

THE RHYTHM OF CITY. GEO-LOCATED SOCIAL DATA AS AN ARTISTIC MEDIUM

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The paper introduces our approach for applying geo-located social data for artistic purposes, and elaborates on the related artworks. By describing *The Rhythm of City* we explain an innovative and artistic way for using geo-located data as a score in real-time. At the same time, the data represent a city's pace of life. We stress the malleability of the digital world to the physical one, and the interpretation of social data for artistic purposes.



Fig 1. The Rhythm of City was exhibited at Enter5 in Prague. Copyright Varvara Guljajeva & Mar Canet Sola.

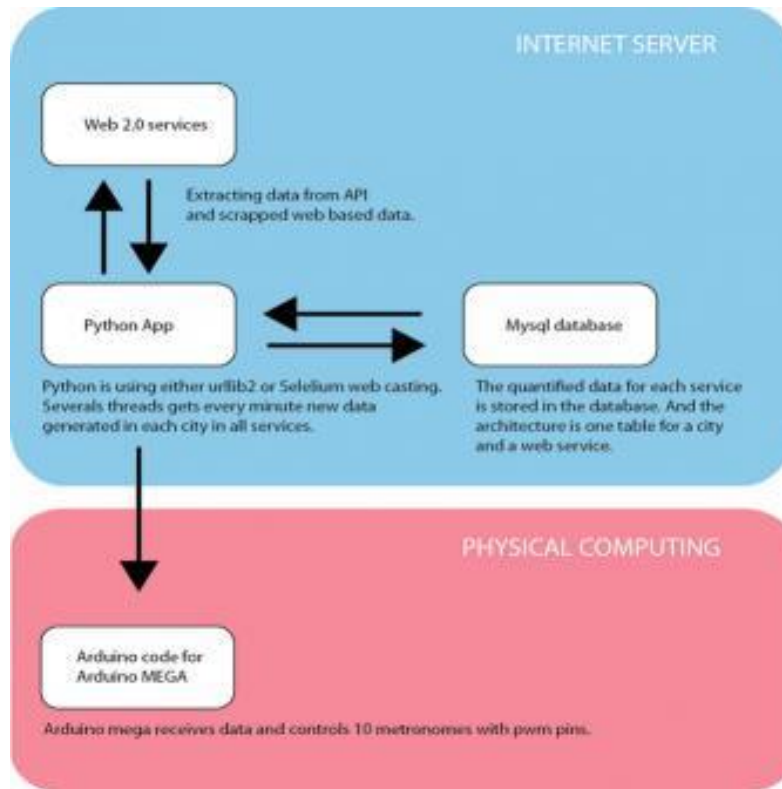


Fig 2. The software architecture of The Rhythm of City. Copyright Varvara Guljajeva & Mar Canet Sola.

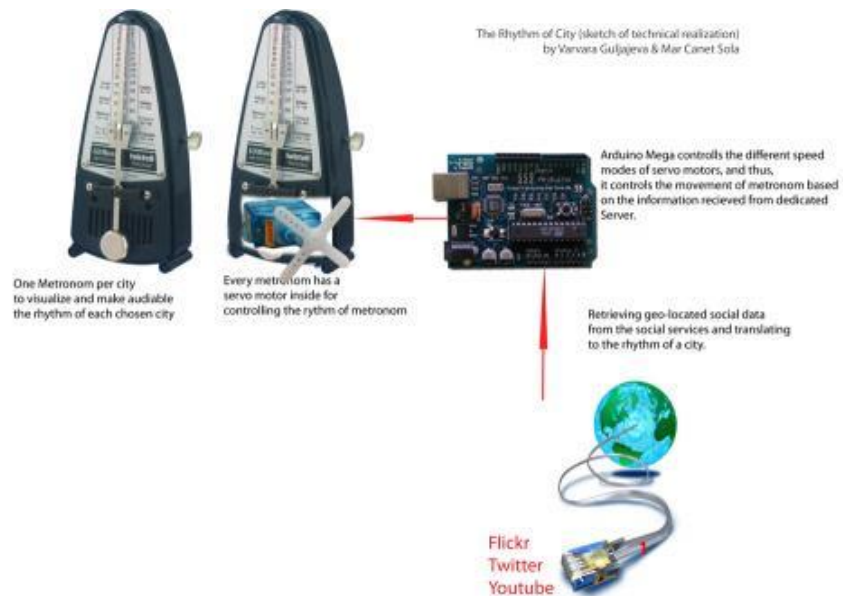


Fig 3. Technical realization. Copyright Varvara Guljajeva & Mar Canet Sola.

INTRODUCTION

Starting with the inspiration for the project, Bornstein & Bornstein discovered a positive correlation between the walking speed of pedestrians and the size of the city. [14] Robert Levine [10] demonstrated the faster pace of life in the northern, economically developed and individualistic countries in his study. In short, the investigations proved that it is possible to describe a city and its' culture by the speed of inhabitants and services, and its location.

Consequently, we assume that the digital geo-located social data can give us similar results: in economically developed countries bigger cities generate more digital social content rather than the cities of undeveloped countries. In other words, we believe that the analyses of geo-located social data will give similar results as have achieved Bornstein & Bornstein and Robert Levine. Thus, the aim is to artistically relate to these studies.

Our assumption is based on numerous facts and writings. First of all, the society is going through the digital revolution and we are living in the information age. Social media has gained an important role in our lives. Kristie Fisher and Scott Counts state in their paper that the relevance of social software is already comparable to the older media like books and television. [5]

In addition to that, location-aware ubiquitous and mobile technologies allow us instant participation in digital social networks. For example, Twitter has announced "182% increase in the number of users tweeting from mobile devices in the past year." [9] That brings us to a conclusion that social media are well received and extremely used by the society. The usage of Internet is much more than the source of information nowadays. Social media are extremely engaging by encouraging socialization and expression of own thoughts, moods, and reporting on the events. Thus, it can be claimed that microblogging and upload of various media is becoming an integral part of social life.

Fujisaka, Lee, and Sumiya state in their paper that a significant part of population is sharing its' daily life and social events through microblogs, like Twitter. Even more, the growing usage of mobile devices makes blogging more popular and accessible. It means people are reporting about happenings, their activities, feelings, etc instantly. [8] The authors refer as well to the fact that it is possible to make sense of the microblogs' data. Although the messages on Twitter are short and have limited information, many researchers are looking for a set of mass movement that allows "discovering interesting and useful patterns such as social/natural events or social customs/culture." [8] All this is possible because of a location and a time-stamp that are involved into many posts in social networks. As well Kristie Fisher and Scott Counts see Twitter as "a very large and rapidly changing information source." [4]

Drawing on these facts, a city's culture, events, and pace of life can be observed by analyzing the geo-located social data. Paul Virilio concludes following: "a virtual reality that dominates the reality while disturbing its own idea of 'reality'." [13] Therefore, it is inspiring for us as artists to use the data of social media as a material in our artistic practices. Moreover, it allows us to reflect upon the phenomenon of hybrid virtual-physical world and provoke discussion.

CONCEPT

The Rhythm of City has a multifaceted concept. First of all, geo-located data are translated into the mechanical rhythm of a metronome. The same rhythm represents a city's pace of life. Second, there is a twist from digital to physical. The digital data are translated into physical kinetic motion and mechanical sound. Thus, the meaning of information has been altered and applied for totally different purposes. The same has happened with a metronome – the device has been given totally new and unexpected function from its' original one.

And finally, the users of geo-located social media are influencing the rhythm of a metronome in real time. It constitutes that The Rhythm of City is an installation that can be viewed as an open work, which score is dependent on geo-located social data. As well the work goes under real-time art according to Jeffrey Crouse. [6] He states that this kind of genre of art comprises two distinct parts: the information source(s) and the work it self. The art piece on its own gives a new frame for the data source, and at the same time, alters the meaning of it. Hence, the information does not stand for the information anymore, but for something totally different. In the case of The Rhythm of City the geo-located social information of sources are transformed into a rhythm of a metronome in real time. On the other hand, The Rhythm of City can be seen as mixed reality installation because it crosses and blurs the borders of virtual and physical spaces.

In addition to that, the artwork can be viewed as a representation of a city's pace of life. In other words, the tempo of a metronome is an interface of a city. Through observation one is able to make a conclusion on the tempo of life in certain city and compare different locations between each other. Hence, the installation can be perceived as a performance by 10 metronomes representing different cities but also one is able to observe a single metronome and listen to a specific city (Fig 1).

When it comes to our inspiration for using metronomes, we were greatly influenced by György Ligeti, who composed "Poème Symphonique for 100 metronomes" in 1962. [12]

Ligeti's work is a relevant reference in terms of score composition and applying a mechanical object as a musical instrument. In addition to György Ligeti, many other Neo-Dadaists and Fluxus artists, like John Cage, Eric Andersen and many more, were looking for new forms of score and art in general. Chance played a significant role in their works often. Basically they treated an art piece as a field of possibilities that underlined the role of chance and choice. [2] We see a number of parallels between The Rhythm of City and the early works that used chance and choice as an integral part of the composition. It constitutes that the geo-located social data play a role of chance in the composition. The important difference is that the tempo of metronomes goes beyond chance and adds cultural meaning. Moreover, the work builds a bridge between virtual and physical spaces, and thus, is a manifestation of networked society and digital age. As Lazlo Moholy-Nagy puts "art crystallizes the emotions of an age; art is mirror and voice." [1] Hence, we are making use of modern technology in order to explore a new possibilities and forms in contemporary art, and to reflect upon the networked age.

REALIZATION

In order to achieve the most accurate rhythms of cities, multiple social networks as the sources of social data are used. According to the selected cities the recent geo-located social data from Twitter, Flickr,

and Youtube are retrieved every minute. Thus, for each location the score is composed periodically. It is a combination of recent social activities in the three social networks.

In short, the software robot of The Rhythm of City gets the number of posts from the social platforms in the last minute and converts it into the rhythm of a city proportionally based on the current trend. All this is repeated every minute (Fig 2).

Explaining the dedicated software, the application was developed in Python. The specific programming language was chosen because Python is an optimal solution for creating web crawlers. Web crawlers is a software-based search robot, known as well as web-spider that analyses web according to the target. In this case, web crawlers is looking for the social data appeared in the last minute on selected social services and afterwards counts the new input. The query of search robot is location specific. It means the program is looking for the new social data only in the declared cities.

The database was created in MySQL for storing the information gained from web crawlers. All location specific values that are used for generating the rhythm of each metronome are placed into the database. The database is used as well for storing the historical data of each city in order to understand the local activity within the social media networks. It means the rhythm of every city is compared to its' historical data periodically. Hence, we are normalizing the data of each location in order to ensure accuracy of the rhythm. The quantified data is then returned to Python application that forwards the rhythm value of each metronome to Arduino every minute.

Continuing with physical part of the project, it consists of modified metronomes and a microcontroller. Arduino (microcontroller) is connected to dedicated computer in order to obtain the scores of the metronomes every minute. The score from 0-255 is translated to the different rhythms by ArduinoMega and forwarded to the servomotors.

The metronomes used in the installation are modified: inside each of them is placed a servomotor that is realizing the tempo of metronome sent by the microcontroller (Fig 3).

LIMITATIONS AND REASONS FOR APPLYING CERTAIN SOCIAL NETWORKS

Twitter, Flickr, and Youtube were selected as data sources for several reasons. First of all, these social services are widely used all over the world and have been applied for describing epidemics and other social events in several studies. [8] Therefore, the score that is a proportional combination of users' activity within these social networks is reliable and realistic for representing the rhythms of cities. Moreover, the project is one of the few ones that apply a combination of data sources and evaluate their importance. Normally just one source, for example Twitter, is applied for extracting and translating social data.

The second reason for selected specific social application was available search by a city. For example, Google provides the geo-located search by country only. Opposite to Google Twitter, Youtube, and Flickr support search by city in real time and therefore were applied in the project. However, it is possible to expand the number of used social networks. For example, Wikipedia could be considered as an additional source for the score calculation.

Concerning further limitation, it is important to point out that certain social networks are banned in some countries. For example, Youtube, Twitter, Facebook, Google and some more web sites are totally or partially blocked in China. It constitutes that it will be difficult to include any Chinese city to the installation.

RELATED WORKS

The explosion of web technology and digital culture continue to be an inspiration for many artists. Moreover, virtual social environment is applied as an artistic medium often. For example, Julian Popp has produced amazing artworks based on his significant exploration of digital culture and real-time web as an artistic medium. Bit.Fall is an installation that displays the most popular keywords of current online news. The words, extracted from digital sources, can be read only for some seconds while the water drops are falling. [11] An art piece from 2003 by Jonah Brucker-Cohen called PoliceState, is another example for applying digital data as a concept and a medium that affects physical matter in real-time. The artwork points out the fact that certain governmental organizations, like FBI, are snooping users on Internet. The artist has developed a software script that makes use of the data being “snooped” by the authorities and turns it into the radio signals that control the toy police cars. [3]

Urban Mood by Mahir M. Yavuz is another project that uses geo-located tweets in order to describe the mood of a city. A single word that is a summary of a post is projected for a minute before displaying the next one. [15] The installation remains in the digital environment. However it demonstrates well how geo-located social data can be used for artistic purposes within the virtual space.

The next related example is News Leak by Timothy Devine, Jamey Cochrane, and Shervin Afshar. In the similar way as The Rhythm of City News Leak brings together virtual and real world by extracting local online activities from Twitter, Flickr, and Google News; and publishing the social data as a kind of instant publication in public space. In short, the authors are collecting geo-located data and giving it a form of publication as soon a person press a button of a dedicated box. [7]

To sum up, there are a huge number of arts, who apply social media as a concept and as well as an artistic medium. Interestingly there are much less artists, who make use of geo-located social data. And even less of creative people are concerned about transforming intangible geo-located social data into a physical form. There might be many reasons for that. First of all, technically it is not trivial tasks to analyze location-based social data and transform it into an artistic material. Second, social media platforms have a number of limitations and not all service providers are eager to share the data, like Facebook.

CONCLUSION

To sum up, The Rhythm of City is an inter-disciplinary artwork that demonstrates creative approach towards emerging social web technology. At the same time, the artwork draws attention to the vanishing border between virtual and physical, and allows perceiving a city’s digital pace of life.

In addition to that, the artwork introduces a unique experience to its’ audience. Suddenly it is possible to see and hear the cities’ pace of life that is performed by mechanical metronomes. The score is unpredictable and unique because the digital inhabitants are the composers of the score in real-time.

In conclusion, a significant amount of artworks that exist in hybrid space constitutes the increasing interests towards digital culture, and possibilities of real-time and location-aware web. Hence, the borders of electronic art are widening rapidly.

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