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Developing Electronic Maps on First-run and Double-feature Cinemas in Seoul from 1976 to 1995

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Abstract: *This paper evaluated the geographical distribution, chronological and economic patterns of the commercial cinema industry in Seoul, Korea dichotomized by the two main types of cinemas that have been prevalent in the recent Korean history, the first-run cinemas and the double-feature cinemas. This analysis involved computational technologies including the R statistical programing language and the interactive map library known as Leaflet for R in order to scrutinize the aforementioned patterns. Historically the cinema industry has been under the tight control of authoritarian military dictatorships that have run Korea in past decades, and the measures they took to control the cinema industry leading to unexpected ramifications. One of them is the decrease in the quality of domestic films, as competition with international films was reduced, and another is the massive increase in the domestic production of low-quality sex-exploitation B-tier films. The double feature cinemas played a big role in the distribution of the low- quality films. Our electronic maps will clearly represent the hierarchy and differentiation of these cinemas in the cinematic landscape of Seoul.*

Keywords: first-run cinemas; double feature cinemas; electronic maps, Seoul

1. Introduction

1.1 The purpose of the research

There has been a rapid increase in the application of computational technology with regard to data in the humanities in recent years. The goal of this paper is to complement the extant body of this kind of work in the digital humanities. We aim to address students and scholars to help them consolidate and extend their knowledge of digital methods. The primary goal of this paper is to find an easily reproducible way of creating digital maps that will allow interested students and researchers in the humanities to combine computational methods with their research. This paper offers a tutorial on digital maps by presenting a blueprint for the digital humanities that combines both history and data visualization based on certain principles. Initially, we will use open-source software so that these powerful tools can be available freely for use, modification, and distribution. Secondly, our method also attempts to deal practically with budget and technical constraints, which may be common issues from a humanities perspective.

Hence, we have produced electronic maps to represent the impact of the Korean government's various measures regulating the cinema industry in influencing the geographical distribution and patterns of cinemas in Seoul, Korea according to the classifications of 'first-run' and 'double feature' cinemas from the late 1970s to 1990s. However, we will only address selected data for the years 1976, 1982, 1988 and 1994 in order to avoid any redundancies in our analysis.

1.2 Background

During the authoritarian rule of President Park Chung Hee (1961-1979), the Park regime incorporated administrative controls that ran the entire gamut of every film sector from production, distribution, export, import, to release. License systems, import quotas, and strict censorship were introduced. The censorship measures aimed to prevent anti-government sentiment from being fomented by negative portrayals or features in films that maligned the country or the government. This stringent and harsh state control over film production strangled the film industry and precipitated a major decline in the quality and popularity of domestic films. Korean film enthusiasts ended up preferring foreign films, mainly from Hollywood, a metonym for the US film industry, to domestic films. Hence, the government was compelled to introduce several protectionist measures in order to suppress the popularity of foreign films. However, the government's efforts to protect the domestic Korean film production industry had the unanticipated effect of amplifying its stagnancy and decline during that period.

As for the protectionist policy, it was principally a government-imposed import quota with a few added regulations, such as the requirement that the cinema industry produce or export a domestic film in order to receive a license to import a foreign film to release to the domestic market. The purpose of this policy was to create a self-sustaining environment for the Korean film industry.

However, instead of helping the production of higher quality films, the Korean cinema industry produced massive numbers of low-budget and B-tier films to get licenses to buy foreign film to show in their cinemas. The majority of them were either shoddy sex-exploitation related films or gangster films. These lower quality films were produced for the double feature cinemas.

Prior to the emergence of the first multiplex cinemas in 1998, the cinemas of Korea were divided into 'first-run' cinemas and 'double feature' cinemas [1]. Primary distribution of newly released films in Korea were carried out under the 'first-run' cinema system until the late 1990s. According to government regulations, the newest films could only be played in a single cinema in the entire city.

Before the advent of digital film technology, the cinema industry could acquire only a limited numbers of analogue film reels from Hollywood that could be shown in their cinemas due to the aforementioned import quotas. As a consequence, the cinema industry distributed blockbuster, big budget, and high-return films mainly in the priority first-run cinemas which were located in central downtown areas. There, spectators could purchase a ticket for a single viewing of the newly released film to be shown at a specific time and date.

On the other hand, low-budget commercial films and outdated films were shown at double feature cinemas located in marginalized or non-central areas, usually in the periphery of the cities. At double feature cinemas, spectators could watch two or more films without any limits at a price of a single entrance ticket and at lower prices than tickets for a single viewing in any of the first-run cinemas.

Figure 1. Kim Hyeja, actress watching a cinema billboard featuring an erotic scene from *Lady Chatterley's Lover* (1981) [2] in 02:07 of *Man Chu* (1982) [3]

Presently, most of both first-run and double feature cinemas have already disappeared and they have been replaced by multiplex cinemas operated by large Korean conglomerates and mainly located in vast commercial districts. The double-feature cinemas, prevalent as Korea began its industrial and modernization drive in the 1960s, were a great attraction for young people in that earlier period. The double feature cinemas either showed

outdated films or sex-exploitation films produced with the goal of acquiring a license for the import of Hollywood films. These films were shown at these cinemas in various configurations, such as outdated-erotic, erotic-erotic, or outdated-outdated. Many of the double feature cinemas were in semi-dilapidated buildings over which were affixed large-sized cinema billboards featuring numerous hand-painted film posters which showed images of sensuous scenes that hinted at female nudity or sexual content in the sex-exploitation films e.g. as represented in *Man Chu* (1982) a feature film directed by Soo-yong Kim in Figure 1.

Figure 2. Yeongdeungpo Cinema, Seoul [4] and Samil Cinemam, Busan [5]

Today, as most of them have long disappeared, the double-feature cinema now evokes many feelings of nostalgia. Figure 2 are photos of double feature cinemas taken from Munhwa Ilbo [4] and Pusan Ilbo [5]. Ha, Yoo, a film director represented his feelings on the erotic indulgence of double feature cinemas in his porm *Hwasingeukjang yetteoreul jinada (Pass by the old site of Hwashin Cinema*) as:

For me, it was the first tidings of flowers
Like the glare out of a cave
The film has started.
The heroine with blue eyes was the incarnation of eros.
She was an idol for me [6].

1.3 Chronical Trend of cinemas in Seoul

The double feature cinema peaked from the 1970s to the 1990s in Korea. Table 1 shows the numbers of cinemas, separated by first-run and double-feature cinemas in Seoul from 1971 to 1997. There were about 105 cinemas in Seoul in the 1970s. Among them, only about 10 were of the highest quality first-run cinemas and most of the remaining 100 were the double-feature cinemas which were comprised of second-run, third-run, and fourth-run cinemas [7]. In the 1980s, the number of first-run cinemas rose to more than 20 while the number of double-feature cinemas also increased to about 130.

Table 1. Number of cinemas of Seoul from 1971 to 1997

Year	First-run (개봉관)	Double feature (동시상영관)	Sum
1971	10	106	116
1972	10	109	119
1973	10	108	118
1974	10	106	116
1975	10	105	115
1976	10	97	107
1977	10	92	102
1978	12	82	94
1979	12	80	92
1980	12	72	84
1981	12	68	80
1982	14	68	82

1983	14	92	106
1984	16	127	143
1985	16	143	159
1986	21	149	170
1987	21	160	181
1988	24	158	182
1989	31	171	202
1990	32	179	211
1991	36	171	207
1992	39	149	188
1993	34	142	176
1994	48	103	151
1995	56	76	132
1996	57	66	123
1997	67	68	135

Source: KFA 1970 to 1997

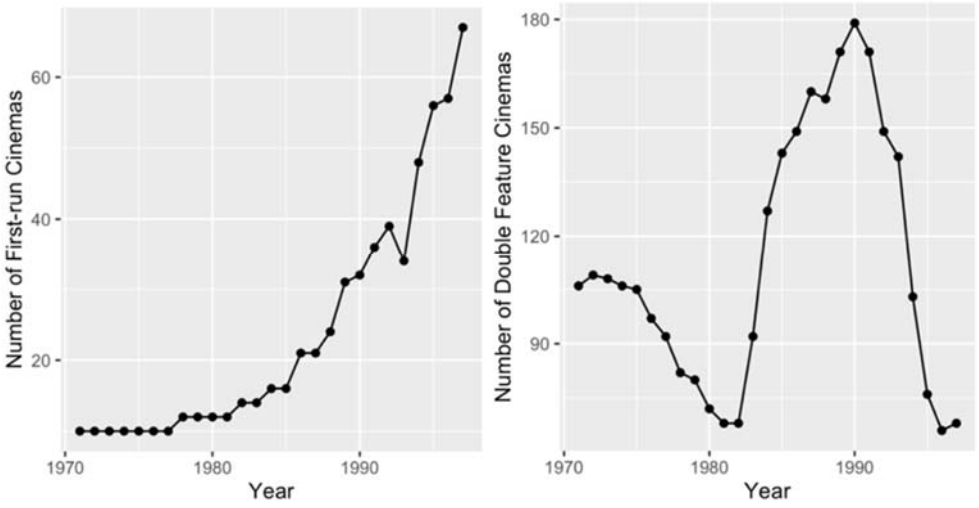

Figure 3. Number of the first-run cinemas and the double feature cinemas from 1971 to 1997

In the 1990s, Korea saw a gradual increase in the number of first-run cinemas in contrast to the drastic plunge in the number of double-feature cinemas as shown in Figure 3. In terms of shares of box office sales, the first-run cinemas accounted for less than 50 % of the audience in the 1970s and early 1980s. From the mid 1980s, the share of the double feature cinemas continued to wane until they plunged in the 1990s.

1.4 Data visualization of coordinates of cinemas separated by first-run and double feature

As mentioned above, we have analyzed the data of four selected years for visualization to provide a brief survey on general cinema trends in Seoul. For Figure 4, we have then represented the coordinates of these cinemas, divided in the categories of first-run and double feature.

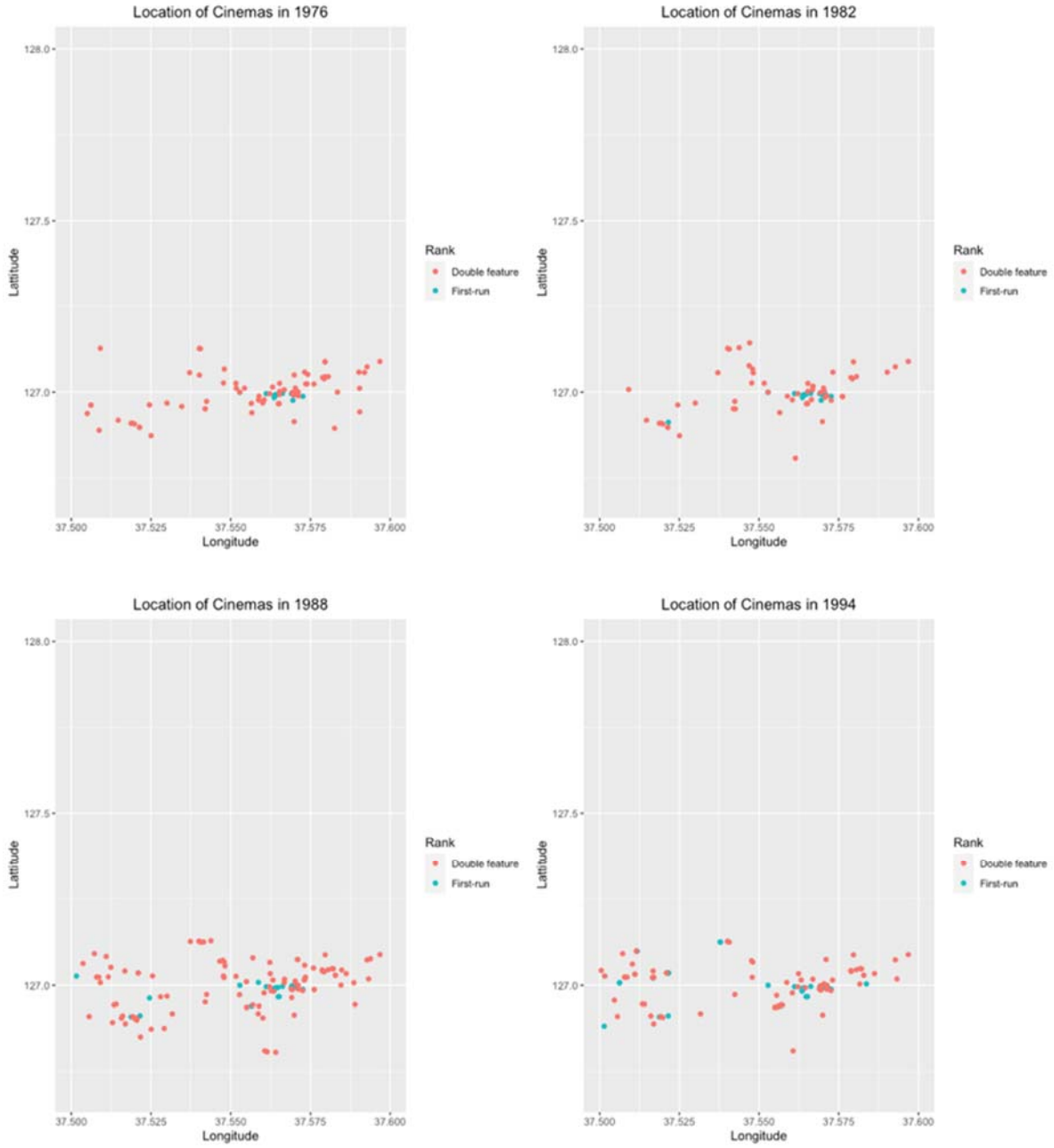

Figure 4. Coordinates of cinemas separated by first-run and double feature

From Figure 4, we can see that first-run cinemas were concentrated in the center of Seoul in 1976 but gradually became distributed across the city by 1994. In contrast, the geographical distribution of the double feature cinemas is noticeably sparse in 1994.

1.5 Data visualization of frequencies of cinemas in terms of seats

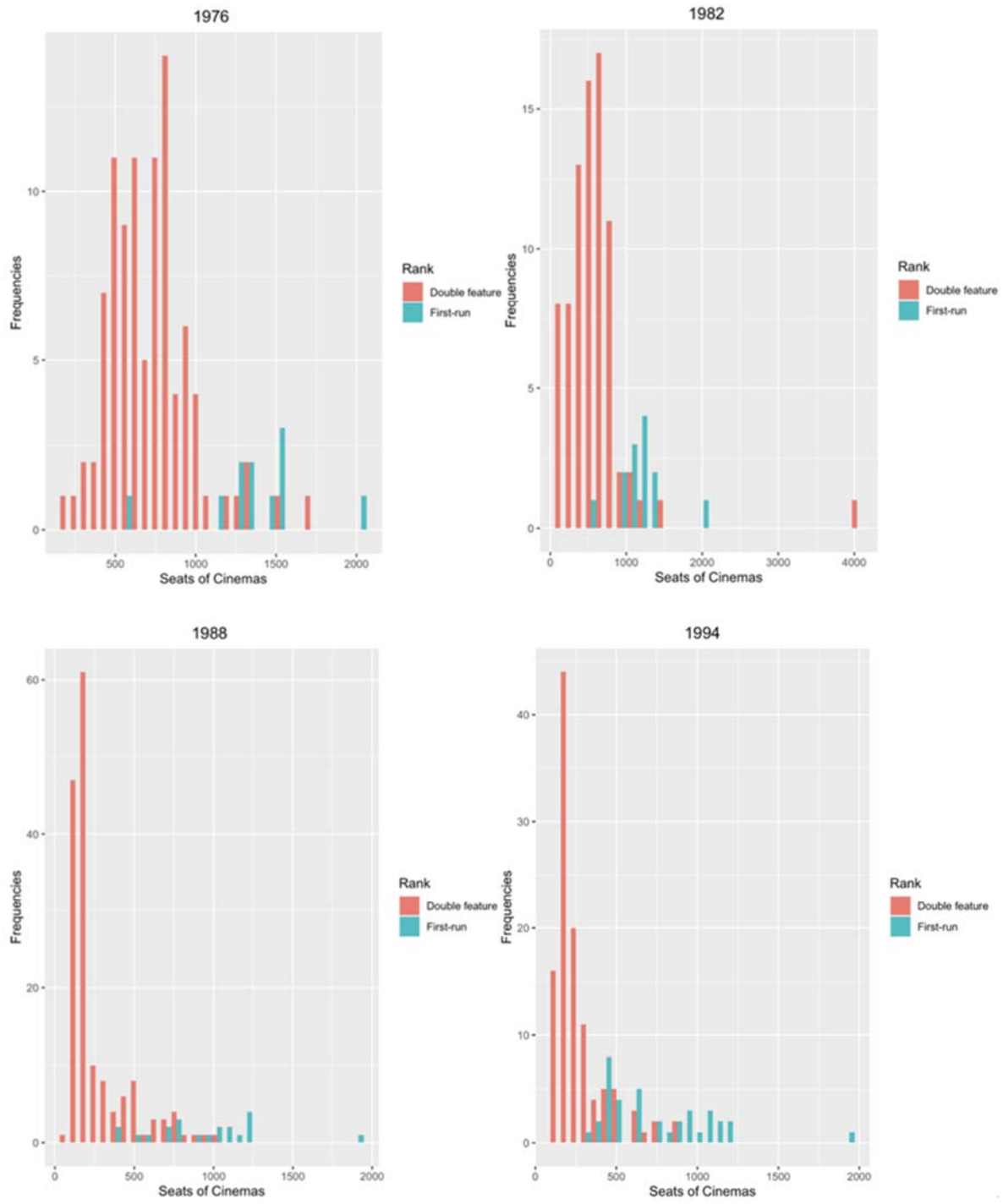

Figure 5. Frequencies of cinemas in terms of seats

Figure 5 provides a view on the frequency of cinemas based on the number of seats in Seoul. Although the number of first-run cinemas are smaller than the double feature, they had more seats. The years 1988 and 1994 also show the shrinkage of the double feature cinemas in contrast to the gradual increase of the first-run cinemas.

1.6 K-means clustering of cinemas' proximity and seats

We have performed k-means clustering of the selected data. K-means clustering is a method that aims to partition *n* observations into *k* clusters in which each observation belongs to the cluster with the nearest mean. We have included coordinates i.e., the latitude and longitude of cinemas in order to consider their proximit, alongside number of seats as variables for analysis. We have set two as the value of *k* as shown. The results are

shown with red and black colored circles in Figure 6 with red circles representing first run cinemas and black circles representing double feature cinemas.

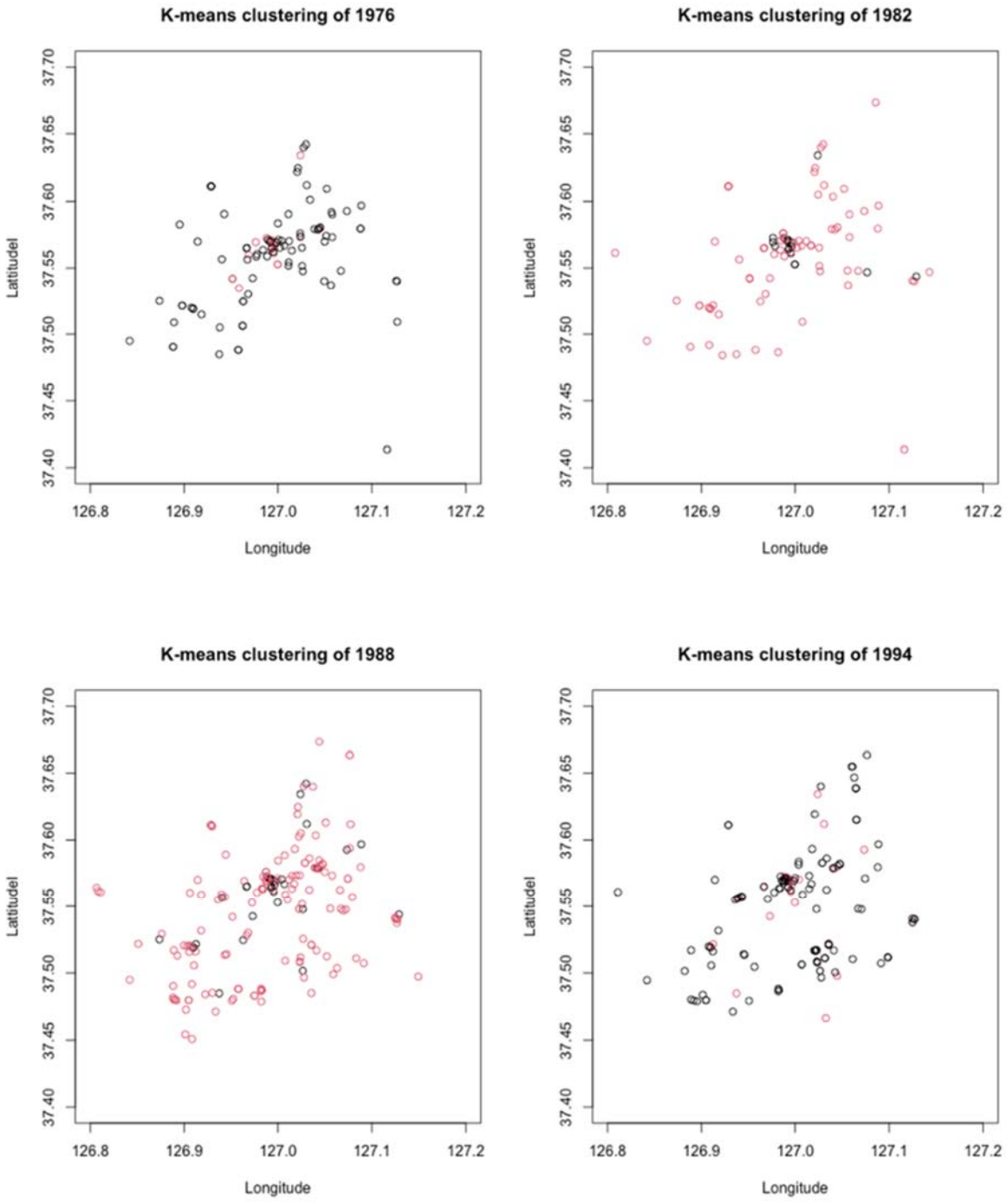

Figure 6. Visualization of k-means clustering of cinemas' locations and seats

From the clustering analysis, it is difficult to distinguish between the first-run and double feature cinemas because its analysis only considers the geographical proximity and the number of seats. The clustering of cinemas of the years 1976, 1982, and 1988 show that the red circles are focused on the center of Seoul while black circles are widely distributed. We can interpret from this that the first-run cinemas with large numbers of seats gradually expanded in size and geographical distribution while the double feature cinemas waned.

According to this background information, this paper extracts from these characteristics to create a hierarchical and geographical understanding of the differentiation in the location of Korean cinemas based on their categorization of first-run or double feature cinemas from the late 1970s to 1990s using electronic mapping technologies.

1.7 Necessity of the research

The reason for mapping the locations of the first-run and double feature cinemas along with their relevant characteristics are as follows. First, the authors of this paper are mainly of a humanities background. We believe that use of data visualization such as digital mapping for historical analysis could be a great step forward for the digital humanities. History has long used historical paper atlases in both education and research, however, conversion into digital historical mapping has not been explored with much pressing concern. This research will hopefully contribute to triggering such a transition into this kind of digital mapping.

Secondly, our mapping technique has several strengths in comparison to the conventional method of web-based mapping. Many digital mapping projects in the humanities have relied on HTML and Javascript programming for web services. Hence, it is actually impossible for individual researchers to produce digital maps because mapping for the web requires a relatively large budget and the contribution of experts in computer programming, web design, as well as experts in geography and map-making. Furthermore, there is also a cost simply for maintaining and modifying website content. Our approach to mapping has a comparative advantage because it produces digital maps by using simple programming code on a personal computer without requiring advanced knowledge or skills. We can develop high-quality maps in an electronic format easily, which we will be explained later.

1.8 Literature review

The development of digital maps is a key example in convergence research and can be found in previous research. The GIS (or geographic information systems) which was developed in the 1960s breached into the world of the social sciences and the humanities and allowed spatial related questions to be dealt with or studied in more depth in the disciplines. The wide availability of instrumental GIS tools enabled the humanities to adopt strategies of quantifying data in the humanities for studying “place”.

It is necessary to refer to ‘cybercartography’ as presented by Professor Taylor of Carleton University in Canada. Cybercartography is a term that combines the words ‘cyber’, meaning digital, and ‘cartography’, and refers to digital map production. Professor Taylor defined the elements that make up cybercartography to include interactivity, internet platform, and multimedia elements, as well as open and active participation by academia, the private sector, government, and individuals, including interdisciplinary research personnel [8].

In a digital humanities textbook, Arnold & Tilton classified the field of digital humanities into five categories: network, geospatial information, image data, natural language processing data, and text analysis. This document introduces the production of electronic maps with humanities information as a major example of geospatial information [9].

In 1996, Electronic Cultural Atlas Initiative (ECAI), http://www.ecai.org) was formed to produce international standardization work to build an electronic cultural map in academic and educational uses. There are many examples of projects to build digital cultural maps around the world like 'Asias Map' by Professor Roland Fletcher of the University of Sydney, Australia, the Yenching Research Institute of Harvard University and the Center for Historical Geography at Hudan University in China. ‘CHGIS’ was jointly conducted by Geography and Geoscience Center, and ‘Historical GIS’ by the University of Portsmouth, England [10].

In the case of mapping projects in Korea, there are ‘Development and application research of the electronic cultural map of the Joseon Dynasty (2002~2004)’ and the ‘Study on exchange patterns between civilizations in the Mediterranean region” supported by the National Research Foundation of Korea’ and “Asian Cultural Map” produced with support from the Ministry of Culture, Sports and Tourism [11].

Most of the previous works have common problems. First, these maps simply represented objective information as if they were paper maps, lacking in the combination of diverse storytelling, multimedia and targeting of various humanities and social science topics. Moreover, these electronic maps adopted a web-based mapping service approach leading to the requirement of massive amounts of financial and technical resources. In the case of Korea’s projects, they did not adopt a standard web interface which made it inconvenient to use when connected to a mobile device.

Finally, we deal with previous works on mapping in film. Jeff Hopkins took on a semiotics perspective on mapping. He dealt with the mapped landscape of film by way of a semiotic approach. He argued that there is much to learn from a geography of film in an age where the image dominates [12].

Hallam and Roberts examined geospatial tools as to the development of local film culture and its contribution to projections of ‘place’, drawing on archival research into Liverpool and Merseyside on film.

They articulated an epistemological shift toward the adoption of the *database* as the new symbolic form that can shape critical analysis of film texts and practices (spatial, vertical, paradigmatic), as opposed to the dominant *narrative* model (diachronic, linear, cause and effect). For them, *cinematic cartography* is an emerging field of both a product of and a response to the shifting cultural, spatial, and intellectual terrain privileging metaphors such as "navigation," "mapping," "sorting," "searching," and "excavating" over those of more passive activities such as "spectating," "gazing," "viewing," and "watching [13].

2. Materials and Methods

2.1 Methods

For our purposes, we generated electronic maps of cinemas in Seoul from 1977 to 1997 using R and Leaflet for R libraries. R is an open-source software for statistical computing and data visualization available on multiple operating systems. Our research can be easily reproducible freely without any software license issues. Currently, R is one of the most commonly used programming languages and widely taught in data science. Furthermore, there are many online communities that cater to users of R. Hence it is easy to consult with these online communities to address problems.

Leaflet is a leading open-source JavaScript library created by Vladimir Agafonkin (http:// agafonkin.com/en). With it, you can create complex, interactive, editable maps with lines of JavaScript code. The Leaflet for R library is also an opensource software R package, which makes it easy to integrate and control Leaflet maps in R, while operating in an embedded environment in the R language. We adopted Leaflet for R because Leaflet is by far easier to use it in R than in JavaScript.

We have implemented the R scripts using R version 4.3.0 and Rstudio Desktop 1.1.442 on iMac installed with macOS Big Sur. Rstudio is a free and open-source integrated development environment (IDE) for statistical computing and graphics. Rstudio is a regular desktop application that provides a graphical user interface for R programming and is the most popular IDE within the general R community.

2.2 Materials

As for the data, we have used the *Korea Film Annual* (hereafter KFA) published by the Korean Film Council. The KFA is a public institution established to improve the quality of Korean films and promote them and the film industry as a whole, a role entrusted to them by the Ministry of Culture, Sports and Tourism of the Korean government. The KFA is an annual hard-binding yearbook published by Korean government, providing a general survey of the Korean film industry at a glance. This includes the box office statistics of films released in Korea, total audience numbers, and the current status of cinemas. Currently, the full texts of the KFA have become digitalized and available at the website of the KOFIC [14]. In this paper we extracted data from the volumes of the KFA from 1977 to 1997, excluding the KFA of 1983 which is not available on the KOFIC website.

We have produced tabular data on the annual information of cinemas of Seoul, Korea from the KFA into comma-separated values (CSV) as shown in the example of 1986 data in Table 1. Each table has five columns containing *cinema*, *lat*, *lon*, *seats*, and *rank* and explanation on the five elements as shown in Table 2.

Table 2. Variables and description of the encodes CSV

Variables	Description
cinema	Name of cinema in Seoul in the Korean language
lat	Latitude of the cinema
lon	Longitude of the cinema of Seoul
seats	The number of seats of cinemas of Seoul
rank	A: the first-run cinema B: Double feature cinemas for second release C: Double feature cinemas for above third release D: Double feature cinemas for above fourth release

We programmed R scripts for producing a map which is simple and easy for researchers and students to understand with a view to making it reproducible for further research. Here we provide the R script to produce a map of cinemas in 1989 as follows. We provide a detailed tutorial, datasets, and R scripts, shown in Figure 7, for mapping on the GitHub website (https://github.com/youngsuehan/cinemamap) to make them freely downloadable.

```
library(leaflet)
data <- read.csv("1989.csv", header = TRUE)
# This line imports CSV file.

View(data)
# A=RED, B=BLUE, C=GREEN, D = Black.

map_pal = colorFactor(c("Red","Blue","Green","Black"),domain = data$rank)
map <- leaflet(data)  %>% addTiles () %>%
       setView(126.97840315634821, 37.567112476046894,  zoom = 11)  %>%
       addCircleMarkers(data =data, lng  =  data$lon,  lat   =  data$lat,
                  color = ~map_pal(data$rank), weight   =   1,
                  radius  =   ~sqrt(data$seats) * 0.5, popup = data$cinema)
# setView() takes values for coordinates to set the center of a map and value of zoom level.
```

Figure 7. R scripts for making a map

3. Results

3.1 Comment on legendary of the maps

We have produced electronic maps with a legend positioned in the right-upper corner of the map. The legend contains four categories visually represented as A in red (the first-run cinema), B in blue (Double-feature cinemas for second release), C in green (Double-feature cinemas for above third release), D in black (Double-feature cinemas for fourth release and beyond). The size of the circle in the map represents number of seats at the cinema.

3.2 Digital maps of cinemas of Seoul

The following maps represent the various locations of different types of cinemas within Seoul.
Both types of cinemas cater to different audience preferences.

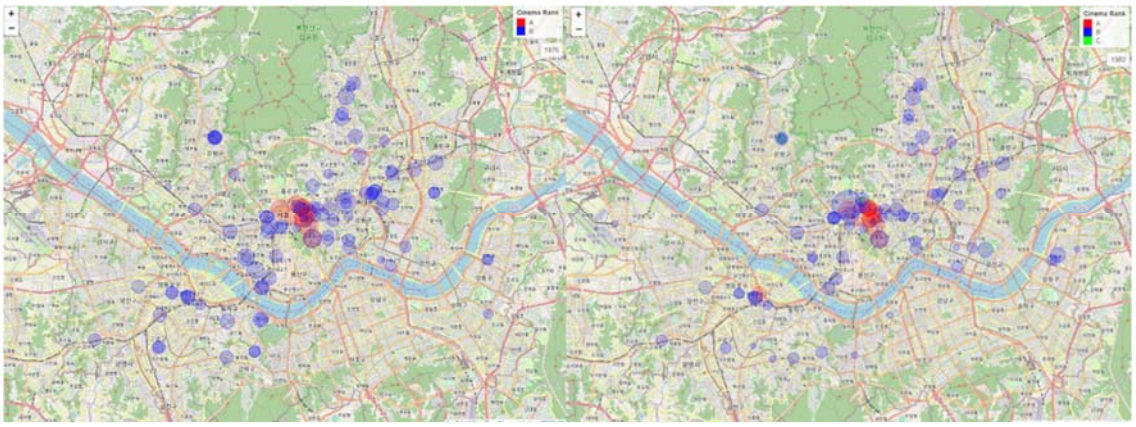

Figure 8. Map of cinema of Seoul in 1976 and 1982

Figure 8 is the map from 1976 and 1982, which is the tail-end of the dictatorship era of President Park Chung Hee and shows us the distribution of high quality first release cinemas (in red) across the city of Seoul. From the map we can see that these high-quality cinemas cluster around the historic central areas of Seoul, specifically the historic Jongno district and thereabouts. As for the double feature and re-release cinemas, they cluster across the city, especially in areas that were more marginalized and economically deprived at the time

such as the areas north of Dongdaemun (east of central Seoul) and close to the Cheongnyangni train station and Yeongdeungpo in the south-west.

Six years later there seems to be an even greater concentration of cinemas of all types in the central Seoul area of Jongno, with an increasing number of both high-quality first-release cinemas alongside large double-feature cinemas. This shows that the area has become a geographic magnet for the cinema industry in the city. Yeongdeunpo also gets its first high quality cinema as well. The rest of Seoul on the other hand has seen, for now, mostly stagnant growth in the number of both types of cinemas.

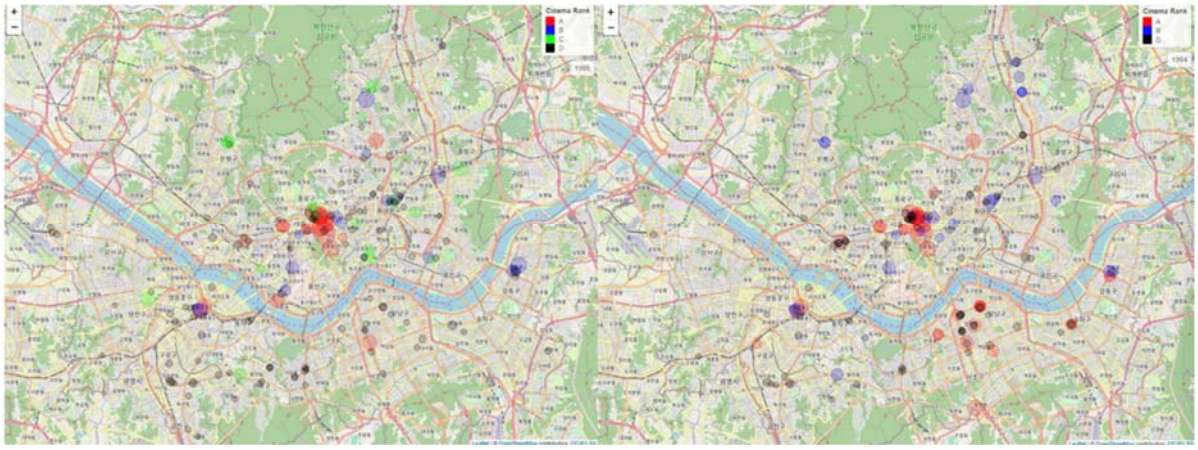

Figure 9. Map of cinema of Seoul in 1988 and 1994

From Figure 9 from 1988 and 1994, we see that the first high quality first-run cinema opens near the Yeoksam area, part of the Gangnam area south of the river, which is rapidly developing and increasing in importance as a new economic zone in Seoul. We see a marked decline in double-feature cinemas as a whole and they maintain a presence mostly in the economically deprived parts of Seoul, such as the North-East. The areas of Gangnam and Jongno continue to hold the lion's share of the best cinemas, while double-feature cinemas that used to be common in these areas close down because of lack of demand from well-heeled consumers.

4. Discussion and conclusion

We have produced data visualization based on various characteristics of cinemas in Seoul and a series of electronic maps which try to accurately represent the clustering of cinemas in Seoul from the late 1970s to the mid 1990s. Overall, across geography and time, the physical cinema itself tells a story about many aspects of the city of Seoul, its development, and the clustering of economic centers of gravity. With its meteoric development, Korea has achieved a socio-political and economic transformation in a few years what took other developed countries, centuries. And this is reflected in our analysis of the Korean cinema industry as well.

We have taught the production of electronic mapping using the Leaflet for R package to undergraduate students taking the course 'Understanding and Using Big Data' at Catholic University of Korea from the second semester of 2022 to the first semester of 2023. We found that the students were able to easily reproduce electronic maps for various different topics. The course did not require students to have any programming knowledge or experience. We found that the students indeed obtained working knowledge on digital mapping creation. Hence, we believe we have contributed to the digital humanities by identifying a method for digital mapping which does not require a large budget or technical and design expertise. We emphasize that the applications of computation to humanities should focus more on developing research methods which do not require large resources. We believe digital mapping technology can play a pivotal role in enhancing digital literacy for both students and researchers in the humanities. Our research could be seen as a positive development in digital mapping for the humanities.

Despite our best efforts, our research has limitations. First, the KFA which we have used as the data for our research has problems in terms of quality. We could only collect data on cinemas limited to Seoul because the KFA has not consistently provided data on other cities outside of Seoul. Hence our research could not address the nationwide cinematic landscape. Secondly, we were confronted with the issue of missing values in some volumes of the KFA. Therefore, we have produced only 14 maps ranging from 1976 to 1995 excluding

nine maps from the years 1979, 1978, 1979, 1980, 1981, 1983, 1990, 1996, and 1997. Despite the absent maps, we could make sense of geographical trends of cinemas in Seoul with relative ease. Third, our research did not include the usage of multimedia content in our digital mapping because we aimed to provide a reproducible tutorial for the humanities. We hope that our research could trigger interest from within and outside the humanities and increase further research on digital mapping.

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Conflicts of Interest: "The authors declare no conflict of interest."

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