as reporting transportation failure, indicating the hot zones (or lockdown zones), and suggestions for evacuation paths. This scattered information was usually condensed and analyzed in real-time maps on social media platforms, providing another visual lens to reflect reality apart from photography and propaganda. They cast a great impact on the daily routines of the protestors because of the availability of personal mobile gadgets and customized digital social networks, sometimes giving the tools to agencies to pull people out of danger or even lethal brutality.

Mapping has long been used for precise projection of the unknown physical world which was yet to be conquered by “pioneers” and empires [Presner et al, 2014]. The professional study of maps and their drawing progress was framed as *cartography*, where cartographers design the method to represent spatial information in a two-dimensional space. One of the earliest examples of cartographical practice can be traced back to the map of the ancient city Çatalhöyük, drawn around nine millenniums ago. The mural map does not represent the territory with accuracy but more as a symbol of the ancient society [Dorling, 2013]. The ideology of society embedded in the maps kept evolving along the political reforms in history: from religion to science; from village to empire; and from surface to underground. At the beginning of the 19th century, an American physician named Valentine Seaman inspected the waterfront areas of New York and indicated the occurrences of yellow fever on the map. This map is likely the first example where rational information about the society is represented on a cartographical framework, opening the new age of “*social cartography”* when diseases, crimes, and poverty were investigated on maps as cities grew into a new scale [Vaughan, 2018]. This profession helped the authorities visualize the hidden crises of the cities and manage their territories with the support of consistent maps.

Approaching the present, cartography has been transformed by the invention of computation, digital projection, and the internet. The professional practice no longer only relies on physical surveys and resources from the authorities. Instead, ordinary citizens can access the open cartographical tools in the digital world and create their customised interpretations of the city such as the tags and comments on Google Map. However, the credibility of those custom add-ons is hard to be verified because of their reliance on personal observations and the unrestricted access. In the context of the protests in Hong Kong, the locations of crowds and the usage of crowd dispersal weapons were reported to the Telegram channels by the protestor. Since there was no restriction in the access of the platforms, fake warnings could be mapped when the protestors provided misinformation or the mappers entrusted an unreliable source. Hence, the credibility of the spatial information on those maps could be questionable. Even the law enforcement officers of the HKSAR government also collected spatial information of the protests, they would not allow the general public to access their database so it is not possible to cross-check the maps illustrated by the two opposing power. Moreover, the censor of the “official database” limits the discussion of how the police responded to the maps during the protests, turning the police into an unfamiliar force to be iterated and analysed. In spite of these research gaps, the emergence of real-time protest maps holds the potential to be archived, explained, and presented as a collective legacy

forged by the countless struggles of the people of Hong Kong. Meanwhile, people from other cities can also reference it and be prepared ahead for future civil jitters.
The main discussion of the thesis is constructed of four sections:

- Section 1 — To address the significance of the internet on contemporary cartography in Hong Kong, the thesis will examine a range of urban maps drawn from the colonial age to the recent times of Hong Kong. The city of Hong Kong was founded and governed by the British colonial power based on many top-down cartographical studies, such as the topographical surveys and the report of the plague in the late 19th century ["*Portion Plan of the City of Victoria*", 1859]; [Simpson, 1903]. By analysing the socio-political contexts within which they were produced and examining who produced them, the thesis will compare the aims of the cartographic processes and their influence on urban transformation.

- Section 2 — In a reverse manner, the right to mapping has been shared by the press and citizens in the contemporary times of Hong Kong, when technology opened the door to the internet of map archives and real-time data to the public [Kow et al, 2020]. Apart from the legacy of the conventional cartographic material, the digital culture and platforms also spread the seeds of free resources and led to the bloom of real-time maps that contributed to the protests [Lee and Chan, 2018]; [Lai and Wu, 2019]; [Hong Kong Free Press, 2020]. This section will explain the political background and the timeline of the 2019 protests in Hong Kong, associated with the emergence of the real-time maps.

- Section 3 — Following the the lens given in the previous section, this section will focus more on the network of information feedback behind the maps, the evolution of the graphic representation of the maps, and their immediate influence on the protests [WeatherJJ, 2019]; [103 map, 2019]. The content of an interview with a former protestor will be also cited to describe the decision-making in the protesting fields and the applications of the maps in the first-person perspective.

- Section 4 — Since 2019, many people of Hong Kong have been suffering from loss and pain forged in the series of political campaigns. A variety of documentation, such as photo albums, journalist reports, video channels, and written literature emerged after the suppression of the right to assembly and protest. This raised a new question of how we archive the bitter collective memory and present it to the far future of the coming generations. This section will also borrow some ideas from other countries like the critical analyses carried out by the Forensic Architecture Studio [Weizman, 2017] and an urban study curated by a group of Indian researchers [Ciborro and Mansi, 2021].

To support the main discussion of contemporary cartography, a primary map archive and its counter-secondary map archive will be used to exemplify different incidents in the series of Hong Kong protests in 2019 [Lai, 2019]; [103 map, 2019]. Four to five particular protests will be extracted from the archive for evaluating the effectiveness of different cartographical features such as symbols, urban blocks, and transportation networks. With concerns about the authenticity of the map archive and the variety of sources, news articles and photographs will be used to enrich the

documentation as well. Furthermore, an interview with a former user of the maps has been conducted to give a more first-person vision of the protests and the untouched history absent in the maps.

In the digital age when information can be compressed and transmitted in an invisible and mobile network, the forms of historical documentation have become more personal and diverse. It can range from an online Instagram story archive of a person to a big data memory disk of all car accidents that happened in the capital city. This transition shall offer more approaches to historical research into finer details of incidents and a deeper understanding of the interactions between powers.

Section 1

Map-making in Hong Kong — from the colonial period to the present day

"Hong Kong is a contested place. From the confrontations between the Communists and the colonialists, the capitalists and the workers, to the showdown between the Chinese and the localists, the police and the people, development and environment, Hong Kong is in the perpetual state of crisis."

— from Seng, Eunice. 2020. Resistant City: Histories, Maps and the Architecture of Development. World Scientific Publishing Company Pte Limited. pp.57.

Maps have been a political instrument to conquer and control the Hong Kong archipelago since the 15th century. In the next four centuries, voyagers and navies from the mainland Chinese empire and the European empires depicted this part of the South China Sea's coastline as a river mouth, a group of steep islands, and a maze of harbours with walled villages on the land [Seng, 2020]. Those maps had no consistency in the scale and shapes of the terrain until British colonization in the 19th century, when cartographers began to settle on Hong Kong island and survey the landscape in detail. The British authority mapped out the nautical data, coastal settlements, territorial borders, and infrastructures at the beginning of the settlements' urbanization, giving rise to a small port town between China and the Western world.

The duty of the survey was also allocated to local professionals since the complex natural landscape and coastline required a demanding workload. This challenge also motivated many of the young cartographers to study abroad to learn specific drawing skills applicable to the terrain of Hong Kong, such as hill shading and hatching [Cheung, 2020]. In figure 1.1, the shading representation of hills and land required professional training and tools to become an applicable language in cartographic drawings. From the authoritative perspective, these terrain maps act as crucial media to understand the natural resources of this juvenile city.

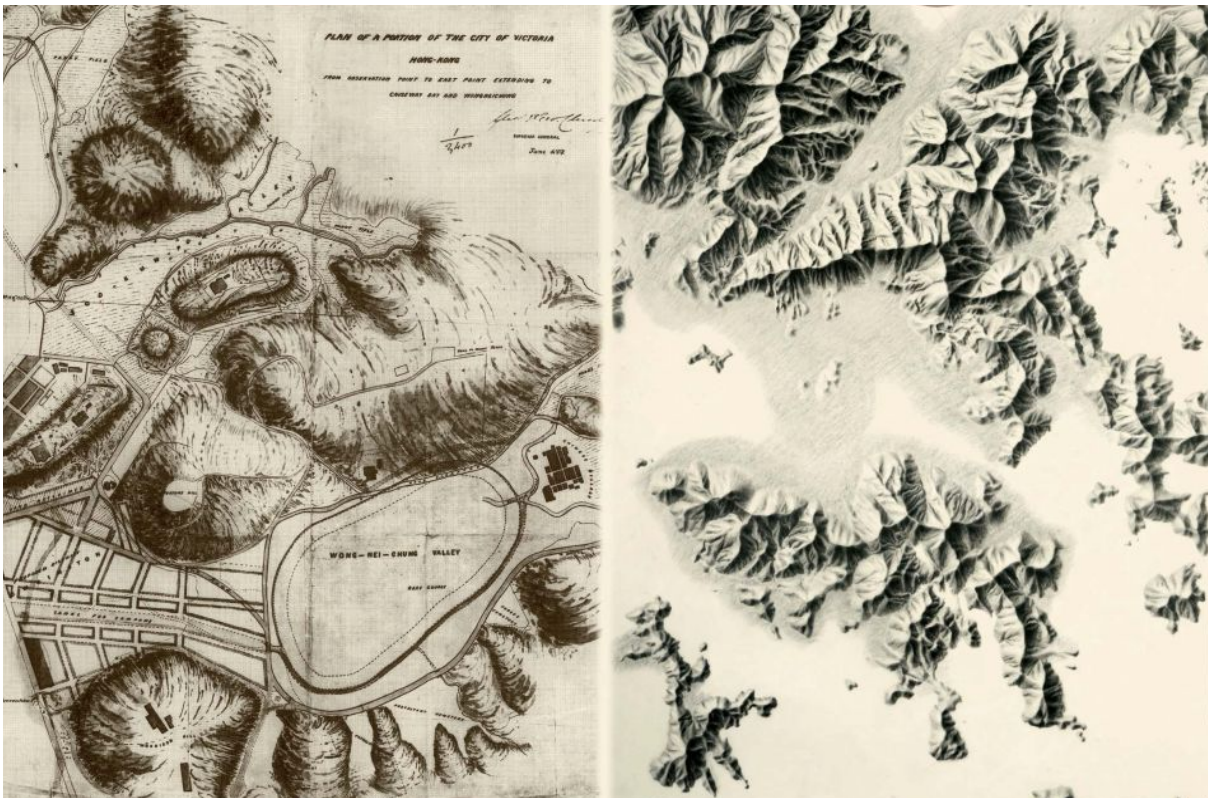

Figure 1.1 *Portion Plan of the City of Victoria in 1859; Hill Shading*. Lands Department, 'Hong Kong Guide 2020: Milestones in Survey and Mapping', Hong Kong, 2020.

Since maps are indispensable mediums to demonstrate how the authority legitimises its possession of a territory [Dung, 1997], the colonial government of Hong Kong sustained its mapping routine in the 20th century to monitor its resources over the city. Nonetheless, the leap of cartographic techniques and the invention of digital maps in the following century pulled the privilege from the authority and drastically changed the nature of maps. Hence, the roles of maps were interpreted very differently from the colonial age of Hong Kong to its contemporary times. To understand the significance of the paradigm shift, several historical maps of some hazardous urban crises in Hong Kong were borrowed to explain how the authority responded to game-changing disasters and political turmoils.

In January of 1894, a mysterious plague broke out on Hong Kong Island and infected thousands of citizens in the dense urban district. The Governor of Hong Kong - Sir William Robinson described the situation as an "unexampled calamity" while scientists and government officials were frustrated to find the root cause of the disease [Daniel Crouch Rare Books, n.d.];[Pryor, E. G. 1975]. The unsanitary living condition became the target of the investigation and the government ordered house-to-house inspections in the infected district.

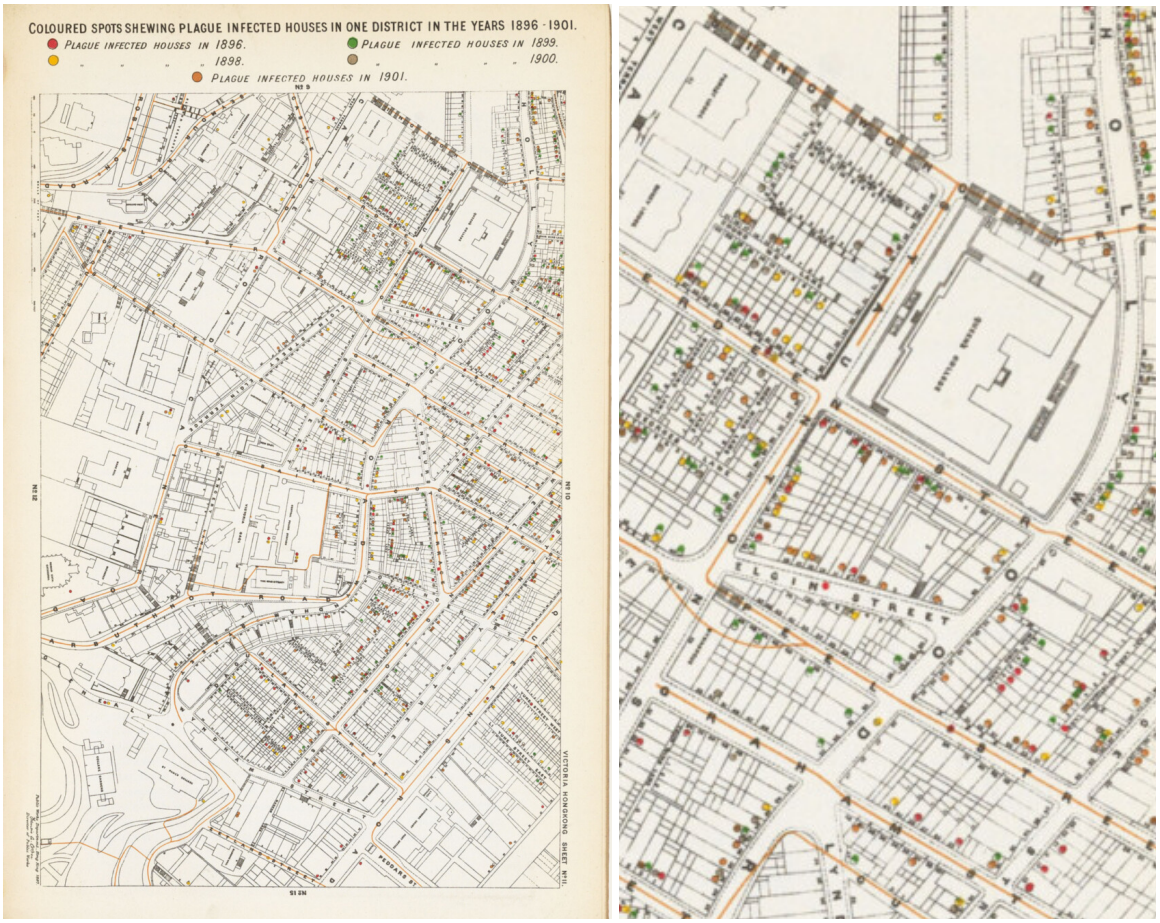

Figure 1.2 and 1.3 *Uncovering the mystery of the Hong Kong Plague*. W. J. Simpson, 'Report on the causes and continuance of plague in Hongkong and suggestions as to remedial measures', London, 1903.

Figures 1.2 and 1.3 shows an analytical map drawn by the government officials in the report on the causes and continuance of plague in the city. Cases of infection were mapped out and indicated with a dot of a colour referring to the year of infection. This data collection and representation method proved to be effective in finding the means of transmission by deciphering the pattern of the nodes on the map, such as the famous map of cholera in London drawn by Dr. John Snow [Snow, 1855]. The correlation between the disease and the underground water system was uncovered on the map, which effectively persuaded the local council to disable the pumps and halted the spread of cholera in a year. In contrast, the researchers in Hong Kong were not able to form a convincing hypothesis for the origin of the plague and the root cause was not discovered until The Plague Research Commission of India in Bombay discovered that the virus intruded human bodies through fleas bites which were carried by rats [Daniel Crouch Rare Books, n.d.].

In contrast to figure 1.1, the plague map projected the city in a plainer representation: natural landscapes were excluded while the terrain was divided into systematic lots and buildings. This way of drawing rationalized the complexity of the territory and provided more flexibility to overlay more geographic data and planning. At this stage, cartography did no longer only serve for inspecting the landscape, but also resolving urban crises.

To plan for the possible danger in the city, the colonial government in the 1940s initiated some field studies and research on the squatter settlements located at the city's periphery. Those settlements were mostly built by mainland immigrants and they were poorly designed in terms of structures and safety. The dense population and fragmented wooden structures posed a high risk of fire outbreak in the settlements and triggered the government to plan fire lanes over the villages for the extinguishment logistics. The lanes were illustrated as highlighted roads on maps like figure 1.4, demonstrating the mobility and extended control of the rural area by the authority [Public Records Office, 1952]. Despite the effort, a massive fire still ignited and wiped out thousands of squatter houses at Christmas in 1953 [Cheung and Hong Kong Youth Hostels Association, 2013].

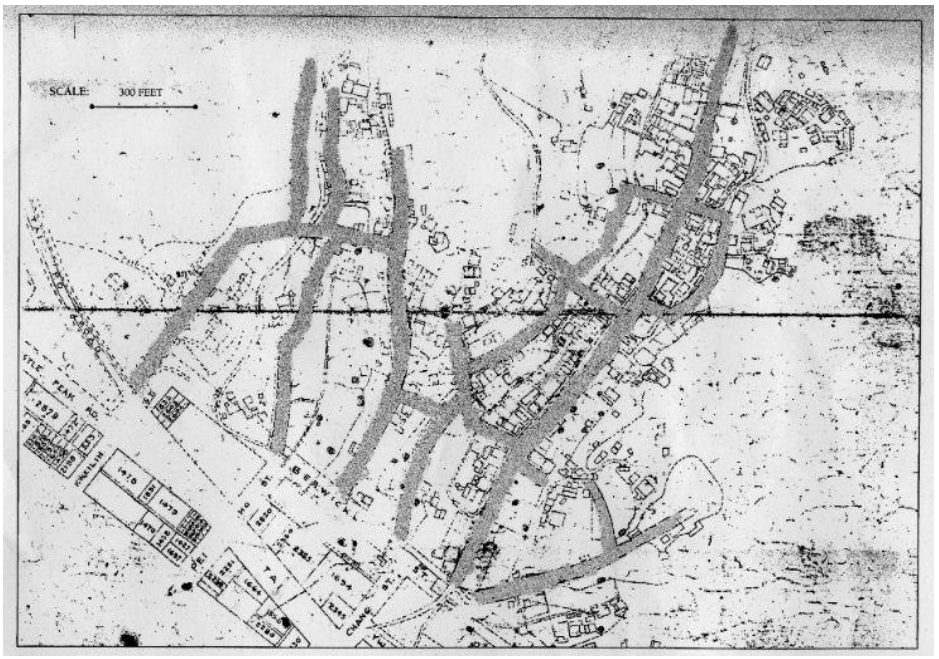

Figure 1.4 *Planned fire lanes in Shek Kip Mei.* Adapted from: HKRS 163-3-20, Public Records Office, Government Records Service, Hong Kong. 1952.

Apart from the squatter settlements, the immigration of mainland residents also brought more political disputes and unrest to Hong Kong during the Civil War and the Cultural Revolution in China. In 1954, a large-scale protest and riots started off as a clash between the patrons of the Chinese Republican party in the mainland and the British Colonial government in Hong Kong. From the map shown in figure 1.5, the conflicts were categorized into four types in their respective colours: red for arson, yellow for firings from the police, green for tear gas and vomit bombs firings from the police, and blue for robbery. By examining the distribution of hot zones[1] and the supply lines from the law enforcement power, the authority divided the city into five lockdown zones to enforce curfews and suppression. The graphic representation of this map shares many similarities with the plague map in figure 1.2, such as the colour dots, the boundaries of zones and the clear illustration of roads. In contrast, the urban incidents in the riots map were given hierarchy according to their political nature. Some particular incidents were even elaborated in more detail in later pages of the report, showing a growing capability of information search by the colonial government.

1. Hot zone is defined an area that is considered to be dangerous. Violence can induce a hot zone, as occupants are subject to attacks, crossfire, or even direct fire targeted at them specifically. [“Hot Zone (Environment).” 2023. In Wikipedia.]

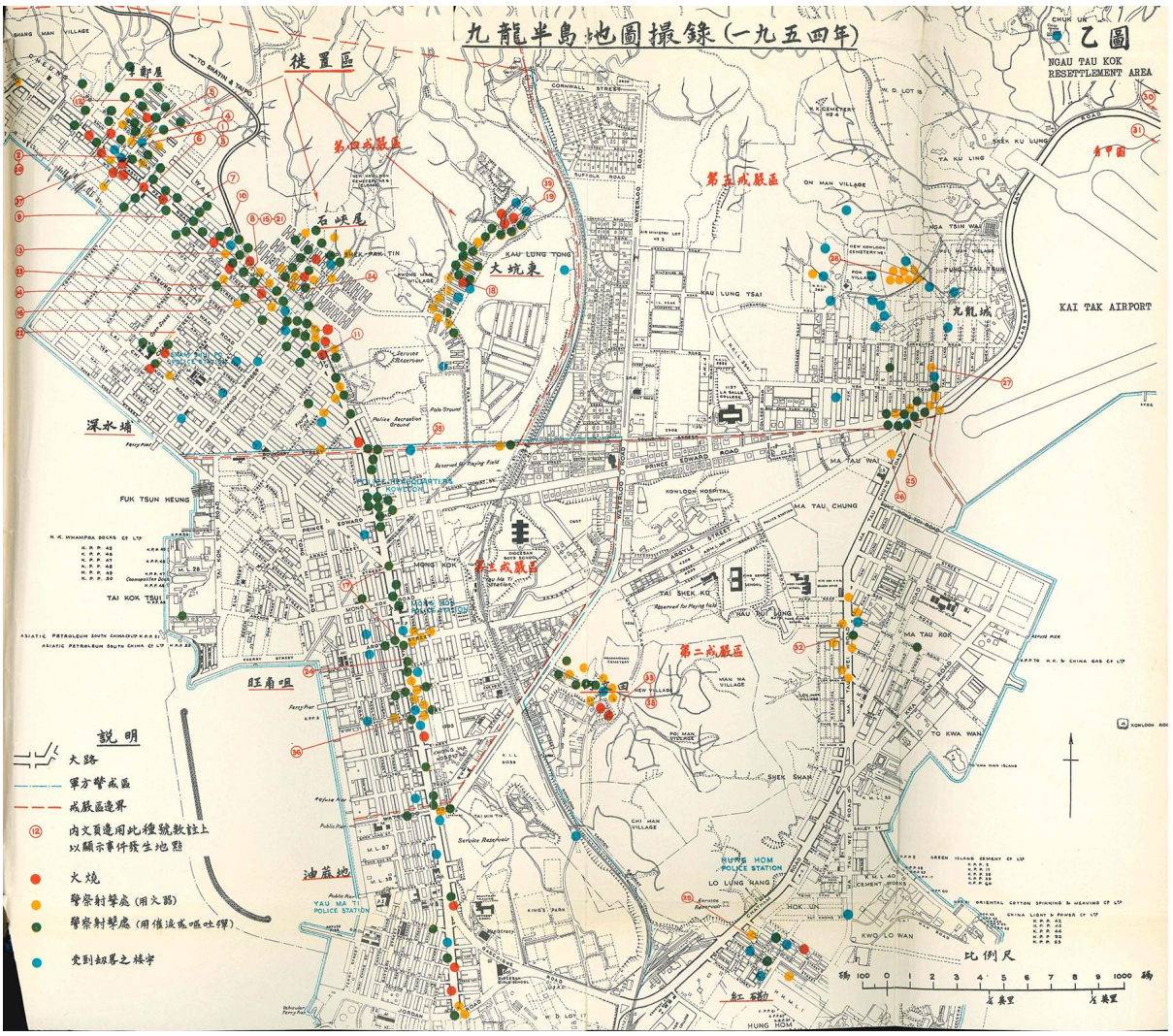

Figure 1.5 *Map record of Kowloon Peninsula (1954).* Report on the riots in Kowloon and Tsuen Wan. Public Records Office. Government Records Service. Hong Kong. 1956.

On the other hand, by separating the data of the riots from the map, some hidden narratives to the city can be revealed. For instance, among all the buildings captured by the frame of the map, only schools were represented in solid black hatches. Since this map was designed for the law enforcement's operations, this selective coding reflects the police's special attention to the contact between the territories of schools and conflicts. Furthermore, the resettlement residential estates were also selectively indicated on the top-left corner of the map. This particular mention related to the demographic complexity inside those resettlement communities where most patrons of the Chinese Republican Party lived together and defended their beliefs against the colonial authority [Cheung and Hong Kong Youth Hostels Association, 2013]. By summarizing and responding to the riots that took place in a year, the colonial government could extract one of the networks out of the thick fabric of the city and set it up as an example for the future governors.

While the conflicts between the political beliefs in Hong Kong continued to stir the lives of the citizens in the 1960s, a drastic cartographical revolution was coming to transform the urban narratives of the city:

> **"***With the development of the first computational tools for producing digital maps and analyzing troves of geo-data in the 1970s, the material history of mapping entered a new chapter... Today, web-based mapping applications…have brought the analytic tools of GIS [Geographical Information Systems] to the general public and are changing the way people create, visualize, interpret, and access geographic information.***"**
>
> *— from Presner, Todd, David Shepard, and Yoh Kawano. 2014. Hypercities Thick Mapping in the Digital Humanities. https://escholarship.org/uc/item/3mh5t455.*

This is the point when the government of Hong Kong started to apply digital tools and translate their existing data archives to the authoritative server in the cartographical practice. The transition encountered its first challenge in the first few years of the new millennium. In 2003, a wave of the severe acute respiratory syndrome (SARS) emerged in China and spread chaos in the city of Hong Kong [Boulos, 2004]. The rising death tolls and respiratory transmission of the disease caused more panic to both the citizens and the government, forcing the authority to look for external assistance from other professional organisations. To construct a visualising system of self-renewing geoinformatics, a software company in California - ESRI - decided to collaborate with the government of Hong Kong in the battle against the epidemic. To start with, the company designed a base map of the urban fabric of Hong Kong and developed a graphic coding system to project the address data on SARS cases borrowed from the government [Peltz, 2003]. By providing an open access to the website linking to the digital map, the public health decision makers, travellers and local populations at risk could reclaim the navigation power in the sea of datasets.

Unlike the previous paper maps, the framing of the digital maps bears a much greater flexibility as the users can zoom in (enlarge) and out (shrink) to choose an appropriate scale for their own interest. This new freedom broke the convention in terms of the power of framing in cartography while the coding of geoinformatics also introduced a new branch of graphic representations for maps. In figure 1.6, the screenshot of the user's monitor shows a customized frame of the distribution that maps the SARS cases in Hong Kong in 2003. The base map shows the differentiation of the land, the sea and the parks in colours while transportation infrastructures and streets outline the simplified fabric of the urban district. Different from the old maps, the names of the streets and residential regions were exaggerated in sizes to help the users to locate themselves in the virtual terrain. On the other hand, the address data of the SARS cases were represented as different colours of triangles and circles: orange circles with red triangles for multiple infected cases within a diameter of 250 metres ; yellow circles with red triangles for no other cases within a diameter of 250 metres; red triangles for infected cases and purple triangles for delisted cases [Boulos, 2004].

Figure 1.6 *Web browser screenshot by this author of one of MapAsia's SARS distribution maps for Hong Kong.* (24 April 2003). MapAsia. Hong Kong. 2003.

Although the citizens of Hong Kong have no access to the datasets of this SARS map, the customization of the framing already began to enlighten the general public to develop a wider understanding of their habitats from small to large. Adding to that, when the citizens got more familiar with the digital cartographical tools and the geographical incidents around them, the maps gradually blend into their connection with the city. In the following decades, this would inspire an epic comeback for the people of Hong Kong to defend their freedom by taking over the control of maps.

Section 2

Racing with Time — the emergence of real-time maps

Figure 2.1 *Untitled photo.* Lampson Yip. *HKFP Lens: From hope to despair in a single day – Lampson Yip's stunning shots of Hong Kong's extradition law protests.* Hong Kong Free Press. 2019.

Towards the end of the millennium, the city of Hong Kong was put on the table between the British colonial government and the central government of the People's Republic of China (PRC). The PRC government wanted to reclaim the territory as its own land while the British colonial government stood to preserve a stable political environment for the international exchange of resources in Hong Kong. The result of the negotiation formed the Sino-British Joint Declaration which both nations agreed on, establishing the city as the Hong Kong Special Administrative Region (HKSAR) and executing a new political structure framed as "one country, two systems" for at least 50 years from the handover in 1997.

Nevertheless, the agreement did not dispel the doubts in every citizen of Hong Kong. Different scales of protests and marches broke out to confront the influence of the PRC government and express messages to the new HKSAR government. Approaching the expiring year of the Sino-British Joint Declaration, the scale and vigorousness of the protests escalated while the citizens began to develop collective routines and associate cultures with the demonstrations. For instance, the summer protests in 2003 and 2014 both occupied Victoria Park as the first assembly venue and marched towards the west to the headquarter of the HKSAR government [Seng, 2020]. Nonetheless, the protests did not grant the citizens a more promising future and the HKSAR government decided to make its next move in 2019.

In May 2019, the executive council of the HKSAR government drafted an extradition bill that allowed its law enforcement units to detain and transfer wanted people back to mainland China or territories with no formal extradition agreements [Li, 2019]. This bill raised the tremendous anxiety of the citizens and the pro-democracy parties, motivating them to recruit more people to participate in the coming protests aiming for the withdrawal of the contradictory bill. Meanwhile, waves of the propaganda calling for the protests started to dominate in a wider range of media, including physical leaflets, newspapers, social media platforms, online forums, radio broadcasts, online streaming platforms, and television broadcasts [Kow et al, 2020]. The fast spread of information consolidated the citizens' motivation in a blink and led to unprecedentedly large protests in June.

Despite the effort to supervise and control the protest, the law enforcement unit could not suppress the inflating numbers of protestors coming from different districts in Hong Kong. On the 12th of June 2019, it was reported that millions of citizens participated in the massive march and many major roads near the government headquarters were occupied by protestors. In figure 2.2, the research journalists of the New York Times tried to present the enormous scale of the protest with composite aerial footage and annotations. By juxtaposing an abstract urban map and the aerial collage, the readers could follow the consequences of the protests in relation to their impressions of the city's urban features and fabric. For example, the abstract map on the left indicates the marching route and its direction clearly while the aerial footage on the right shows more substantial features like trees, pitches, and roofs. The combination delivers a clear overview of the civil movement to the global audience, but it relies on advanced tools, the profession of the journalists, and a longer period of time to synthesize an understandable picture.

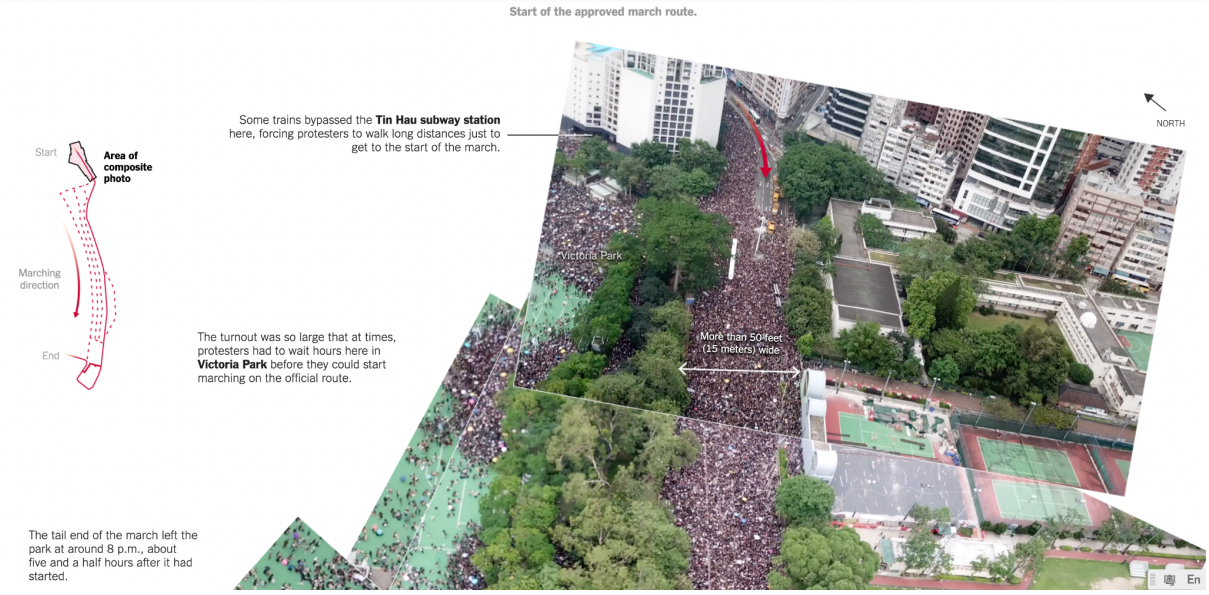

Figure 2.2 *Screenshot of an interactive article.* Aerial footage by Agence France-Presse; EyePress Images; Apple Daily; Reuters; and The Associated Press; as well as photographs by Agence France-Presse — Getty Images; The Associated Press; Tyrone Siu/Reuters; Jorge Silva/Reuters; Stephen J. Boitano/LightRocket, via Getty Images and Anthony Kwan/Getty Images.*"A Bird's-Eye View of How Protesters Have Flooded Hong Kong Streets."* The New York Times. 2019.

In contrast to the overlooking narrative, the dynamics and complex communication network inside the protest deserved an alternative way of telling the story. In figure 2.3, the photograph framed a closer view of the composition of the rally. Although the photographer did not zoom in further to the personal scale, from afar he reflected the differentiation of actions among the protestors rather than a universal swarm. For instance, the colourful umbrella near the tree masks and implies an ongoing risky action initiated by the protestors, while the others at the bottom of the photograph were transmitting messages by hand gestures. This division of labour was not a result of a single stream of agenda from the pro-democracy politicians, but an emergence from the decentralized campaigns held by the drifting groups of protestors and the anonymous in the online media platforms [Kow et al, 2020];[Lee and Chan, 2018].

Figure 2.3 *Untitled photo.* Todd R. Darling/HKFP. *"HKFP Lens: The day that shook Hong Kong, Part 1 – dramatic photos from the frontlines."* Hong Kong Free Press. 2019.

Nonetheless, the number of protestors and their spontaneous organization were no match for the crowd control weapons and forceful suppression by the police. The protest on the 12th of June 2019 ended with chaos as figure 2.1 shows: tear gas grenades and rubber bullets were fired toward the frontline of the protest, and some juveniles were subdued and arrested by specially armed police. Meanwhile people found ways to escape the hot zones and squeezed into office buildings and shopping malls. After retreating, many protestors immediately suffered from trauma and critical injuries which required safe places to carry out first-aid treatments [Radio Television Hong Kong, 2019]. Consequently, many international entities such as the Hong Kong Bar Association and Amnesty International condemned the overdosed force demonstrated by the police.

Since the HKSAR government refused to withdraw the extradition bill, the protests sparked again and spread widely in other districts of the city. Learning from the experience in the previous march, the protestors began to develop a better system of coordination by taking up responsibilities related to their specialized skills such as poster publication, supply line support, and reporting the most updated situations to social media [Kow et al, 2020];[Lee and Chan, 2018]. One of the streams responded to the aftermath chaos of the previous protest and started the experiments of using maps to help the navigation for the people. The mappers visualized the information gathered from the reporting channels in Telegram and other social media platforms, forming a new cartographical language that made it easier for the general public to grasp the most updated situation [Kow et al, 2020]. Figure 2.4 shows one of the very first batches of maps created by the anonymous channel *WeatherJJ*, embedded with some screenshots of the live broadcasts filmed by Now TV, a pay-TV service provider.

Figure 2.4 公共安全情報 *(Information for public safety).* WeatherJJ. Telegram. July 28, 2019, 07:48 p.m. http://t.me/weatherjj/2055

This map uses contrasting red and yellow colours to represent the temporary territories of the police and the protestors respectively. The contact zone between the forces was labelled with a couple of tear gas warnings while the screenshots of the live broadcasts helped to verify the danger. On the other hand, the base map was simplified into a representation that highlighted the contrast between the urban blocks and roads, providing an easier vision for the viewers to navigate themselves on the roads. Meanwhile, some important geographical anchors were also labelled by symbols and short texts to link this frame of the map back to the full scale of the city, such as the stations of the Mass Transit Railway (MTR) and the Liaison Office of the Central People's Government (appearing as a blue tag on the left side of the map). By applying symbology, the map could recover some features lost in the process of simplification and translate the spatial information to people who were not familiar with this part of the city. Although the icons appeared oversized and out of scale compared to the old social cartographical studies shown in the previous chapter, this exaggeration worked better on the screens of mobile gadgets and the interface of social media platforms.

Multiplicity in information is equally crucial with visualization. This map is not the dominating output in the Telegram channel but a critical moment where the inputting updates could be summarized and upcoming news could be introduced in a better context. Looking into the details of figure 2.5, the two messages before the release of the map were saying:

"1934, a child lost his mum, wearing red dress, six or seven years old, please go to Kau Yang Church"
"Tsung Tsin Mission of Hong Kong Kau Yan Church, Sai Wang Gough Street 97A"

These texts received around 2900 views indicated inside the message boxes but the attention rose up dramatically when the map embedded the location of the church, accumulating up to 20,800 views. It was not easy to find out why the viewers were more engaged by the map, but the viewing numbers did reflect the differentiating demand for information during that particular moment of the protest. Sliding the time frame to the aftermath of the protest, the second screenshot in figure 2.5 shows a variety of retreating suggestions for the protestors:

"The whole Lan Kwai Fong clubbing region is still operating as usual (heart)
It is good to have a drink after playing 'rugby'"
"2317 Tin Sui Wai West-rail station, Yuen Long West-rail station are not safe (repeating 3 times)"
"2318 Tsuen Wan West has parents meeting their children disassembling from works and studies"
"2246 Retreating protestors, please leave along the mid-level paths"

These broadcasts did not act as captions or responses to the map, but worked as another stream of media giving more specific information. For instance, people used the channel to find their lost companions while the safety reports of the rail station implied a creditable disassembling route for the protestors. This mode of communication kept developing in multiple channels until a moment when it redefined the function of buildings and places to cope with the disasters triggered by the turmoil. For instance, the church often opened to the wounded people involved in the protests and the bars became a potential hide-out for the retreating young adults.

Figure 2.5 *Screenshots of historical broadcasts from WeatherJJ channel.* Author. Telegram. March 21, 2023.

By reviewing the Hong Kong protests in 2019 through the lens of a drone and the journalists' camera, we are able to understand how the behaviours of the protestors were represented in different scales. The spatial dynamic of the actions taken by the protestors and the police was a set of a complex dance which had been visualised in maps by the anonymous in the social media platform. Compared with the texts cited from the Telegram channels and some documentary books, maps have an advantage of overcoming the language barrier and providing a more comfortable way for foreign followers to understand the most updated "chess boards" of the protests. It continued to catch more views in the Telegram channels and became an indispensable tool for the protestors to protect themselves from the uncontrollable conflicts.

To understand the application of real-time maps from the perspective of a protestor, I arranged an interview with a volunteer, Mr Ng who participated in the series of protests in 2019 in Hong Kong. The interview was formed into two parts: the decision-making on a day of protest and the critical review of the significance of real-time maps among different media. The next section will elaborate on the later works of the real-time mapping and their influence on Mr Ng's actions. Although the excerpts of the interview may present some contents overlapping with the findings in the previous paragraphs, they should give more depth to the topics and lead the thesis to the final theme of archiving collective memory.

Section 3

Freedom at a glance — charge or retreat within a protest

Figure 3.1 *Untitled photo.* Aiden Marzo. *HKFP Lens: Day of havoc across protest-hit Hong Kong overshadows China's National Day party.* Hong Kong Free Press. 2019.

Not every protest and demonstration would lead to confrontations and conflicts. The decentralized course of the protests often defied the planning and ended with an unexpected clash or silence. Nonetheless, this flexibility gave opportunities to the protestors to decide their personal role and tactics along the rough schedules of the protests. To illustrate, the frontline gang would need to face the direct hit from the crowd-dispersal actions performed by the police while the backing would be responsible for constructing a sustainable supply chain. My interviewee, Mr Ng also described his general role in the protests:

> *"I am a normal protestor. If you are placing me into the spectrum from the "valiant" to the "non-violent", I am somewhere in the middle. Activists in social movements usually don't go to the extremes in the spectrum, so I would see myself as one of them in the middle but slightly shifted to the more active side."*

Although there were different groups of protestors responsible for a range of volunteering posts, all of them needed to secure their safety in order to sustain the protests. In the first month of the serial protests, the protestors developed a routine to use specific media to gather updates on the potential danger in the protesting field, such as online live broadcasts, telegram channels and real-time maps. Each media performed for different phrases of the protests:

> *"Telegram channels had the fastest updates but usually, they were only texts. Online live broadcasts were restricted by the poor signal network at the protesting grounds so they were always delayed. Moreover, you would not have that much time to keep your eyes on the broadcasts and process all the information, while the broadcasts often only displayed the situations from one particular angle and neglected the wider picture. On the other hand, the real-time maps were also not as fast as the text updates from the Telegram channels, but they visualised a better picture of the hot zones for the users."*

In short, the real-time maps did not provide the most updated information compared to text messages but they offered a wider picture for the users to understand their positions in the context of conflicts. To illustrate how the maps could contribute to the tactical moves of a protestor, I brought up a scenario drawn from one of the maps and asked Mr Ng to explain his decision-making in that situation. Figure 3.2 shows the map of Admiralty, an area full of government institutions, and the moment of potential confrontation between the protestors and the police.

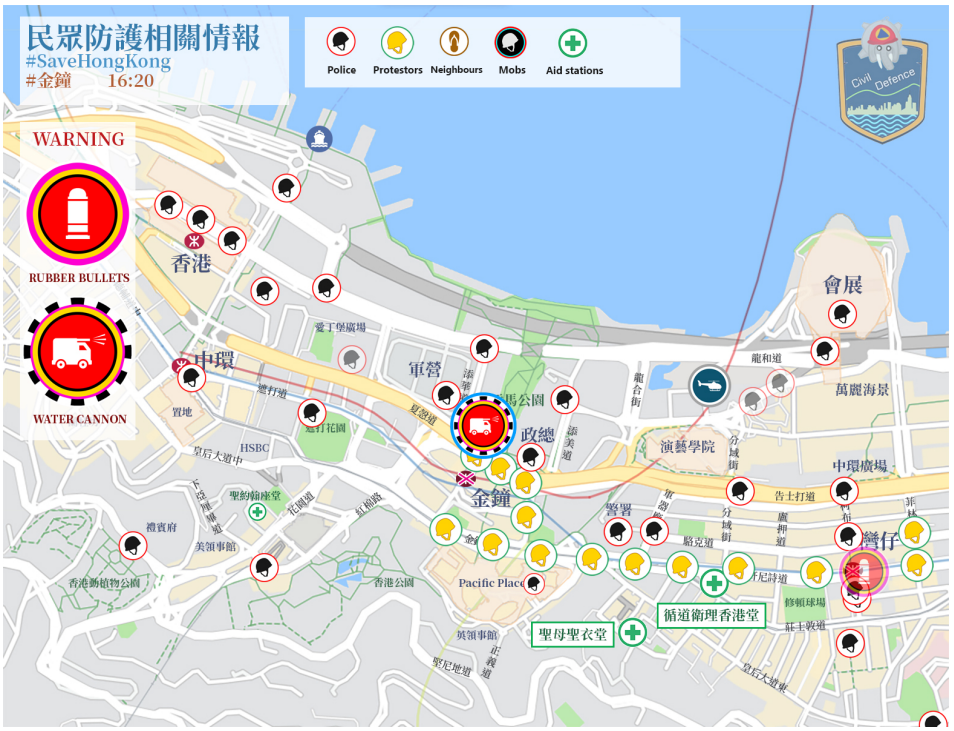

Figure 3.2 公共安全情報 *(Information for public safety).* WeatherJJ. Telegram. Oct 1, 2019, 16:20 p.m. *https://t.me/weatherjj/6526*

"I was exactly one of the protestors trapped in Admiralty at that time. Although the mobile network is still working well on the streets, many people understood their geographical disadvantages through the [Telegram] channels and became desperate to find a way out. Therefore, I used this map and my in-situ observations to determine a safer escaping route. According to my resources, it was not possible to get out by walking on foot along the roads in Admiralty [towards Central] while the retreating direction was also blocked by the rubber bullet threat. As a result, the only choice was to climb up the hill through the safest path. Since there were police guarding Pacific Place and the gate of Hong Kong Park, I decided to go up the hill through a church near Wan Chai. This decision was made in a few minutes while we were running [away from imminent danger].

The church mentioned in the excerpt was marked as an aid station on the map, located near the bottom of the frame. Since many churches took a neutral stance in the protests, they would not restrict their accessibility to either protestors or police. Instead, they would provide drinking water and a safe haven for the people who were willing to listen to the preaching. Although some catholic churches had been subjected to political pressure to close their doors against protestors in the previous social movements, a couple of them still persisted in opening themselves to the demonstrating citizens and became a symbol of refuge in the fabric of the protesting field [Read, 2020].

In contrast to the favourite places for protestors, the police also occupied some specific buildings to carry out their crowd-dispersal strategies. According to Figure 3.2 and the interview with Mr Ng, the Government House, the Central Government Complex of HKSAR and the complex of Police Headquarters were constantly guarded by a large portion of the law enforcement forces. Meanwhile, some public buildings like the Exhibition Centre and the Academy for Performing Arts were occupied by the police as well to mobilize their resources. Since these locations were far from the dense residential and commercial districts, they could be easily fortified and protected from the protestors' disturbance. Hence, these buildings and the seaside promenade became the "dead zone" for protestors, demonstrating how political turmoil can radically change the perception of a "public place".

Apart from the active protestors, the maps also attracted views from the more subtle supporters outside the protesting field. Mr Ng was able to escape the siege illustrated in Figure 3.2 because of the assistance offered by some volunteering drivers:

> *" I was trapped at that time and I looked into the maps [to find a way out]. There were 7 police squads around so I decided to walk up to the hills first. Luckily since the "parents" also looked into the maps and parked their cars at the safer locations, I was able to get on one of them and left the hot zones."*

By linking the excerpt with the map, we are able to depict the scenario at specific locations in Figure 3.3. Mr Ng walked up to the hills towards the south after he passed by the church in Wan Chai, reaching another main road on the upper level of the hill. As this road did not connect to buildings with tactical values so neither the protestors nor the police had an interest in occupying it, leaving the road as a safer refuge shown on the maps. Some volunteering drivers noticed this void from the maps and parked their cars on that road, waiting for protestors who were finding a way to escape the siege.

Figure 3.3 *Escape route in the protest on 1st of October 2019.* Author. 2023.

As the protestors often had very limited time to digest the information feeding into their phones, the abstraction and representation of information determined their perceptions of the real-time situation. Maps are never objective, in a way that the geographical properties of objects would always need to be translated into abstract cartographical features. Therefore, when multiple channels with different backgrounds, habits and political stances, tried to convert their pool of information into maps, a range of cartographical features and templates were invented and tested along the course of the protests. To understand how the cartographical variations impacted the protestors' actions, a pair of maps was presented to Mr Ng.

Figure 3.4 公共安全情報 *(Information for public safety).* 103map. Published by WeatherJJ. Telegram. Aug 25, 2019, 17:49 p.m. *https://t.me/weatherjj/3799*

Figure 3.5 公共安全情報 *(Information for public safety)*. WeatherJJ. Telegram. Aug 25, 2019, 17:50 p.m. *https://t.me/weatherjj/3803*

Figures 3.4 and 3.5 are the real-time maps drawn for the protest ignited in a satellite town called Tsuen Wan. They shared very similar frames to project the protesting field and visualised the spatial information around the same time. In contrast, the hierarchies represented in the maps were different. Figure 3.4 used a monochromatic backdrop of the urban fabric and highlighted the swarms of protestors and police in different densities of colours. On the other hand, figure 3.5 applied the colour codes from Google Maps for the backdrop: yellow ochre for dense urban districts, green for parks, pink for hospitals, blue for waterbodies and light yellow for highways. Instead of visualizing the shapes of the confronting forces, the second map used circular icons to represent the crowds and conflicts.

According to Mr Ng's opinions on the maps, the first map was more precise on the locations of crowds while the other one was more vivid when it came to the warning signs. He used both maps in that protest and he found out that the second map was easier to read within the demonstration based on several reasons. Firstly, the legend list of the first map was too long and detailed to be understood on a screen of a phone. The locations of barricades and the speed of protestors' actions were too hard to capture in the same time frame when they were constantly changing along the course of the protest. Secondly, the warning icons of the second map were more successful in addressing the patterns of police tactics and the most dangerous threats posed by police weapons. Last but not least, the colour-coded backdrop of the second map worked better than the black-and-white alternative of the first map. The actual advantage of the second backdrop was not the colours, but the deja-vu embedded in the Google Maps codes. Although many maps used a clean background to create a contrast with the highlights, Mr Ng had a different comeback on this argument:

> *"... since the maps were designed for the general public, over-simplification would cost people more time to digest the visuals, which was bad for the protestors who were always short of time. In addition, the off-scale warning signals also helped a lot since they pointed out the two most dangerous beings here: rubber bullets and the water canon."*

In other words, the map in Figure 3.5 sacrificed the precision presented in the former one to exchange faster reaction time to the information input while its familiar colour codes synchronized more with the experiences of the protestors. This suggests a different justification of social cartography in the context of social movements, giving more privilege to the actors in designing the languages of the maps. In this scenario, the quality of the maps does not rely on the objectivity nor the subjectivity of the projection, but on the argument built by the mappers to address significant interactions between forces:

> *"Whether a particular relationship between two wholly objective elements is of significance or not depends on the quality of the map maker's judgment ... If he is mistaken in his belief, his map may mean little more than a map would that shows by counties the ratio of illiteracy to cocktail lounges, even though the objective statistical facts of this relationship might be mapped with meticulous precision."*

— from Wright, John K. "Map Makers Are Human: Comments on the Subjective in Maps." Geographical Review 32, no. 4 (1942): 527–44. https://doi.org/10.2307/209994.

In spite of the justification built in the conversations with Mr Ng, the cartographical properties did not stay forever in only one stream of mapping. The convenience of digital network allowed the features, symbology and methodology of the rel-time maps to be exported and imported by other anonymous mappers.

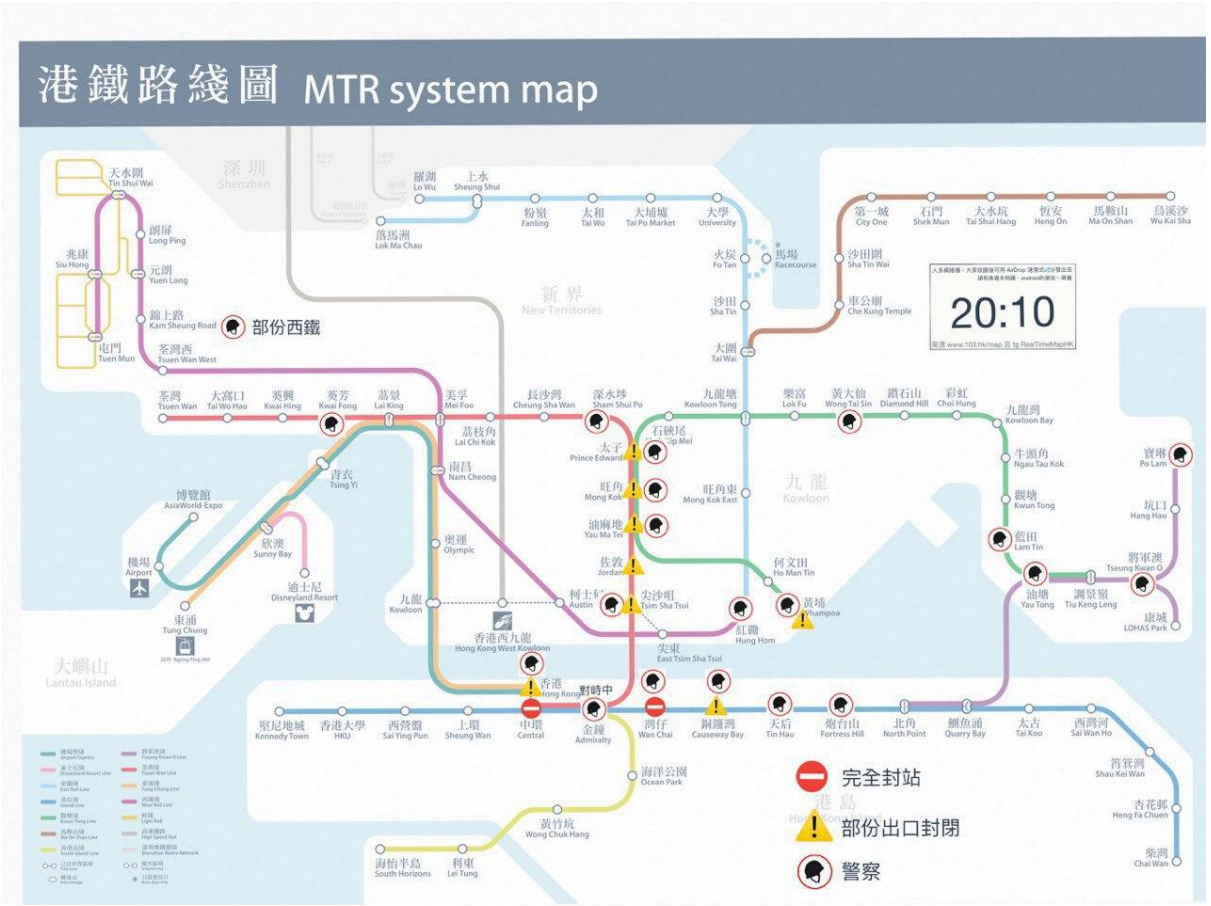

Figure 3.6 公共安全情報 *(Information for public safety)*. 103map. Published by WeatherJJ. Telegram. Sep 08, 2019, 20:10 p.m. https://t.me/weatherjj/4975

Figure 3.6 shows an example of how a shared graphical language could be spread to other streams of real-time maps. This was a map indiciating the respective potential risk of the subway stations, acting as an important reminder for the protestors who wanted to get back home at the end of the protests. It borrowed the official abstract map from the subway company as the base so the viewered could easily relate the situations in the everyday context.

Nevertheless, the maps did not dominate the media usage in the protests since they also had limitations and discrepancies when we look into the mapping process and different protesting fields. Since the anonymous mappers collected the spatial information from their public feedback channels, it would be the responsibility of the mappers themselves to verify the credibility of the information sources [Kow et al, 2020]. The process of verification usually depended on the online live broadcast where the mappers could capture the protests' dynamics through others' cameras. Therefore, it was hard to verify the things that happened outside the frames of those cameras when the protests grew bigger and more scattered. This methodological drawback led to

unavoidable false alarms on the real-time maps and reflected the mentality of the protestors. Mr Ng was asked about how he managed the false alarms and fake updates on the maps, and he summarized his thoughts in the following words:

> *"Even if there were no ways to verify this warning, they [protestors] would not assume that it was fake due to the risk behind it. Therefore, we always predicted the worst scenario instead of putting ourselves into the confusing field between real and fake information."*

Confusion was one of the biggest enemies of the protestors. Many of them put their personal freedom at risk on the streets and could not bear the legal consequences. This was the reason why there was a small room of tolerance when they noticed some false warnings on the maps. Furthermore, Mr Ng brought up his protesting experience at the Chinese University of Hong Kong to explain another defect of real-time maps. Thousands of students gathered at the university in the later course of the serial protests and confronted the police at the periphery of the campus. They fought for control of the adjoining highway and both sides set up their temporary shelters to sustain their resistance [Kidangoor and Leung, 2019].

Figure 3.7 公共安全情報 *(Information for public safety)*. WeatherJJ. Telegram. Nov 12, 2019, 21:55 p.m. *https://t.me/weatherjj/14909*

Since the students had already developed tight bonds with each other and were also very familiar with their territory, real-time maps became redundant when they could transfer information verbally at a faster speed. Mr Ng pointed out this viewpoint in the interview but he also gave credit to the maps when he was about to leave the campus at the end of the turmoil. Figure 3.6 shows a map visualizing the intense conflict between the protesting students and the police at the university. As Mr Ng mentioned, there was not much online input contributed by the students

inside the campus so the icons of protestors faded out when they were trying to imply the ambiguous situation.

The last real-time map in this series was published by the Telegram channel WeatherJJ on the 10th of May 2020, marking the end of this cartographical practice and their role as an information visualizer in the protests. Since the first map was drawn on the 28th of July 2019, this channel has produced more than 500 maps for the protests and become one of the reliable media in the network of the protestors. Different from the precedents of social cartography, this series of maps used online open resources to form its graphic languages and responded to the emergencies that happened in the protests within shorter time frames. The old paper maps might took the cartographers years to calibrate and draw before they could be published. In contrast, the contemporary digital map can be drawn from the legacy archived in different online database and exported with customized features in minutes. This remarkable speed successfully made the maps into a more popular information resource compared to the text broadcasts published by the Telegram channels, saving at least one person from the danger created by the political turmoil.

Section 4

The Afterglow — the format of collective memory and legacy

Figure 4.1 *A collage of real-time maps published by the Telegram channels WeatherJJ*. Author. 2023.

The massive protests ignited in the summer of 2019 in Hong Kong came to an end in 2020 when the protestors faced more difficulties and risks in assembling social movements. Many of them were arrested or granted asylum in foreign countries, leaving the city full of unresolved disappointment and wounds cast by the clashes. The remaining activists tried to sustain their resistance against the influence of the pro-Beijing parties by publishing photo albums, journals and artwork through different media. One of the vivid examples was the movie “Revolution of Our Times” directed by Kiwi Chow which used the footage of webcam and drones to narrate the stories of the young rebels. Some film critics saw this movie as a product created by the propaganda war between the people of Hong Kong and the authorities, presenting the blood spilt in the course of pursuing democracy [Robey, 2021]. Although the movie used a more first-person perspective to project the brutality of the social movements, there would be some protestors who were not willing to see those images and footage due to their mental burden. My interviewee, Mr Ng also suffered from the mental aftermath and explained his repulsion towards photographic documentaries:

“I am afraid of gunshots and I would also subconsciously analyze flashing lights emitted by vehicles. And I refuse to recall those memories. The incidents I experienced in the “7-1 [1st of July] Legislative Council” and the “Chinese University protests” really exerted a harsh impact on me. For instance in the Legislative Council, when

you were relying on only the word of mouth to fight against the fear of the unknown. That fear haunts you for your whole life."

Mr Ng did not buy any photo albums of the protests, despite acknowledging the effort paid by the journalists and photographers. This raised the question of the format of collective memory in this digital age: how should we archive and reflect on haunting collective memory when it can be visualized with more precision brought by the new technologies? Mr Ng appreciated the collection of the real-time maps and addressed their significance in narrating the blossoming and withering of the protests. However, during the interview he did not generate suggestions or arguments about the archiving format of the maps. As there are no longer any protestors requesting maps or images for every hour, the archive has more time to be designed and criticised with examples in the international scale.

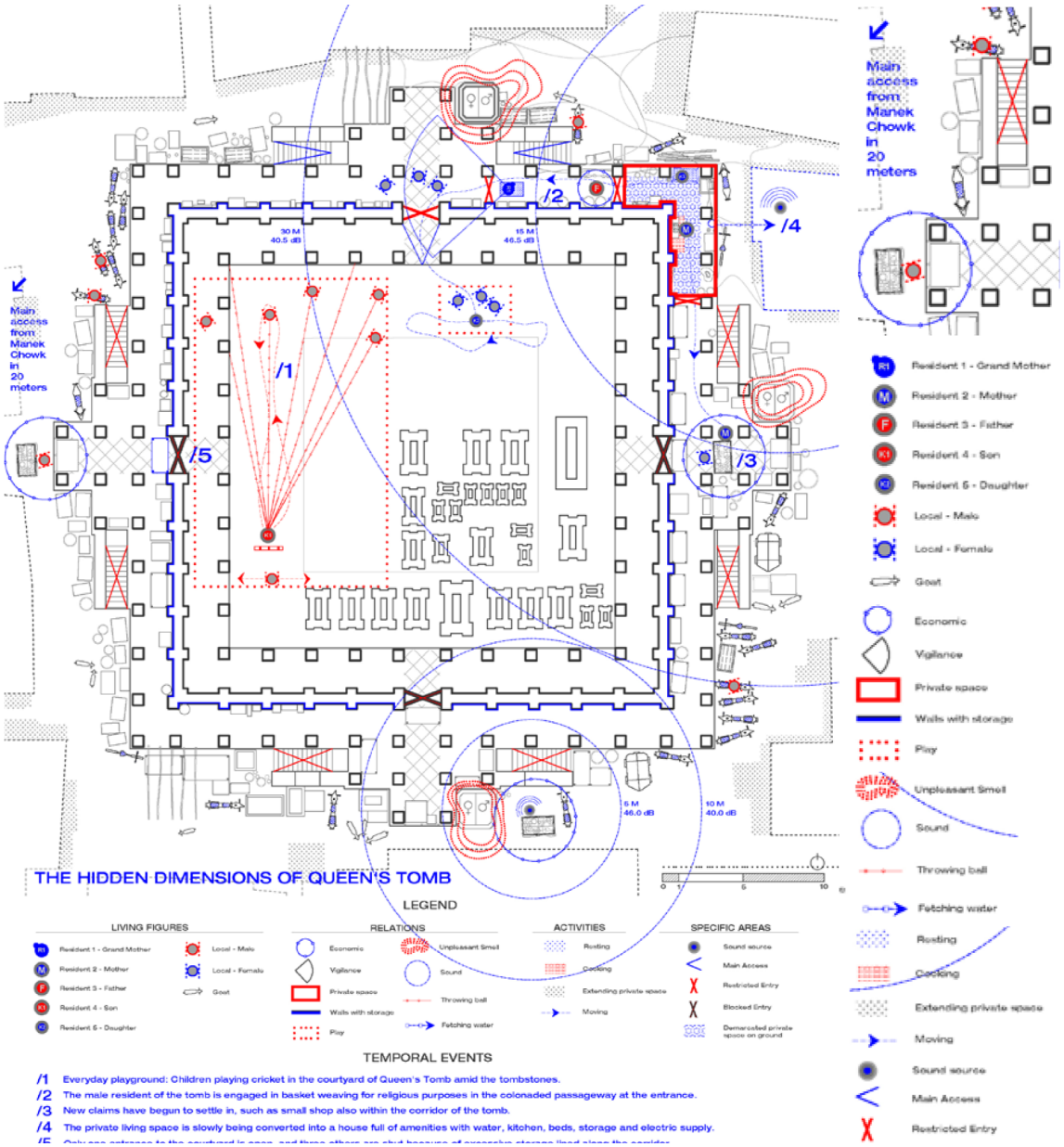

Figure 4.2 *A Cartography of different occupations in Queen Tomb*. Shriya Dhir. 'Narrative cartographies' research group. 2021.

Overlapping and synthesizing data in a fixed frame of space is a common way to archive human activities within a place of interest. The first example of archiving format is the cartographical studies of contested heritage precincts in Ahmedabad, conducted by two professionals from the field of urban design and architecture. They were interested in the domestic occupations in the heritage buildings within the walled city of Ahmedabad, and the subtle resistance from the occupying families who tried to repel the national conservation plans [Ciborro and Mansi, 2021]. The researchers borrowed the ethnographical approach popularized by Japanese architects like Wajiro Kon and Atelier Bow-Wow and used a cartographical format to represent their observations. Figure 4.2 shows one of their maps for the hidden relations and activities in the heritage site. They used the red and blue colour codes to visualise the contrast between male and female, access and blockage, and active and passive activities. The colour codes were applied to different graphical annotations to represent the sensations of the living inside, such as smell, sound and movements. This map successfully archives and narrates the richness of the existing domestic lives of the families, strengthening the researchers' thesis of addressing non-archaeological qualities of the heritage site. Nevertheless, the overlapping method is defined to disrupt the direction of time and place the superpositions or cancellations at the top in the hierarchical order. If this method is applied to the series of protesting maps, the reasoning and consequences between each movement will be compressed on the maps while places with the most frequent occupations will be revealed and highlighted. Therefore, this archiving format could be used to show the concentrations of conflicts or occupations throughout a longer timeline of the protests, but not the sequence of the tactical decisions.

Figure 4.3 *The architectural image complex.* Forensic Architecture and Amnesty International. 2014.

To recover the missing relations between civil incidents, virtual modelling is applied in some forensic research when videos and images are not capable of providing credible evidence. The Studio of Forensic Architecture cooperated with Amnesty International to rebuild a day of the tragic 2014 Gaza conflict with a series of synthesized image complexes. These image complexes were comprised of screenshots of a virtual model and photographs taken by the victims during the

carnage. The studio received seven-thousand photographs and video clips published by Arab, English, and Hebrew mainstream and social media platforms, making this single-day documentation into a forensic project that lasted for a year [Weizman, 2017]. They did not only spend time verifying the credibility of those crowd-sourced resources but also measuring the spatial relationships between each source and rebuilding the scenario as virtual models:

"Constructing virtual models from the spatial information harvested from images, we can locate cameras in time and space. What we refer to as the architectural image complex is a method of assembling image evidence in a spatial environment. The architectural image complex can function as an optical device that allows the viewer to see the scene of the crime as a set of relations between images in time and space."

— from Weizman, Eyal. 2017. Forensic Architecture: Violence at the Threshold of Detectability.

The studio also used satellite images to support their research when they needed to address the relations of crimes on an urban scale. Figure 4.3 shows a screenshot of the online platform where users from the public domain can upload their witnesses according to the interactive satellite image. This platform overcomes the restrictions of frames and borders and it is widely adopted in many archive systems. Figure 4.4 is another example of an interactive archive documenting the Tehran election protest in 2009. It even embedded a daily timeline and some Youtube video clips with fact-checking evidence to enrich the reconstruction of the collective memory. This transition of scale designed by these urban researchers was induced by the legal threshold precision for satellite images, when their resolution was restricted to protect personal privacy. This limitation further proved the significance of abstracting urban fabric and combining multiple resources to archive such a complex civil disaster.

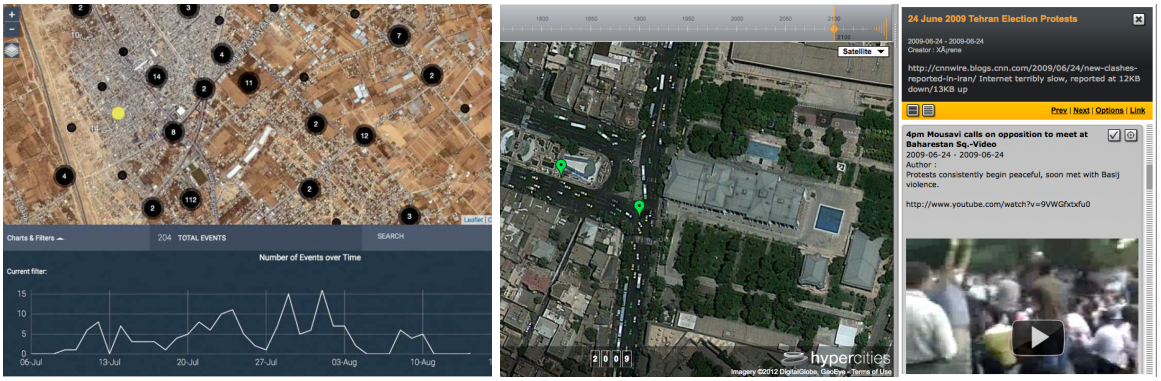

Figure 4.3 "*The Gaza Platform: an interactive map of Israeli attacks during the 2014 Gaza conflict*". FORENSIC ARCHITECTURE/PATTRN; AMNESTY INTERNATIONAL AND FORENSIC ARCHITECTURE/ PATTRN. 2014
Figure 4.4 "*Screengrab of Xárene Eskandar's HyperCities project".* Matt Soar and Monika Gagnon. Database | Narrative | Archive. 2013.

To take a step further to document the interior details and atmosphere of human disasters, the Studio of Forensic Architecture also invited volunteers surviving those turmoils to advise the virtual modelling and rendering of some specific scenarios. Cooperating with the European Centre for Constitutional and Human Rights (ECCHR), the studio contacted a witness who survived a missile attack in 2010 Pakistan [Weizman, 2017]. Accompanied by her lawyer, the witness sat with

one of the architects from the studio and played a leading role in rebuilding her home in the virtual modelling space. Every new substance added to the model triggered her connection to the elusive memory and narration of her life in the house:

> *"WITNESS: Here was a big heavy iron door like on the other side. Correct. I would widen it a bit more…*
> *LAWYER: Does this visualization help to remember what happened two and a half years ago?*
> *WITNESS: It helps me a lot. Without the plan, I could have not remembered it like that."*

— from Weizman, Eyal. 2017. Forensic Architecture: Violence at the Threshold of Detectability.

By inviting the victims to act as the leading designer of the documentation, it broke the restriction of detectability of the digital tools and really presented the finest details of a civil catastrophe. With the multidisciplinary participation, the visualization was also credited with the legal power to be presented as legitimate evidence in the archive, sustaining the defence of human rights and freedom. This forensic mindset is very useful when there is a demand to convert the archive of a civil event into legal evidence. Applying this archiving format to the series of protest maps in Hong Kong, would require an enormous amount of effort and time to contact the involved protestors and carry out peer-to-peer fact-checking. Nonetheless, some methodologies could be extracted from these examples and allow the public to understand the growth and decline of the protests in an interactive and comfortable way. Furthermore, the protest maps depict more than victimization, namely the strategic resistance against the counter forces within the urban fabric. Hence, the archive shall present a function to guide the viewers on how to respond to civil disasters as an individual and defend their treasures of lives.

Figure 4.5 *"The interior courtyard with the fan and the child walker", modeled and rendered according to the description of the witness. FORENSIC ARCHITECTURE. 2010*

Conclusion - the decentralization and survival of media archives

Figure 5.1 *"Radio Television Hong Kong (RTHK) reporter Bao Choy arrives at the West Kowloon court in April".* Jérôme Favre/EPA. The Guardian.

Under the pressure exerted by the government, many media and press were forced to terminate their operations or even convicted for violations of laws [Tsoi, 2021]. In April of 2021, one episode in a news documentary television programme, produced by a public broadcaster Radio Television Hong Kong (RTHK), was honoured with The Human Rights Press Awards. This series of the television programme was called Hong Kong Connection and it has been broadcasted for more than 40 years, covering many social issues in Hong Kong such as politics, history, education, environment and economics. That particular episode documented the police involvement in the mobs' attack on the Yuen Long rail station, during the 2019 protests in Hong Kong. Despite the honour given by the international community, one of the leading producers in this episode, Bao Choy was convicted and fined for accessing a public database as part of the investigative research for the documentary [Davidson, 2021]. The episodes reporting the 2019 protests were also deleted from the official Youtube channel of RTHK, marking the beginning of a muted era for the media and press in Hong Kong. From this lawsuit, it is clear that the archives of the collective memory are being challenged by the new narration from the authority. This has prevented researchers from accessing some databases managed by the government and contacting the former protestors in such a coercive environment.

"採訪無罪 (No guilt for investigation)!" shouted dozens of supporters as Ms Choy stepped out of the court to meet up with her peers from other media entities [BBC News Chinese, 2021]. The determination of Ms Choy and her colleagues was broadcasted and motivated another wave of volunteering to archive the endangered documentaries of the protests. Thus, the interviews of the

secondary students, the sounds of the burning police vehicles and video footage of the hazy battlefields survived the crackdown on freedom of the press, due to the digital decentralization of archived information. The decentralization also helped the production team of the movie "Revolution of Our Times" to make contacts with a mapping team active in the protests. The production team tried to revive the hidden scenes behind the maps by recording footage of their mapping process. At the curated moments when the anonymous actors analyzed the police tactics on the maps, the scenes brought the audience to the past and enlightened them with a collective testimony of urban transformation. The narration of urban studies was no longer dominated by professional cartographers and urban researchers [Revolution of Our Times, 2022].

Figure 5.2 Screenshot of the trailer of "*Revolution of Our Times*", directed by Kiwi Chow. Revolution of Our Times. Youtube. https://www.youtube.com/watch?v=WbBU1AZS8HA

The screenshot of the movie trailer in Figure 5.2 condensed the main argument of this thesis, about active participation in measuring and analysing ourselves in relation to the urban fabric and disasters. In section 1, precedents of cartographical studies in Hong Kong were discussed in the context of civil catastrophes. They showed how the representation of spatial information transformed with the development of the political environment and technology. Mountains and coastlines were once the subjects of the maps of Hong Kong during the early times of settlement and its colonial age. Cartographers were trained to translate the physical properties of nature onto maps, building up the base for urban development and management. When the city of Hong Kong expanded at a rapid pace in the 20th century, maps also became a tool to investigate potential unrest and disasters. Since the scale of these subjects could be extreme, from epidemic viruses to crimes, the cartographers began to apply symbology and abstraction to these practices of social cartography. Their work influenced how we map data and other non-physical features in contemporary times. One of the precedents demonstrated a method a step further to invite the public to contribute to the mapping process. The deadly epidemic of SARS which struck Hong Kong in 2003 raised the government's attention to the issues of chains of infection and quarantines. These concerns were visualised in the interactive map offered by the government where the citizens can report potential cases and review the scope of infection in different districts. From these examples, we can see that humans in the city were categorised in the context of disasters:

sick or healthy, guilty and innocent, registered and unauthorised. On the one side, this polarization of categories was a natural consequence of information filtering and abstraction; but on the other hand, the polarisation may also lead to more intense conflicts in the context of civil turmoil.

The massive protests in 2019 in Hong Kong were brought up as the main subject to be discussed in the next following sections. In section 2, the political background and timeline of the protests were explained and different scales of images were used to emphasise the complexity missed by the conventional documentation methods. This leads us to understand how the emergency and digital network broke through the conventional frames of time of mapping and resulted in the emergence of real-time maps. The maps worked together with the text broadcasts in the Telegram channels to alert the protestors of the potential danger, indicate the safe refuge near the protesting field, and even help people to reunite with their loved ones after the chaos. This information was not exclusive to the protestors, but it also informed the general public about the locations of conflicts in their living districts.

In order to deliver more critical views to the maps, section 3 cited the experiences shared by Mr Ng, a former protestor, and reviewed the advantages and limitations of the maps. He gave a deep insight into how the protestors played on the chessboard of their city and decentralized the posts within the protests. As an agent between the frontline and the supplied backup, Mr Ng took a position where he could learn the common ways of communication between the two sides and understand the significance of real-time maps in both contexts. The maps helped the frontline to flee from the imminent danger while informing the backup to relocate themselves to a safe distance from the conflicts. Furthermore, the role of public buildings was also discussed in this section. Those buildings still performed their function during the protests, sheltering an enormous amount of people or offering a place for worship. However, these functions acted in different roles in the context of massive protests: the sheltering became a temporary base for both the police and the protestors while the sacred place became a refuge for the protestors and even the neighbourhood suffered from the tear gas strikes. The protests clearly changed how the citizens understood public buildings in such an emergency.

Although the Hong Kong protestors did not achieve their goals in the political conflicts, they tried hard to document their witnesses to the fall of the city. The last section looked into the format of archiving collective memory and unfortunate civil events. Some foreign archiving examples were used to address the difficulties and variety of documentation, recalling that the format of tortured history is tied to uncertainty and torn memories. Since the protestors carried heavy mental burdens from the harsh memories of the turmoil, honest photographs and video footage of those experiences became unfortunately harmful to them. Meanwhile, those information sources are also critically crucial in verifying the accuracy of the maps in future archiving practices. The studio of Forensic Architecture spend a whole year to just issue credibility to the tragedies that happened in a single day during the Gaza conflicts. Therefore, it is important to pinpoint the audience or the beneficiaries of the archives. Are they the victims seeking legal jurisdiction, the foreigners who want to understand the operations of the protests, the governments who are finding the best location of their headquarters or the future generations who wants to defend their rights again? In this case, the real-time maps archive should create the greatest resonance with the former Hong

Kong protestors and the active foreign protestors. On one side, the archive can help dissolve the melancholy of the former protestors, telling them an alternative way to sustain their beliefs and review their effort. On the other side, the protestors outside Hong Kong can also learn from the past experiences visualised on the maps and advance their resilience towards the unjust.

Figure 5.2 警方於旺角警署附近的「布袋陣」戰略 *(The police siege tactics around the Mong Kong Police Office).* WeatherJJ. Telegram. Oct 30, 2019, 19:53 p.m. *https://t.me/weatherjj/10351*

To make the archive an interesting and informative resource, several advanced studies can be carried out along with the verification process. Figure 5.2 shows an example done by the Telegram channel WeatherJJ which reflected on the police tactics and presented their simulation of the potential conflicts on the map. This district has a grid urban structure so the main arteries and corners became the indicators to foresee the next steps of a crowd-dispersal event. This kind of analysis can be extended to other districts and uncover the relationship between social movements and the existing urban fabric. On the other hand, the growth and decline of the protests can be narrated by animations composed of the maps in chronological order. With the supplementary information provided by the animations, video documentaries, photographs and text witnesses of the civil events, the archive shall become a mature resource for the upcoming generations.

Post-script - a witness of the witnesses

Since the disappearance of protests in Hong Kong, I have been waiting for this moment when the reflection on the real-time maps can be carried out by someone in a structural manner. Nonetheless, the unfortunate political situation in Hong Kong suspended much of this research while many former participants of the protests gave up on the government and chose to flee from the city, leaving those precious fragments of history untouched.

Apart from the academic significance in the context of the architecture and urban studies, I believe these maps could alleviate people's pain in their memories. There was a time when I decided to review one of the video documentaries about the siege of universities in the late course of the 2019 protests. This video was made by the production team of the aforementioned news documentary called Hong Kong Connection, who interviewed different parties and citizens involved or influenced by the tragedies. When they were narrating the siege of the Polytechnic University, there was a scene capturing a middle-aged man, wearing a ragged outfit, scurrying without a clear direction on the streets. He was finding his son, who was trapped in the university. As an ordinary citizen, he may not share the same political stance with the protestors, but in this scale of the emergency, he was in a panic trying to save his only child from the fire and tear gas strikes. After a few rounds of searching and asking for help from the other emerging supporters of the protesting students, he decided to sit with the other parents who also suffered from the same situation. For this man, every text sent by his son and any information proving his safety was the ultimately precious and comforting source of motivation for his search. This particular moment made me understand that, despite the uncertainty in the crowd-sourcing process, every point and icons on the real-time maps tie to the praying from the citizens.

"Can mapping really help citizens to reclaim their rights and build up the resilience of the city?"
I asked my interviewee Mr Ng on another occasion.

"It saves my life," he said.

"So architecture and urbanity can really save someone's life?" I replied and laughed with him.

By the time the protestors stepped onto the streets confronting the unknown future, they had no time to criticize theories and make up a proposal, they just reacted to what they faced and created history. As Mr Ng said, it was the participants who held the power of decision and cultivating cultural values in the protests. They curated the collective messages shouted to the government and the world while creating systems based on empathy and observations to sustain the protests. One of them is the real-time maps, but it was only a part of the long stories.
Here, I presented my highest respect to the people of Hong Kong who fought for their values and concluded the thesis with a quote from the book HyperCities: Thick Mapping in the Digital Humanities:

“If there is a utopian idea at the core of the digital humanities, it would have to be the notion of “participation without condition”- that is to say, participation in the creation of the cultural record of humanity regardless of facticity and, hence, not dependent upon or restricted by race, gender, class, religion, ethnicity, nationality, age, language, access to technology, or education.” pp. 140

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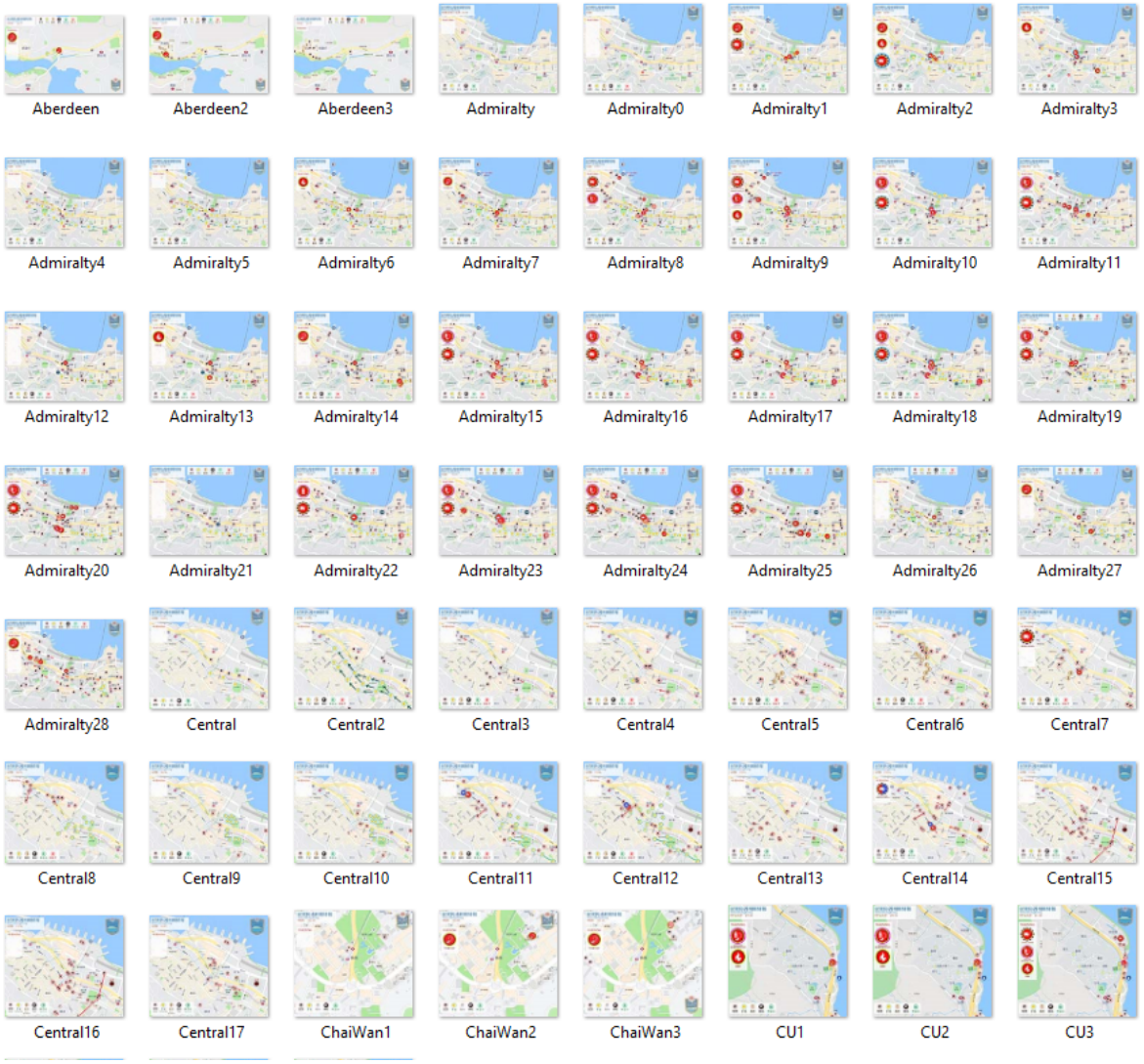
Appendix I: Archive of Real-time maps

公共安全情報 *(Information for public safety)*

Date: 28nd of July 2019 to 10th of May 2020
Publisher: WeatherJJ, Telegram channel
Editor: Jacky Lai
Notes: 501 images in total, arranged in alphbetical order

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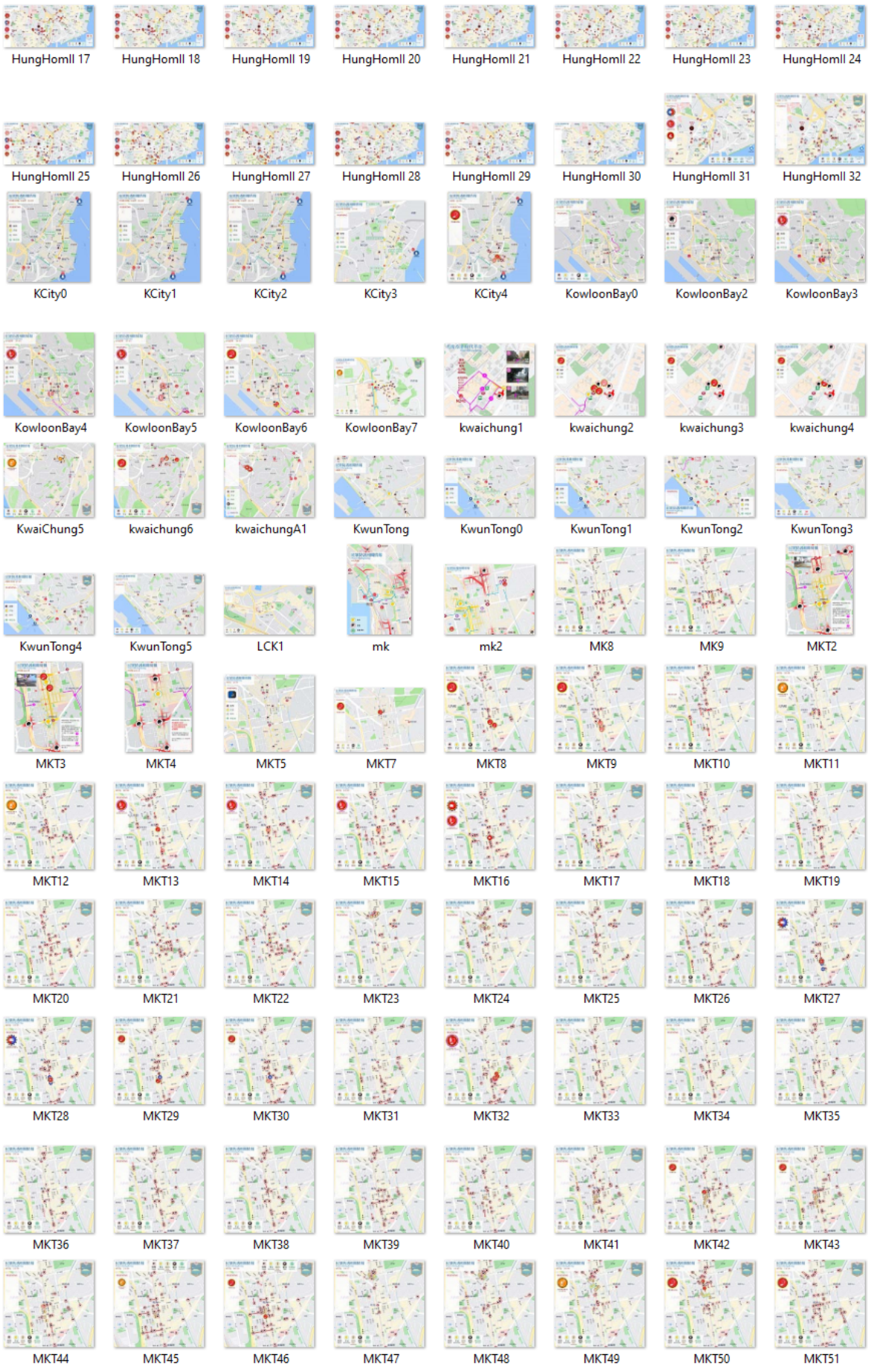
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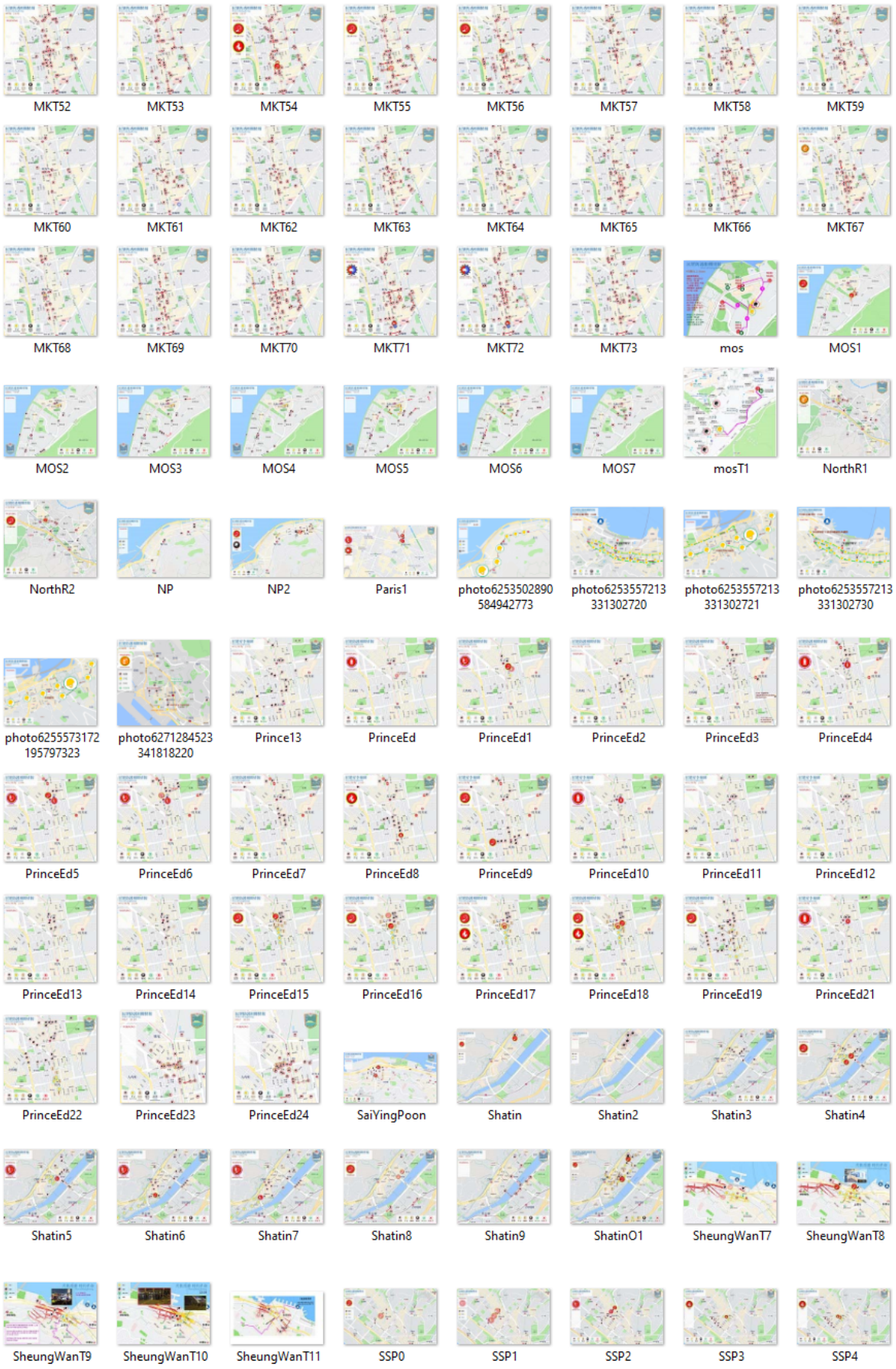
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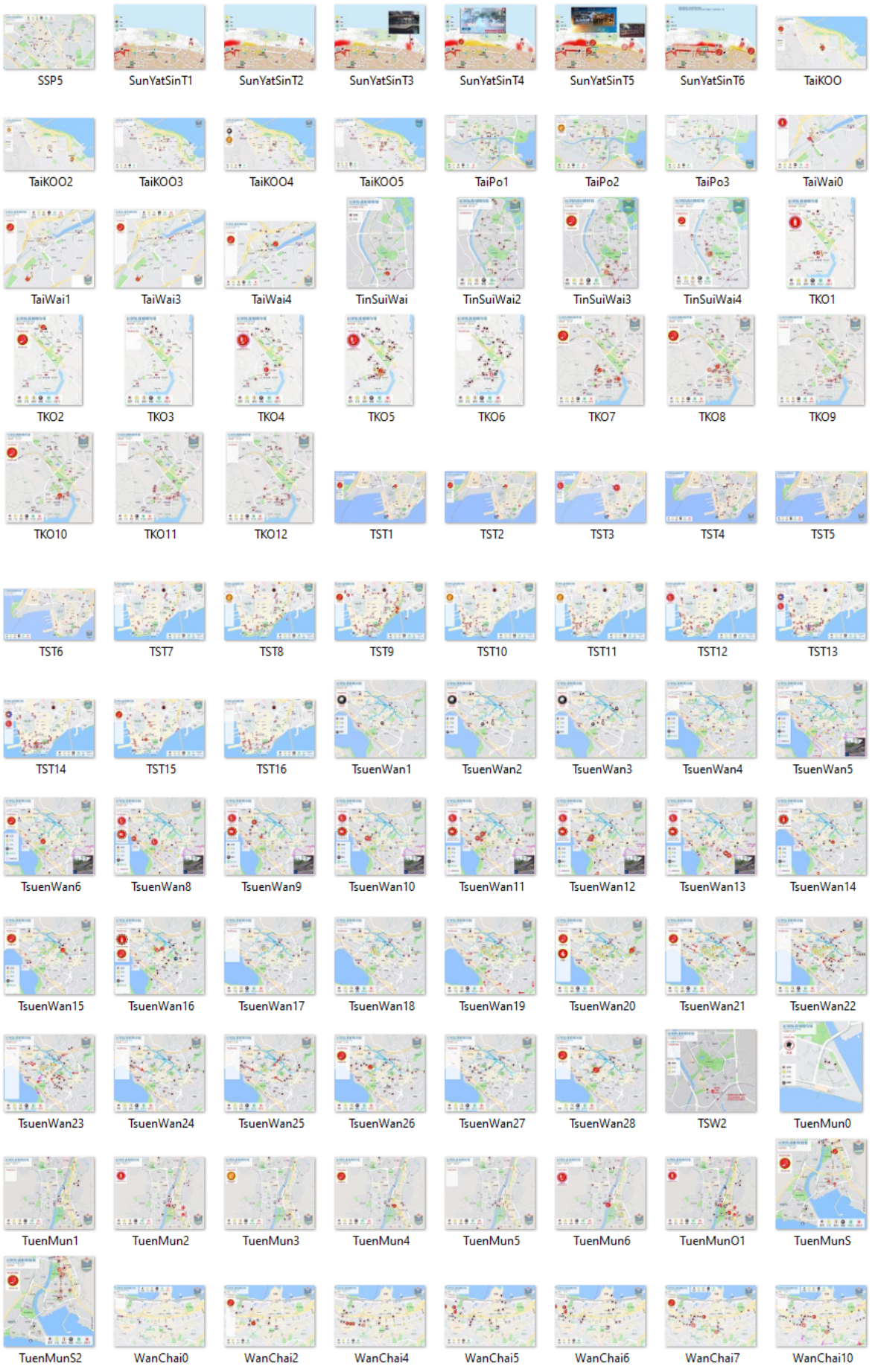
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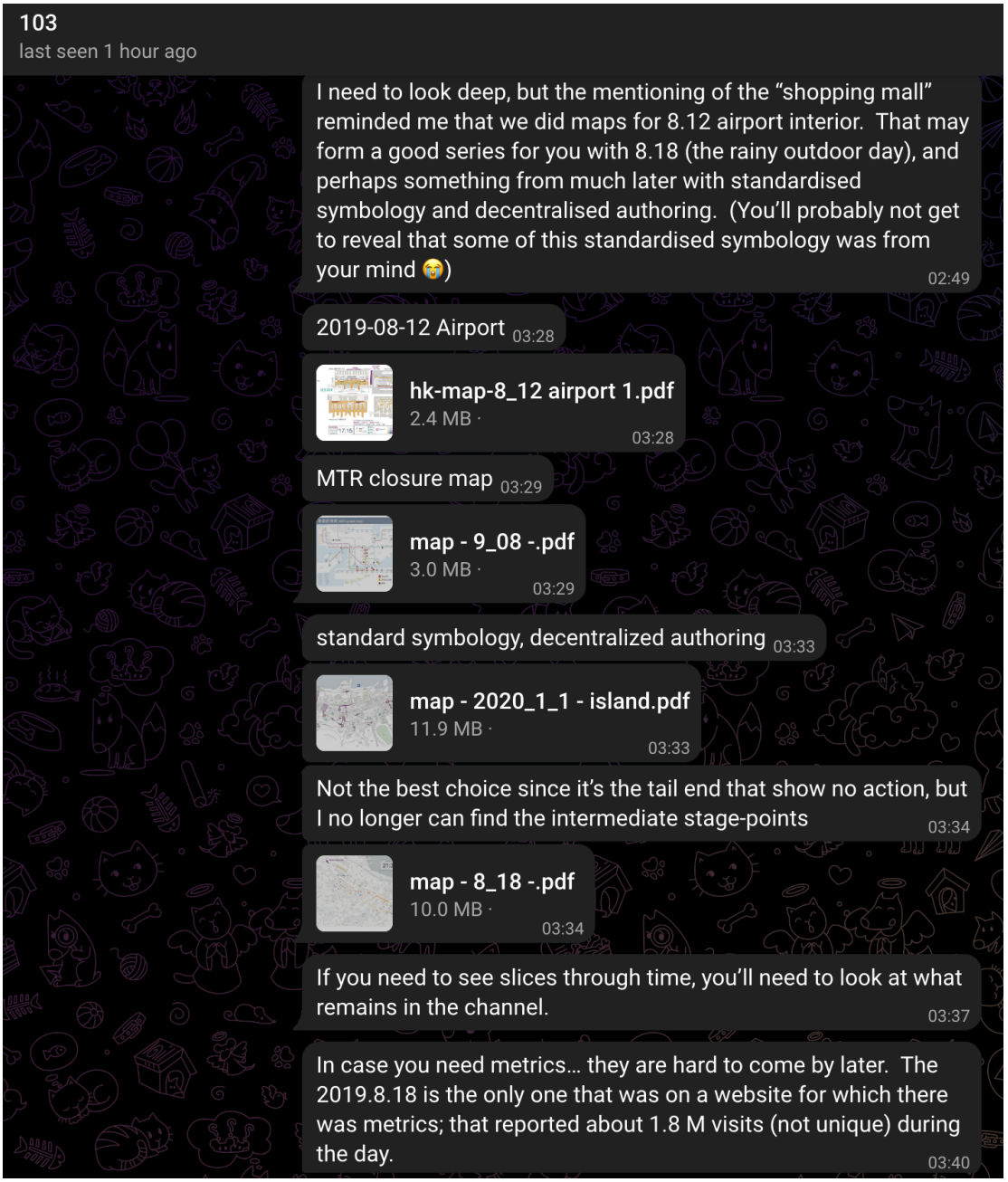
Appendix II: Transcript I

A short feedback from one of the anonymous mappers

Date: 16th of Febrauary 2023 (02:43 - 03:40 CET)
Initiator: Jacky Lai
Respondent: An anonymous mapper titled "103 map"



Lai: Hi 103 bro. I'm not sure whether you are still active or not but I hope you're fine.
Lai: Btw I'm writing my Master urban history thesis essay about mapping protests so may I ask for some credits from you?

103 map: hello. How can I help?

Lai: Hey long time no see 😂
Lai: I'm thinking whether I can have access to your map archive so I can do a comparative studies

103 map: (Comparative between what?)

Lai: [Attachments of the thesis proposal and a screenshot of the overview page of the history thesis course on the Brightspace online system]

Lai: This is my thesis proposal
Lai: And this is the overview of my history course, I'll spend 10 weeks from now on to write 5000-8000 words essay/thesis based on the protesting maps.

103 map: Given what I see here, I think the emphasis is on choosing the right pieces of artifacts to help you tell a story.

103 map: I need to look deep, but the mentioning of the "shopping mall" reminded me that we did maps for 8.12 airport interior. That may form a good series for you with 8.18 (the rainy outdoor day), and perhaps something from much later with standardised symbology and decentralised authoring. (You'll probably not get to reveal that some of this standardised symbology was from your mind 😭*)*

103 map: [Attachments of some maps drawn by 103 map]

103 map: 2019-08-12 Airport, MTR closure map, standard symbology, decentralized authoring

103 map: Not the best choice since it's the tail end that show no action, but I no longer can find the intermediate stage-points
103 map: If you need to see slices through time, you'll need to look at what remains in the channel.
103 map: In case you need metrics… they are hard to come by later. The 2019.8.18 is the only one that was on a website for which there was metrics; that reported about 1.8 M visits (not unique) during the day.

103 map: Good luck with the writing. Would want to read it when you're done!

Lai: Yay thanks a lot

Appendix III: Transcript II

The interview about the protests in 2019 Hong Kong and the significance of real-time maps

Date: 31st of March 2023 (16:45 - 18:30 CET)
Interviewer: Jacky Lai
Interviewee: Mr Ng

[Introduction]

Lai: Hi I am Jacky Lai and I am working on a master history thesis about the Hong Kong protest in 2019, to a extent related to the civil resilience of the city.

Lai: The content of this interview will be only presented and stored within the system of The Delft University of Technology, upon the agreement made between the interviewer and the interviewee.

Lai: So sir, may I ask for your identity which you wanna use for this interview?

Ng: Mr. Ng

Lai: Thank you Mr Ng, good to see you here.
This interview is constructed by two parts with separate themes to the protest, but feel free to speak with a flexible way without constraining ourselves to the specific questions. The idea behind to the two parts is to provide a more first-person perspective to the Hong Kong protest before jumping into the maps and reflections.

Lai: In addition, if there is any chance for future updates or publications about this thesis, especially for the interview content, Mr Ngai has the right to permit or reject the citation of this interview.
So may I ask Ng, what kind of role did you play in the 2019 protest?

[Topic 1: the role of protestors]

Ng: I am a normal protestor. If you are placing me into the spectrum from the "valiant" to the "non-violent", I am somewhere in the middle. Activists in social movements usually don't go to the extremes in the spectrum, so I would see myself as one of them in the middle but slightly shifted to the more active side.

Lai: Is there a reason for your decision of choosing that role?

Ng: I think this is a position where you can contribute the most with the least risk, within a safe zone.

Lai: I really like the term "safe zone", maybe I should also share my position during the protest. I also took a similar position to yours. Usually, if I joined the demonstrations, I wouldn't go to the frontline but spent most of my time observing and scouting the surrounding as I couldn't bear the [highest] risk.
As we can remember, there were protests almost every week in that season and many public means of transport were interrupted. Could you talk about the flow of routines in the protest on a day?

Ng: Do you have any preferences on specific dates or can I talk on any day?

Lai: Not at all, you can choose a day when you remember the most.

Ng: Ok, let me think. Usually, in the morning, there will be a time for the [first] assembly. There are two stages in the protest [at that time]: the first stage is a peaceful march and it would gradually develop into a more radical situation. For me, I would take public transport to the more "normal march", but do you think the phrase "normal march" is a bit strange? Anyway, the conflicts often came later: if the assemblies started in the morning, the conflicts would come at around 6 pm, the earliest at around 2 pm or 3 pm.

Lai: Maybe there is the audience who don't know what a march is or they don't have experience joining one. Would you explain more about how you found your way on such a long day, or do you know someone who was calling for help with some protesting resources?

Ng: The direction depended on the [guidelines of] Letter of No Objection [issued by the Hong Kong Police Force (HKPF)] which defined the starting and ending venues of the march, usually they are Victoria Park and the headquarter of the HKSAR government. The debriefing assemblies at the government headquarter building always transformed into radical conflicts [between the protestors and the police]. On the other hand, along the marching route, there would be a collection point where many participants dropped some resources for the protests [such as water, safety goggles and umbrellas]. At a particular moment, these resources would be dispersed to the people who needed them.

Lai: Those collection points are not located in a particular place right? They are also dispersed.

Ng: Yes it is a flowing concept. For example, if there is a frontline followed by a swarm of protestors behind, there would be one "supply station" every three to four hundred metres. Sometimes when there were too many resources, there would split into more stations and lower the "risk". Meanwhile, they could vanish anytime, depending on the stages of the protest and the locations of the "hot zones". Therefore, by decentralizing the "supply stations", we can prevent the situation when all the resources were lost in the conflicts.

[More examples of the supply stations]

[Topic 2: a day of Protest]

Lai: So let's leave the topic of finding supply stations to the second part of our interview.

Ng: Ok.

Lai: Most of the time the protestors would start to leave the swarms when the sun set, apart from some special dates when there were still millions of people staying up until around 8 pm. Could you talk about what happened when a protest was gonna end soon, how did the people decide when to go home?

Ng: Basically, most of the protestors [not all of the participants in the march, usually the more dedicated teenagers] made their decisions upon the last operating public transports [around midnight] while their collective decision could also group them together to secure their safety on the way back. For instance, when a march ended at 6 pm and the conflict broke out at 7 pm, the protestors would leave at around 11 pm or 12 am by the last trains or buses.

Lai: Do you also take the last transports?

Ng: I always took the last transport since as a student, I couldn't bear the danger of staying up late without a public means of escape.

Lai: Were those who stayed up late usually teenagers? Grown-ups and people supporting their families needed to return home and work the next day.

Ng: It's right, it also related to the age structure and the nature of the protest.

Lai: Talking about transportation, we can bring up an interesting phenomenon called "parents' cars". As the protest unprecedentedly link up the citizens of Hong Kong and their respective "strangers" on the streets, the term "parents" emerged and was used to refer to the people who were willing to drive the young protestors back home at a time with no public transportation. Mr Ng, have you tried that before?

Ng: Yea I have taken a "parents' car". It was a day, on the 1st of October.
Lai: "Blossoms across the whole city"

Ng: Yes, where was that? Oh yea, in Wan Chai. I was trapped at that time and I looked into the maps [to find a way out]. There were 7 police squads around so I decided to walk up to the hills first. Luckily since the "parents" also looked into the maps and parked their cars at the safer locations, I was able to get on one of them and left the hot zones.

Lai: You guys did not contact each other afterwards right?

Ng: Yes, since they helped us to bypass many difficulties. At that very moment, the only other escaping option was to walk and pass the police headquarter building or the government house. You could never pass those buildings safely by walking in person but a car could help disguise your way out.

Lai: This also relates to the history of urban development in Hong Kong. This city, especially the part on Hong Kong Island was constructed on hilly terrain and this resulted in wider roads along the slopes connect by narrower paths on different topographic levels. Therefore, the combination of walking upwards and driving away [to the other side of the hill] was a great escape tactic in this context.

[Topic 3: The credibility of media and information]

Lai: Apart from the maps, there were numerous media reporting updates and news about the protests. In this overwhelming boom of information, do you have a way to filter them and distinguish the facts among them?

Ng: We shall elaborate on this in the context of the in-situ scenario. The protestors rely on three media channels to gather updates: online live broadcasts, telegram channels and real-time maps. These three media were the most useful when you were standing in the protests. Telegram channels had the fastest updates but usually, they were only texts. Online live broadcasts were restricted by the poor signal network at the protesting grounds so they were always delayed. Moreover, you would not have that much time to keep your eyes on the broadcasts and process all the information, while the broadcasts often only displayed the situations from one particular angle and neglected the wider picture. On the other hand, the real-time maps were also not as fast as the text updates from the Telegram channels, but they visualised a better picture of the hot zones for the users.

Ng: There was a scenario where I moved forward to the frontline and heard about the charging police squads. So I transferred this update to the "supply stations" and helped relocate the stations to a safer place. At the same time, the volunteers at the stations would send an update to the Telegram channels so that they (the administrators) can forward this information to the public channel and visualize it on the maps.

Lai: From what I remember, there were 6 to 7 active Telegram channels on the protesting days. How did you choose the one to follow up with?

Ng: There must be 1 or 2 channels with the fastest updating speed and you could always verify their credibility by comparing their information with your own in-situ observations. Oh, and there was also a way to communicate with each other within the protests by using hand gestures: "the classic victory hand gesture" means scissors; "two fists pulling from each other apart horizontally" means zip ties; "two fists pulling from each other apart vertically" means umbrellas; and "twisting your wrists to open the cap of a bottle" means water. In this way, the requests from the frontlines could be transmitted to the "supply stations" to sustain the protests. Nonetheless, sometimes the frontline would be overloaded and "crushed" by the resources because of the natural delay of the hand-gesture way of communication. The storming of the Legislative Council Complex is a good example of showing how the people formed up a human chain to transport umbrellas and packages of normal saline, from the "supply stations" up to the circular frontline around the building.

Lai: The Legislative Council Complex… Did that happen when people storm in or out?

Ng: I "knew" the whole process, starting from 6 am when the people were discussing the way to break in, til the moment when they retreated from the building. During the occupation, it was hard to receive updates through the Telegram channels because the signal network had become weak inside the building since 9 am. Therefore, the protestors inside really relied on the chain of oral communications.

Ng: To answer your question about fact-checking in the protests, I would say there are no other principles more reliable than our own observations and logic. Whenever there was a frontline calling for more supporters, you are the one who was responsible for your own safety so we shall say the in-situ fact-checking at that time depended on the protestors' individual analysis of their surroundings and online resources.

Lai: Have you ever made a wrong decision due to some fake information?

Ng: Yes, I did in the "28th July" protest. At that particular moment, the frontline of the march was pushed to a location very close to the building of the Liaison Office of the Central People's Government (LOCPG). The march originated from Victoria Park [on the Eastern part of the urban district] and confronted the government buildings on the west side of the urban district. One of the real-time maps showed that there were still many protestors all the way from the LOCPG to the Park, which was wrong based on my observations. Most of the

protestors jammed themselves in the middle of Central while there was hardly anyone lingering in the east already. That was the place where I was almost got caught by the police who, perhaps, decided to ignore me due to my innocent appearance.

Lai: I had a feeling that the government at that time had not yet decided how to respond to the protests and then developed a strategic arrest against the protestors.

Ng: True. Even if it was a random stop-and-search, the police did not check every passerby. They seemed to instinctively pick up the one who raised their suspicion. So I think that I was very lucky.

Lai: Yea. Now it's almost time to have a break. Does Mr Ng have any more experience to elaborate based on those previous topics?

Ng: Actually I wanna talk more about how fake information affected the dynamics inside the storming of the Legislative Council Complex. There were always rumours circulating within the protestors' network, some of them were obviously fake but there were people who started taking some news as reality. It was the work of fear. The stressful environment at the centre of the storming raised fear in the protestors: "What if they [the police] really fired guns towards us, what if we all gonna die here?" The terror "manipulated" the logic of the protestors and affected their decisions to respond to the rumours.

Ng: At the site, there was zero accessible information about the surroundings apart from the word of mouth and rumours. It was scary.

Lai: Yea, the emergence of the mobile online network really changed our perceptions of society. With the help of the network, we were able to grasp an overview of the situation. In return, without the network, we all fell into the fear and emptiness which were not experienced by humans in the previous generations.

Ng: Yes, this creates a new "unknown", between the real and the unreal.

Lai: Do you think the government at that time already knew how to apply this "unknown"?

Ng: Yes, I also had that feeling. For example, if you can control the flow of [digital] information in the protests, warning the frontline protestors with an icon of a non-existing enemy on the real-time maps, the protestors would retreat. Even if there were no ways to verify this warning, they would not assume that it was fake due to the risk behind it. Therefore, we always predicted the worst scenario instead of putting ourselves into the confusing field between real and fake information.

[Break]

[Topic 4: How did the maps help you?]

Lai: Now we are entering the second part of the interview and the topics would be more related to mapping, a way to link the citizens back to the urban fabric in the protests. Mr Ng, do you remember some particular protests where you used real-time maps?

Ng: Hm… I would say the "CU (The Chinese University of Hong Kong)" protest and the "1st October" storming.

Lai: Do you still remember your first encounter with those maps?

Ng: Hm…It was at the very early stages of the protests, maybe "1st July".

Lai: Did you see that in your Telegram feeds or forwarded messages from your friends?

Ng: It's "Lihn dang" (a forum website which is always referred to as the Hong Kong version of Reddit), but it was relatively slow.

Ng: The maps were very useful in a way to synthesize and visualise the information provided from the field of the protests. Since we could not always follow up on the updating speed of the scouting Telegram channels, the maps could be an alternative analytical resource for your next decisions.

Ng: On the other hand, I also developed some skills which could help me to plan my next move in the protests. I was quite sensitive to the siren lights of vehicles reflected by the glass walls along the streets. Since the vehicles driven by the police and the ambulance teams used different colours for their sirens, I was able to detect the hidden danger more quickly by examining the reflection.

[Talking more about the signals of danger in the protests]

Lai: Let me share a map on the screen. This was drawn and published on the Telegram channel on the 1st of October 2019, at 4 pm. At that moment, the frontline of the demonstration arrived at the Pacific Place shopping mall in Admiralty while the police had already allocated their forces at several tactical locations. We can also spot the rubber bullet warning in Wan Chai where the police tried to cut off the march in the middle. Hence, many protestors were trapped in Admiralty, where were you at that time, Mr Ng?

Ng: I was exactly one of the protestors trapped in Admiralty at that time. Although the mobile network is still working well on the streets, many people understood their geographical disadvantages through the [Telegram] channels and became desperate to find a way out. Therefore, I used this map and my in-situ observations to determine a safer escaping route. According to my resources, it was not possible to get out by walking on foot along the roads in Admiralty [towards Central] while the retreating direction was also blocked by the rubber bullet threat. As a result, the only choice was to climb up the hill through the safest path. Since there were police guarding Pacific Place and the gate of Hong Kong Park, I decided to go up the hill through a church near Wan Chai. This decision was made in a few minutes while we were running [away from instant danger].

Lai: We can also talk about why there were several places usually packed with police, such as the Exhibition Centre and the Government House. And how did some particular places, like the church, change their roles in such a special urban incident?

Ng: Let me explain. The Government House is a place where the chief of executive [the political leader of the HKSAR government] lives so it is always a fortified place. Generally, most of the crucial buildings [symbolizing the authority] of the HKSAR government were also guarded by the police. In the case of the Exhibition Centre, it became the hub for the police because of its tactical location. It is built next to the harbour and far from the conventional protesting routes, so it offered a safer and larger interior space for the police to assemble their forces. Therefore, from the perspective of a protestor, you always wanted to turn your back on the sea, squeezed yourself into the narrow streets and avoided encountering any government buildings.

Ng: The Academy for Performing Arts was also a trap. Usually, the universities [and colleges] were a safer hub for the protestors in that context. However, the academy here was also transformed into a territory of the police

forces. In contrast, I visited a church once [during the protests] to refill my water. It was a place where you may enter without notice to walk away from the turmoil. For example, the Methodist House was a special high-rise church located in Wan Chai, where you could walk in and pretend to be a [Christian] fellow. Although the Church would not be happy to approve of this situation, the people in charge would still treat the "visitors" as potential fellows and neglect their backgrounds. Therefore, the Church was one of the alternatives if the protestors want to leave the conflicts, similar to the resting points in video games where you can recharge your energy.

Lai: You also mentioned another interesting interpretation of parks, that you decided not to enter Hong Kong Park to find your way out as many protestors saw parks as dangerous places, right?

Ng: Yes. This perception was founded on the structure of parks in Hong Kong. They are full of [hidden] corners and hard to be seen through. It was a blurry place where police could potentially hide behind a corner somewhere. Moreover, there were hardly any people lingering around in the parks during the protests. Without protection from other protestors, it was not safe to enter the park by yourself especially when you were still wearing a protesting appearance.

Lai: There are many protests in other countries using parks as a primary venue for assemblies. Although the people of Hong Kong also gathered themselves in Victoria Park, there were hardly any other parks in the city centre that could accommodate this huge amount of people. Therefore, this really highlighted how Hong Kong's topography shaped the protests' format.

Ng: The scale of parks also mattered in determining their role in the protests. Small parks often were used as "supply stations" if the marching routes passed by them. Whenever there were public seats, that place would become a "supply station".

Lai: In the next discussion, I want to discuss the different representation formats of the real-time maps published by the Telegram channels. I have picked two maps depicting one of the protests at the same time but in different representations. Have you seen both maps before and could you share your comments on the effectiveness of the maps or your preferences as a protestor?

Ng: Yes I have seen both. The map on the left side was more about the density of crowds. Since you would be safer if you followed a bigger crowd, this map was useful to find out a safer location for you to participate in the protests: more saturated yellow highlights stand for safer situations. However, I would not take the "protester barricades" as real since I knew that, from my experience, the barricades were constantly relocated based on the frontline situations. Moreover, the "speed of the flow of protestors" [categorized in the legend] had zero contribution to the decision-making. This was a feature drawn for the people who didn't join the protests.

Lai: There is another feature in this map that raises my interest. Some particular places have more clarified descriptions related to the protesting context, such as "D-park [a shopping mall] has shut down its operations". Hence, this small integrated caption implies that there was always somebody wandering around those highlighted places who forwarded the observations to the map-makers. Isn't this another way to show off your connections with people in a particular region?

Ng: Meanwhile, the empty void of information on the maps undermined some potential danger.

Ng: The map on the right side is more straightforward in its representation format. If you pursued more frequent updates on the maps, some fields of information would need to be filtered and sacrificed. This map is clearer in depicting the pattern of police tactics in scenarios like charging and dispersing protestors.

Lai: One more question for this pair of maps. As we can see, the map-makers also used different base maps as the bottom layer of their work. One side is a monochromic map illustrating the urban blocks and the silhouettes of the buildings, the other side is more similar to the base design of Google Maps, with colour codes standing for different programmes of the urban blocks. Does this difference affect your decision-making within the protests?

Ng: Google Map [style] was faster [to be understood]. For instance, the yellow roads shown on that map were already embedded with a consensus, that they should represent highways on Google Maps. Therefore, we instinctively understood that those roads were not accessible to protestors unless they got into vehicles. That map indicated the parks and hills more clearly as well.

Ng: On the other hand, I don't think the shapes of the buildings really matter since we wouldn't enter [many] buildings during the protests. As a result, I would pick the map on the right side for my preference.

Lai: I know that Mr Ng also has an architectural background in his higher education. As you know Colour is always a sensitive subject to be brought up in architectural discussions. Do you think the map on the left side is actually more simplistic and effective to some extent when it uses fewer colour codes?

Ng: No, instead I think it missed some important information such as the parks we mentioned before. It was fine as long as you used the red colour properly since it was often used to represent danger, which was the main feature in these real-time maps. On the other hand, since the maps were designed for the general public, over-simplification would cost people more time to digest the visuals, which was bad for the protestors who were always short of time. In addition, the off-scale warning signals also helped a lot since they pointed out the two most dangerous beings in this particular protest: rubber bullets and water canons. Although the water canons were not lethal weapons, the canons could dye your outfit in specific paint so that the police could easily spot you out in the crowd.

[Break]

[Topic 5: the limit of maps]

Lai: We are approaching the last sections of the interview but I would like to continue the application of real-time maps since Mr Ng had an unforgettable past with the protests in the Chinese University and the maps.

Lai: As we see from the screen, this is a map illustrating the conflict on the 10th of November 2019, at 7:40 pm. There were tear gas and fire ignited on the map, could Mr Ng talk about what was happening at that time?

Ng: People had constructed a frontline/barricade on the Number 2 Bridge and the conflicts also broke out at the same place. Meanwhile, there were confrontations in other universities as well, but this map showed the most striking incident at that time. It started with around 30 students confronting also around 30 cops.

Ng: It was overwhelming. I watched the live broadcasts of the conflict and decided to depart for my school on foot. By the time I arrived at the outskirt of the university complex, I used this map to find the safer way to enter the campus. Since the entrances near the rail station and the Science Park were both labelled with police icons, I decided to walk up the hills near Tai Po and enter the school at the third entrance at Tai Po Road.

Ng: It is important to bring up the topographical feature of this university campus here. The campus was built on a hill so there were limited ways to evacuate in an emergency. Since the path for evacuation is always important to secure your safety in a [dangerous] place, I began to examine the hilly landscape on the campus and tried to find a feasible escape path. My action still depended on my observations, the in-situ communication and the maps.

Lai: During that protest, the outsiders or the public were not very clear about the picture inside the Chinese University. As we can see, the icons representing protestors became more transparent, fading away from their credibility. May I ask where did those students, or protestors gather during that time, at their dormitories or canteen?

Ng: Yes. Most of them gathered at the Sir Phillip Haddon-Cave Sports Field, near the Number 2 bridge. All the conflicts took place there. There was a photo circulating in the online platforms showing tear gas grenades being fired into the sports field at the early stage of the protest. Afterwards, the sports field became a temporary first-aid station and a resting point for the protestors. Following the supply line, you would find a big "supply station", also acting as a temporary hospital run by some volunteering medical professionals, in the University Sports Centre next to the sports field. Zooming further out to the scale of the whole campus, the supply chain could be traced all the way back to the entrance at Tai Po Road, with some minor exchange intersections in between.

[Bringing up more examples of temporary programmes and structures that emerged on the campus.]

Lai: In contrast with your descriptions of the protests in Admiralty and Wan Chai, you had a more detailed memory of the interiors of the buildings. So maybe your identity also determined your scope of observations and feedback. However, I wanna ask why there was less information visualised on the maps even when there were numerous active students inside the campus.

Ng: This was because an internal circulation of information was formed in this event. There was no need to use the online platform as a media connecting the protestors as they were already close to one another inside the campus. By the time the protestors enter their territory, they would be informed almost immediately about the locations of the "supply stations" and the frontline. Also, the speed of the information exchange was too fast that the map-makers could no longer follow up and visualise them before the next conflict. Furthermore, this series of conflicts were located at a fixed point on a map so there were hardly any updates in terms of the geographical context of the protests.

Ng: Nonetheless, these maps still helped a lot when we needed to leave the university. When the school became a field of conflicts and fire, not every protestor could bear the mental stress and the intense atmosphere inside their territory.

Lai: I didn't remember clearly how the protests at the Chinese university ended. Did the people move to the next protest taking place at the Polytechnic University?

Ng: No, it ended with internal disagreement. I would say the police made a wise decision they stopped intruding on the university since this initiated internal discussions and debates about the purpose of defence among the protestors. The debates could not conclude with a convincing argument sustaining the defence so the protestors decided to leave this fortified hill.

Ng: Now, when you mentioned the Polytechnic University, I remember the initiative of the protest at the Chinese University. The protestors' target was to block and paralyze the Tolo Highway next to the university. As the protestors confronted the police on the Number 2 bridge over the highway, the image of the conflict triggered many university students to go back to their schools and defend their "second home". This series of developments also applied in the next protesting field, the siege of Polytechnic University.

Lai: There are too many stories about that siege that we won't be able to cover them all in this interview.

Ng: I didn't get pulled into that siege since I was exhausted after getting involved in the whole series of protests at the Chinese University.
Lai: Did we finish discussing the topic of "online military counsellor"?

Ng: Ah yea, of course [we can say more about it]. I just wanna say, we had organized ourselves well without any supervision from you guys [the "online military counsellor"]. Meanwhile, there was a big information gap between the outside and the inside. For instance, some outsiders would suggest that this place was lack of a particular resource and this triggered an overflow of that particular resource in the supply chain. There was a time when the storage of inflammable substances even outnumbered the storage of food.

Lai: That's crazy. Although the protest at the Chinese University almost marked the last stage of the massive protests in Hong Kong in 2019, does Mr Ng have anything more to share with us?

Ng: No, I think that's pretty enough.

Lai: Thank you, then let's go through the last topic of this interview.

[Topic 6: the unbearable memory and archive of historical moments]

Lai: We had spent enough time on the protest maps. Maybe I should address my aim in the history thesis again, which is to investigate and synthesize the archive of these maps to rediscover the role and legacy of this collective memory. For me, it's a reflection of my experience in the protest and may I ask how you feel or reflected yourself when the protest was finally over?

Ng: Let me talk about the maps first. In the timeframes and fields of the protest, they helped the protestors to make their decisions quickly. When I look back at these images, I feel like they document the history of protests, in detail. You can see how things grew and died throughout the archive and how the format of the protests transformed along the timeline. This is a very precious fragment of history which deserves to be kept well. It also recalled memories from that time and reminded us of historical moments.

Ng: I wanna talk about PTSD [posttraumatic stress disorder].

Lai: Yes, please.

Ng: I think that I am bearing it [PTSD]. I am afraid of gunshots and subconsciously analyze flashing light to see whether it comes from a police car. And I refuse to recall those memories. The incidents I experienced in the "7-1 [1st of July] Legislative Council" and the "Chinese University protests" really exerted a harsh impact on me. For instance in the Legislative Council, when you were relying on word of mouth to fight against the fear of the unknown. That fear haunts you for your whole life. I was so scared, especially during the early stage from 12 pm to 3 pm when the cops almost decided to temporarily abandon the council building. We would have retreated if no supporters were coming from our backs.

Ng: It still haunts me in my nightmare, associated with the gunshots of tear gas grenades. And then, in the Chinese University, it was another level of shock when you were inside the frontline. I could not believe my eyes when I saw people [surviving] in such a dense cloud of tear gas. The cloud was not white, but RED.

Lai: Was that because of the pepper spray?

Ng: It was because of the burning Molotov cocktails. I was not even at the very front, like 25 metres apart, but it was already tremendously overwhelming. Meanwhile, this was not the most intense resistance in the protests of that year, can you imagine the scenes inside the siege of the Polytechnic University? I… keep escaping from my mental burden but rationally, I still want to remember those memories.

Lai: In terms of collective memory, I have seen many different formats of documentation circulating in the commonplace of Hong Kong. For example, many photographers and journalists used photo albums and interviews to document these memories. For me, I would be happy to buy a photo album about the protests if the photographs were taken in good quality. Would you also buy those books, or do you think something can be done better in terms of documentation?

Ng: Personally, I would not buy those books due to my PTSD, and I would try to escape from those memories. However, if you stretch the timeframe to 50 years and someone wants to talk about the history of these protests, those maps will be very useful apart from the colourful images [photographs] and videos. I think these resources should work together to transfer this fragment of history. The format shouldn't restrict itself to one dimension, it should be expressed in multiple dimensions created by photographs, videos and maps. In this way, different simultaneous incidents taking place during the protests can be represented as a scene rather than a picture fixed in a particular frame.

Lai: I remember there was a studio studying Forensic Architecture at the University of Hong Kong. They used a more 3-dimensional drawing method to represent different incidents during the protests.

Ng: Is that the one which drew how tear gas grenades were fired into a residential area? I remember that their model was built with the Rhino software.

Lai: I couldn't remember well to verify that, but I just want to address the significance of height in the spatial documentation of the protests, as it was generally ignored in many formats of documentation.

Ng: Yes, that's one of the limitations of maps as well.

Lai: I think the Zoom meeting is ending soon. Should we call it a day?

Ng: Yes… hopefully, I won't experience those feelings in my life again.

Lai: Now I am a bit nervous that I need to hand in this essay.

Ng: Aren't you afraid?

Lai: I have shared my thoughts with some of my classmates and teachers, so maybe my stress had dissipated a bit.

Ng: Anyway, be careful.

Lai: Thanks so much man.

[The end of interview]

Appendix III: Acknowledgements

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Jacky Lai