

Mapping Planned and Emerging Art Places in Singapore through Social Media Feeds

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This paper presents a methodology to collect and visualize social media data about art, in order to map art locations in cities using geo-localized data, and comparing planning decisions with the actual use of spaces. As various social networks have penetrated into the daily life of people, these become one important and effective data source to understand how people perform 'arts' around the city (Shah 2015). The case study for this methodology is Singapore, a vibrant city where art and culture are being promoted in the light of an emerging creative economy. The Singapore government promotes art and creates 'art clusters', such as art districts, galleries, fairs and museums in the city. Additionally, artists, creative entrepreneurs, consumers, and critics seek and explore alternative spaces. Understanding where art and creativity are discussed, broadcasted and consumed in Singapore is a key point to have better insights into art space planning, and study its effects on the city. The paper will try to answer the following research question: Is it possible to discover, through social network data, spaces where art is produced, discussed, and broadcasted to an audience in Singapore? How?

Keywords: social- media, art, creative city, creative places

INTRODUCTION

Municipal planning policies are concerned with the diffusion of culture in the city and its spatial localization. The idea of the cultural city and cultural class, promoted among others by Richard Florida (Florida 2005), has encouraged city-planning departments to

have a specific cultural policy, promoting museums and cultural facilities. There is also the belief that those facilities together with studio spaces and other institutions should ideally be close one to the other; the terms "arty neighbourhood", "cultural quarter" (Roodhouse 2010) or "cultural cluster" (Cooke and

Lazzeretti 2008) indicate the area's commitment to cultural development, the ability of actual artists to live in the area, the access to inspirational cultural institutions or even the actual art economy that flows through the area. The different facilities benefit from the mutual proximity and the "art consumer" or artist find a spatial continuity among the places she is interested in.

American sociologist Lyn Lofland defined "parochial sphere" (Lofland 2006) as space "where we meet like-minded people", and "who are involved in interpersonal networks that are located within 'communities' ". The idea behind "cultural clusters" is that it is possible to recreate a parochial domain within a neighbourhood revolving around art production and consumption. This idea of "cultural cluster" is also connected to the general goal of neighbourhoods' regeneration and future gentrification (Roodhouse 2010, Cooke and Lazzeretti 2008).

While city planners make decisions based on these theories, there is a novel way in which people get to know and decide to go to art happenings: social media. Using again the previous definition of "parochial domain", through the use of social media, like-minded people get in touch and then navigate the space, regardless of spatial continuity, going directly to events that might interest them. Artistic production and consumption do not need to have a spatial continuity anymore. The idea of the "cultural clusters" is not effective, together with the planning policies that, at different stages, in different cities, with different strategies, work toward it.

The paper aims at exploring a methodology to locate art venues and neighbourhoods where art is produced, consumed and broadcasted, with crowd-sourced data (social media data). The methodology is applied to the case study of Singapore, a vibrant city where art and culture are being promoted in the light of an emerging creative economy. The final result is a visualization platform, which can support decision-making processes about cultural planning in the city. In this paper, we intend to discuss not the results of the case study application, rather the methodology

applied to collect, filter and analyse the data.

CASE-STUDY: SINGAPORE AND PLANNED ART SPACES

In the last five years, Singapore's central government actively nurtured and supported the art scene, providing grant schemes, art spaces, and art facilities. Singapore government created data resources on the website of National Art Council (NAC) that includes lists of recipients of grants and the location of 'art spaces' such as facilities (studios, stages, spaces for rehearsal, galleries) offered to artists. NAC defines art as "Dance, Literary art, Music, Theatre, Visual Art and Performance Art" [3]. For the sake of consistency, only those forms of art listed by NAC will be considered in this research.

The government awards major grants to art institutions and universities, but also small galleries to support their operating costs. Production/development/marketing grants are awarded to individual artists to support their personal research and career in Singapore and abroad [3]. NAC has also an agenda developed in concertation with the Urban Redevelopment Authority (URA) to provide artists with infrastructure in the city.

In particular, these 'art spaces' include:

- A "Framework for Art Spaces" (2010) to provide heavily subsidised housing and studio spaces inside Singapore Land Authority properties
- Some shared facilities, owned or subsidised by the government as spaces to perform, rehearse, and produce different forms of art

Together, NAC grants and dedicated URA spaces create a very attractive and internationally competitive package for emerging and established artists. The rationale behind this governmental measure becomes even more evident as art precincts are developed to regenerate certain areas [3]. The 'art belts' have an urban agenda, with the purpose of creating spatial continuities among art-related buildings and increase real-estate values.

However, as pointed out in a local newspaper [4], these policies do not always create the expected outcomes. Art districts strategically located in the city failed to attract both artists and costumers, forcing some international galleries to close.

Additionally, some art is by definition critical. Other art deliberately avoids paternalistic support. These artists continue to live and practice in Singapore, probably relying more on informal and social networks to stage and produce their work, rather than institutional ones. This context creates a framework to justify a different methodology to map art in Singapore.

In a first step, we examine and map these spaces that, according to Singapore central government and NAC [3] are considered, supported, and suggested as 'art places'. The mapping is done in two scales: buildings and clusters. Art venues are buildings where art is produced, consumed or broadcasted. These include studio spaces, rehearsal rooms, museum, and curatorial offices. When art venues are close one to the other we talk about "cultural clusters".

The mapped art venues consist of:

- studio spaces allocated by the government to the artists;
- small- medium galleries economically supported by the government, present in a list;
- small- medium exhibition spaces mapped by the government;
- museums supported or mapped by the government;
- theatres supported and mapped by the government;
- rehearsal spaces/recording spaces supported by the government;
- art university- education facilities mapped by the government;
- foundations or private collections mapped by the government. [3]

Cultural clusters include the government 'art belts'. The size and extent of the art belt might vary, however, in this paper we will refer to the planning

boundaries to represent art belts, meaning the administrative sub-zones. These boundaries are in fact the contemporary planning tools used by the planning administration, thus representing the current city planning practice.

EMERGING ART SPACES IN SINGAPORE MAPPED BY SOCIAL MEDIA DATA

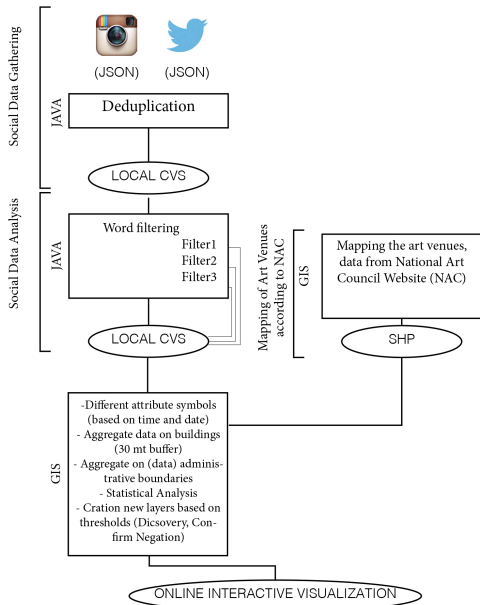
According to Evans and Foord (2008) there is very little official or robust data on cultural activity and provisions in cities. They draw a methodology of mapping art related facilities based on surveys, to be implemented in a GIS platform. Among the different cultural mappings undertaken by planning authorities very little has been shared and made public to a wider audience. An interesting reference is CultureMap London (2004), an interactive resource that maps data on cultural engagement across the capital, originally funded by Arts Council England. It provides some insight into the audience of cultural facilities in the English capital. CultureMap uses Audiences London's extensive data sets about cultural users, including demographics, costs of tickets, and surveys [5].

The possibility to include crowd-sourced data to map art venues has been explored by "Geography of buzz: Art, Culture and the Social Milieu in Los Angeles and New York" [2] a research by Elizabeth Currid from the University of Southern California and Sarah Williams from Columbia University. The authors collected 300.000 snapshots taken by photo agency Getty Images at more than 6,000 parties, openings and premieres in 2006 and 2007 and conducted GIS and spatial statistics to provide a new spatial dimension through which to understand cultural industries and city geographic patterns.

Fortunately, with the recent boom of social media, users have reported a considerable number of activities (i.e., check-ins, comments, pictures) online. Using social media data, scholars have been able to map city users' behaviours and patterns: from community neighborhood based on cultural affinity (Cranshaw et al 2012; Yang, Zhang, and Qu 2016) to users' mobility patterns, from semantic interpre-

tations (Simeone et al. 2012) or city users' analysis (Morandi et al 2013) to sentiment analysis (Ceron et al. 2014), among others.

For the case study of Singapore, we can extract valuable patterns and narratives from the data shared via social networks and digital devices, focusing in particular on art venues. The data collected via social media has been filtered with a word-filtering process and visualized in a GIS platform (Figure 1).



The social media data are collected through open APIs of social networks Instagram and Twitter. Instagram is a mobile application that enables online photo sharing. It also allows text annotations. Users take a picture, apply a digital filter to it, and share it, usually with the location of where the sharing occurred unless this function is specifically disabled. Therefore, a majority of these feeds are geo-tagged. Twitter is a micro-messaging application. The shared content via Twitter is short messages shared with followers. Twitter feeds are not automatically geo-

tagged, therefore the majority of feeds do not contain a location. We only considered feeds that have a geo-location and a text component. We omitted feeds that do not contain a geo-location, or consist only of images.

We selected Instagram and Twitter as our data sources, because more than 2 million people are using Instagram and Twitter in Singapore [1], and these two social media, together with Facebook, are the most-used social media in the field of art [1].

In order to filter the social feeds, considering only the ones "talking" about art, we deployed a word filtering process. This filtering process relies on 330 words (Table 1) that have been selected by analysing more than 2000 art feeds in Singapore, posted by public institutions as well as by private artists and collectives. These art feeds have been processed by a programme, which selected the most frequent words that occurred in these.

The word list includes words in the four official languages of Singapore: English, Malay, Mandarin, and Tamil. The words are organised in three different categories. The first list includes single words that characterize the feed as an "art feed". The second list includes word pairs: both words need to be present in the feed. The final list also includes word pairs, however, this time each pair includes words which should not appear together in the text. We have implemented a program that first scans each social media feed, and selects the ones that include any of the words in the single word list. Then, the program scans the remaining feeds for the word pairs in the second list, and selects the feeds where both words in a list item appear in a feed. Finally, the program filters the collection of all selected feeds, and scans these using the word pairs in the third list, eliminating the feeds that contain both words in a list item. Additionally, the program considers hashtags that are usually part of the comments.

The data resulted in 8500 localised feeds about art in the 7 days of observation (14-20 November 2015).

We performed accuracy studies to determine the

Figure 1
The project components, and flow of the methodology.

reliability of this approach. The average accuracy is 75%. The presented method thus ensures a high probability of detecting art related feeds in the context of Singapore.

Having a one week data collection period is undoubtedly insufficient. However, in order to develop the methodology and implement the analysis and visualization infrastructure for mapping the art scene in Singapore, this approach forms a sufficient foundation. Deriving conclusion regarding the planning policy cannot be the purpose at this stage.

RESOLUTION OF THE ANALYSIS, SCALAR AND TEMPORAL PARAMETERS

When analysing and interpreting social media data it is important to consider the proposed interpretation as local and instantaneous; local because the possible narratives extracted by the data depend on the types of software people use (that changes from

place to place) and how they use it; instantaneous because creating feeds relies on commercial software, with many active users, and the methodology changes together with the market following the way people use their digital devices. Local culture could deeply affect what a click means and how to read it.

In this study, we considered Instagram and Twitter, two commercial platforms quite widespread among the Singaporean society, and particularly used by the artist community. In both of these platforms, location is not the main purpose of the social interaction provided by the software. As previously explained, the users decide to share short messages and pictures and they can choose to embed the feed with latitude and longitude information.

Thus, users present a more implicit will to communicate a message about a place: the user's location is not the main focus of her social interaction, it is a somehow a side effect. This circumstance is

Table 1
List of English
Words for the art
related
word-filtering
process of the
feeds.

Category 1						Category 2		Category y3
album	film	sketchbook	#abstractart	#contemporaryartsg	#nomusicnolife	#watercolor	eletronic + art	play - game
art	galleries	sketching	#abstractartist	#creative	#onlineart	#watercolour	eletronic + music	draw - up
artist	gallery	skypainting	#abstracted	#dance	#onlineartgallery	#weareasia	eletronic + design	opening - jobs
artwork	heritage	sonnets	#abstraction	#design	#paint	#welovebooks	classical + art	play - football
artworks	illustration	stage	#abstractpainting	#drawing	#painting	#wisteria	classical + music	play - fifa
audiences	installation	storytelling	#abstractphoto	#drawings	#paintings	#Arty	pop + music	play - sport
author	museum	theater	#abstractphotography	#electronicmusic	#pearllangallerie	#Artsy	pop + art	event - convention
ballet	museums	theatre	#abstracts	#exhibit	#pencil	#sgcontemporaryart	independent + mus	play - cards
band	music	tickets	#acrylic	#experience	#poetryspam	#recording	indie + art	play - poker
book	newsletter	tour	#aesthetic	#fineart	#portrait	#newcreation	contemporary + art play - around	
books	performance	troupe	#alistsg	#graffitiart	#portraits	#mixtape	contemporary + mt	play - baseball
catharsis	performers	venue	#alittlefable	#grafiti	#portraiture	#mixthatshit	live + set	play - basketball
choreographed	platform	vernissage	#animation	#graphic	#rap	#filmcommunity	record + music	play - soccer
choreographer	poem	visual	#art	#illustration	#recording	#actorslife		play - around
collection	poet	writing	#artcall	#ink	#sculpture	#singaporeactors		play - off
craft	poetry	sing	#artcompetitions	#lightspacetime	#selfportrait	#singaporetheatre		play - down
creative	premieres	singing	#artcontest	#makemoments	#sgarts	#creativeart		play - on
curated	present	library	#artdayout	#makersmovement	#sgevents	#sgnationalgallery		play - role
curators	present	bookshop	#arte	#makersvillage	#sgmusic	#nationalgallerysingapore		play - game
dance	print	actor	#artfair	#makers	#sgwritersfest	#creativeartists		play - along
dancers	programmes		#artgallery	#masterpieceinmotio	#showcases	#liveonstage		draw - out
debut	publishing		#artinfo	#michaeljanssen	#singaporedanceet	#liveperformance		event - conference
design	release		#artist	#minimal	#singaporemusic	#artforacause		seni + drama
director	residency		#artnews	#mobileartistry	#singaporeart	#photographersgallery		buku + skets
dramaturgy	scene		#artofvisuals	#mono	#sketch	#theatre		
draw	screenprint		#artshow	#monoart	#sonnets	#theaterlife		
drawing	sculpture		#artwork	#monochrome	#spray			
edition	series		#artworks	#mural	#spraypaint			
editor	showcases		#book	#murals	#storytelling			
exhibit	sifa		#booklover	#music	#streetart			
exhibition	singaporeart		#color	#myart	#streetartistry			
festival	sketch		#contemporaryart	#noisesingapore	#wallart			
film			#contemporaryartsg					

particularly meaningful, as these kinds of digital footprints on the city can be considered as a more spontaneous pattern of the truly most attended places by smartphone-equipped dwellers: these are the real venues where people spend their urban lives and from which they socially interact.

In the context of art, we interpreted the art feeds venues as locations where art is produced, consumed, and broadcasted. For example, many visual artists, while working in their studios, decide to share the work in progress or the results of their production: studio space, rehearsal spaces, recording spaces, thus are included in our social media mapping and are considered as the locations where art is produced. On the other hand, museums, theatres, events, often offer the chance to art lovers to make pictures or comments on the work of art they are watching: those mapped contributions are the places where art is consumed. But more and more artists, art institutions, and events rely on public relation offices, probably working together with the curatorial team, often in charge of taking care of the media communication. Thus, the mapping process will include also all the locations where art is broadcasted. With the purpose of social media mapping, therefore, we include all the locations with sufficient numbers of art feeds. These locations will be interpreted as art venues: places to produce, broadcast and consume art.

Some separate observations regarding art events include temporary occupancy of buildings or open spaces for art-related happenings. The art events are included in the mapping, as they are potentially spotted by the social media word filtering like any other art contribution. Their location, even if temporary, is equally meaningful for the analysis, as it is usually hosted in buildings or infrastructure normally equipped for this kind of events, thus representing a venue of interest.

The data collected have been visualized in a GIS platform, creating an online map. Initially, we used a commercial GIS to perform some analysis, but the final representation has been done in Carto DB [6], an

open software for the representation of geographical data where it is possible to perform some analysis through the Structure Query Language (SQL).

The layers in the map act as chapters of the constructed narrative. We try to establish the mutual relationship among the places in Singapore supported by the government as places of art, and the emerging ones. In order to understand the relationship between art venues and the contiguousness in space, we worked at several spatial scales: individual buildings (such as galleries and museums) and districts.

We aggregated the data in buildings of Singapore (Open Street Map)[7] and sub-administrative boundaries [8]. In order to consider the different types of utilization of the art facilities, we have considered different time-stamps: day, night, weekends and weekdays. Roughly we could approximate stating that the venues where people tend to go during the weekend could be considered more as locations where art is consumed while the working days contributions include also the spaces of productions. Similarly, the locations active at night tend to be more theatre or events locations, thus, places where art is consumed, while the daily contributions present a whole range of possible interpretations (museums, rehearsal spaces, galleries, exhibitions spaces, studio spaces).

The social media data is presented overlaying the buildings and venues, considered by the NAC and the URA officially as 'art spaces'. In our interpretation, each official art building has an area of influence of 30m radius, in order to aggregate social media data. This value has been selected considering the precision of the GPS and localization signal of social media feeds.

VISUALIZATION PLATFORM

Trying to abstract and synthesize the enormous number of potential outcomes of these collected data, we identified three main categories:

1. Discovery: The social media analysis reveals the existence of certain art venues that are not mapped by the government (Figure 2)

2. Confirmation: The social media analysis spots a series of venues actually corresponding to those mapped by the government
3. Negation: The social media analysis reports no or little utilization of the place referred to as a certain art venue, supported by the government

Assessing *confirmation*, *negation* and *discovery* depends on the statistical evaluation of the current data. In particular, *confirmation* and *negation* is calculated considering the initial mapping of the officially planned art venues, while in *discovery* the feeds are aggregated on all the buildings and administrative boundaries of Singapore. The medium value to define a *confirmation* or *negation* on the buildings depends on their size. Smaller buildings score *confirmation* also with a smaller number of contributions, scaling the threshold.

As an outcome of the map, it is possible to navigate among *confirmation*, *negation* and *discovery* in the scale of the districts and the buildings, and to comment or understand the localization of art in Singapore. Each user can browse the data in the on-line visualization in a graphic way, but also accessing the statistics and analytical representation of the data. Comparing the two representations it is possible to extract not only observations on the actual art life of buildings and neighbourhoods, but also information about the planning strategy in the different locations.

We created a simple metric to value to success of the planned strategy for each district, depending on the number of *confirmation* and *negation*, $(Planned = \frac{(Confirmation - Negation)}{Confirmation + Negation})$ and another metric to value how many buildings in the area deal with art without consistent support from the government $(UnPlanned = (Discovery - Confirmation))$. The first metric scores from +10 to -10; the maximum score indicates that the art venues planned by the NAC and URA, present in the observed district, show a significant number of art contributions. This gen-

erally means that the cultural planning strategy, regarding the buildings, is quite successful. Negative values indicate a high number of *Negations*, thus the planned art buildings don't have a consistent number of art feeds; this could be further investigated looking into the reasons of the negative value, probably depending on accessibility or integration among other factors. The Unplanned metric is positive with a high score when the value of *discovery* is relevant, meaning several buildings not supported by the government in any way, host an art related activity. The two metrics together give some indications about the district and how different art-related facilities interact.

The visualization also helps in understanding the different typologies of buildings on which the contributions are aggregated. Combining the analytics and the maps we aim at having a detailed representation of cultural life in Singapore.

POSSIBLE OUTCOMES

This paper does not aim to analyse the results, however, it is interesting to give an overview of the potentials of this type of analysis. In particular, the observations presented here only showcase the possibilities of this mapping, without providing any real interpretations considering the limited amount of data we are currently analysing.

Table 2 presents some metrics associated with some administrative boundaries of Singapore as an outcome of the visualization. It is already possible to observe or at least to guess some patterns and trends regarding the cultural life of Singapore.

For example, Gillman Barracks is a planned cultural cluster of Singapore. With the support of governmental subsidies the colonial architecture area hosts several galleries, exhibition spaces, workshops and spaces for rehearsal, and also the Centre for Contemporary Art of Singapore (CCA) research-based exhibition space, connected to the Nanyang Technology University of Singapore. We can see how the general contribution is not too high with more art feeds during the day rather than the night. This is

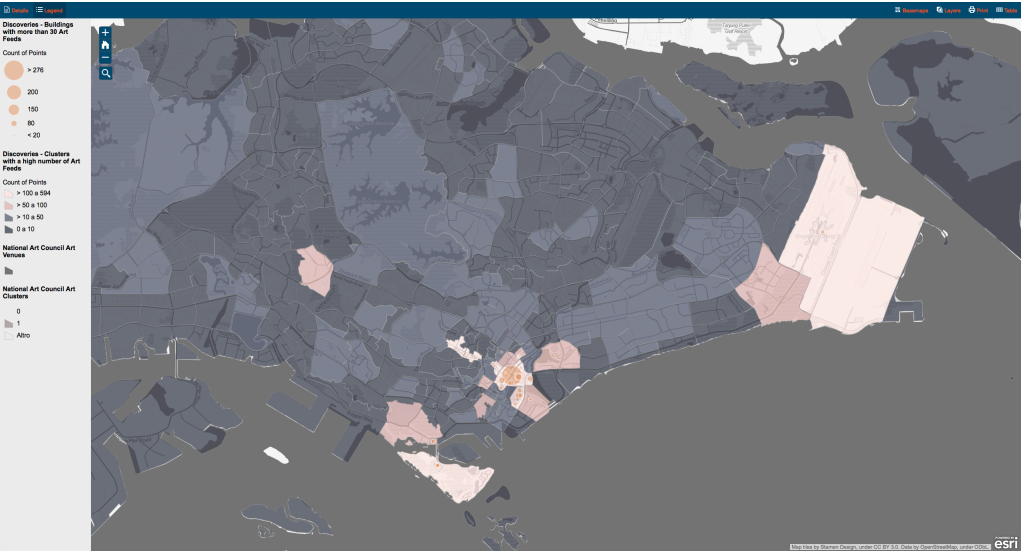


Figure 2
Art in Places Map/
Showing Art Feeds,
Discovery Layer.

Administrative Boundaries		Count	Planned	Un-Planne	Days	Nights	Wd/ daily	We/ daily	Day/ night	Wd/ We
Gillman Barracks	Telok Blangah Drive	71	-2	0	45	26	11	8	2	1
Esplanade	Marina Centre	888	10	0	488	400	105	181	1	0.6
Somerset	Somerset	222	10	1	122	100	32	32	1	1
Rochor	Kampong Glam	154	10	24	79	75	20	27	1	1
Geylang East	Geylang	47	-10	10	35	51	7	7	0.7	1
Victoria	Victoria	97	2	3	46	12	14	13	4	1

Table 2
List of some
Singapore
sub-administrative
boundaries with the
scores performed in
the analysis related
to their cultural
planning.

probably due to the fact that there are more studio spaces and exhibition spaces rather than performance spaces. The value of the Planned metrics is -2, negative, meaning that among the planned facilities we count more negations than confirmations. Meanwhile, the value of Unplanned is zero, meaning that there is no building not supported by NAC, hosting art related activities. Somehow the introduced programme by the government did not activate any sort of spontaneous utilization in the nearby area.

The second area is Marina Area, which includes the iconic theatre Esplanade that hosts national and international performances, and Marina Bay Sands Exhibition space. The general level of art feeds is the highest among the different neighbourhoods and there is the highest trend during the weekend. The Planned metric scored 10, the maximum score, meaning all the art facilities have a substantial contribution. However, the level of Unplanned is again 0: no *discoveries* have been found in the area. Somehow Marina Bay Sands and the Esplanade are *iconic buildings* that work at the scale of single attractions rather than art clusters.

Somerset is a commercial area with shopping malls with some art installations in controlled environments and some art facilities and theatres. It has a high number of contributions and generally confirms the planned buildings by NAC and URA. However, there are also some *discoveries*: they are still aggregated in the shopping malls and probably they are art related events hosted in the commercial strips to attract more visitors. Generally, in terms of consumption of art, this mapping shows interest for "side-effect" art locations: art located in buildings with a different programme, such as shopping malls or the airport, sometimes have more contributions than dedicated spaces like museums or galleries.

Kampong Glam is the Arab quarter of Singapore: it is an area, which is currently undergoing a transformation, generally hosts parties and leisure events and probably still enjoys low rental prices. The Planned level is high confirming the success of all the facilities located there, but also the Unplanned

score is high showing several *discoveries* distributed in the neighbourhood which aggregate mainly in small shop-houses, probably studio spaces or independent exhibition spaces.

Following this logic, it is possible to classify and comment on the different areas. This paper's goal is not to interpret the data but only to exemplify the current methodology. For further interpretations, we wish to combine real-time and cumulative social media data with other datasets such as rent prices and demographic data.

CONCLUSION

The paper presents a new methodology in finding creative quarters and creative hubs, which are the subject of policy interventions and public-private investment. This kind of work has a specific value for the city of Singapore, but generally is a valuable resource in order to value planning policies and strategies affecting the art production and its spatial effects in cities.

The data released by the API of the two software platforms is public, meaning the users did not decide to limit the accessibility to the data. There are some ethics concerns about the use of personal data for the purpose of analysis, but the final visualization considers the data already aggregated, representing each user only with their location. Under those circumstances, their privacy is, in all cases, maintained.

Currently, the data has been collected for one week. In order to have a wider portrait of art spaces in Singapore, we will extend this study and use real-time data. However, we intend this study as a qualitative research, with the purpose of defining a methodology for the use of data coming from social media to extract information about cultural planning in the city.

The current methodology will be improved also regarding the detection of the art related feeds. Considering Instagram, further studies will go in the direction of image sensing to understand the full range of information provided by the feed: the comments and the pictures.

The methodology and the visualization presented here also offer an interesting case for further considerations on cultural planning and how much it is actually possible to plan and control the cultural developments of our cities.

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