

Title: Visual methods for showing cinema circuits at varying temporal and spatial scales

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1. ABSTRACT:

In an analysis of Greek cinema circuits in Australia for 1956-63, Markov Chains were used to identify statistically significant patterns. However, these movements have proven difficult to visualise, particularly given the variation in temporal and spatial scale, at which these movements occur.

This paper will demonstrate some approaches that have been developed to show how film movements between one cinema venue and another can be visualised. In particular dates of screening for individual films that move from one venue to another were used to provide temporal analysis. Spatial locations of cinema were topologically shown using network modelling. These visualisations are important to film and cinema historians to show the micro-level characteristics of sequential film distribution (with specific attention to the relationship between producer, venue and customer expectations) and macro-level factors (intercity rivalries and preferences, the broader relationship between Greek film producers and venue operators for example).

KEY WORDS: Geovisualisation, Greek cinema, Markov Chains, GIS

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Deb Verhoeven: is Professor and Chair of Media and Communication in the School of Communication and Creative Arts at Deakin University. Deb is a leading proponent of the Digital Humanities in Australia. Her principal research interest lies in extending the limits of conventional film studies; exploring the intersection between cinema studies and other disciplines such as history, information management, geo-spatial science, statistics, urban studies and economics. She is a member of the Australian Film Critics Association, the Fédération Internationale de la Presse Cinématographique (FIPRESCI), an Honorary Life Member of Women in Film and Television, an executive member of the International Cinema Audiences Research Group (ICARG), and a founding member of the Australasian Association for the Digital Humanities (aaDH) and the Screen Economics Research Group (SERG).

1. INTRODUCTION

Recent years have seen the widespread application of spatial analyses to non-traditional fields of study. These “new geographies”, often referred to as the “spatial turn”, have resulted in collaboration between researchers from disparate disciplines (Warf and Arias 2009). We are currently participating in an Australian Research Council (ARC) Discovery project, titled *Mapping the Movies*. Our research is attempting to account for the ways in which cinema industries responded to demographic, social and cultural changes in the three decades after broadcast television became available throughout Australia. Within this undertaking is the recognition that film industries generate data with a temporal and spatial element, and that geospatial research is therefore essential to increasing understanding in the field of cinema studies. The key objective of our research is to identify and investigate the most appropriate geovisualisation approaches for portraying and measuring the spatial arrangement and temporal configurations of sequential film distribution practices. Embedded within this research enquiry, is the question of how we manage time within what is essentially a static technology, namely geographic information systems (GIS). This study then, has far reaching implications for the geographic analyses of micro-historical data.

In an initial study we investigated whether or not spatial patterns of film movement from one venue to the next existed for the diffusion of Greek cinema in Australia between 1956 and 1963 (discussed in Verhoeven et al in press and Arrowsmith et al. (2008)). This initial study form the basis for developing the visualisations documented in this paper. A Greek ‘cinema circuit’, or sequence of venues, developed in Australia in the post-war period, coinciding with significant Greek immigration into Australian cities and changes in both the Australian and Greek film industries (Verhoeven 2007). It has been anecdotally noted that the patterns of movement of films within the Greek cinema circuit during this period were determined by the provenance of the films, in particular the identity of the production company (Verhoeven et al (2009)). The Greek cinema circuit operated by “staggering” the release of films. This usually resulted in single prints moving sequentially from one cinema to another. This system of segmented distribution across exhibition outlets gave each venue a period of temporal exclusivity and was typical of film distribution in the mainstream as well. Conventionally a small “clearance” period applied between venues in the same city or spatial “zone” which maximised each venue’s opportunity for commercial success and minimized the chance of any “cannibalization” of profits. In the initial study we wanted to test whether or not this was the case and, if so, which patterns were statistically significant. These patterns could then be examined by film researchers as a mechanism for extracting information about the latent relationships between Greek film producers and Australian venue operators; patterns that have been, to date, largely noted as hearsay. In this way the study demonstrates the generative role of geographic analysis in understanding cinema circuit behaviour. For example, why did particular films show in particular cinemas first before moving to another? Did different cinema circuits exist for different film production companies and/or for different film genres? Do these spatial patterns also reveal social delineations? How can the role of geospatial analysis be used in micro-historical studies? And, beyond micro-historical studies, can we more broadly ask, how are divergence and discontinuity a factor in cinema history?

For the purposes of pattern extraction we adopted a statistical process referred to as Markov Chain Analysis (Kemeny and Snell 1976). Markov Chains provide a powerful technique for analysing time series events where an initial condition results in a number of alternative outcomes (for a detailed discussion of the process used to determine Markov Chains see Verhoeven et al in press). Film diffusion is a particularly apt case study for Markov Chain analysis. For much of its history, the film industry has sought to maximize producer revenues through the application of systematic sequential distribution, in which a film is made available to consumers in different markets in succession. In this system, film markets are segmented and ranked both spatially and temporally. The Greek cinema circuit in Australia was no exception to this practice (see Verhoeven 2011 for a detailed description of this practice). The graphic representation of film distribution as a Markov Chain demonstrates spatial discontinuities (individual venues), the production of temporal divergence (emphasising the passage of time between screenings) and the multiplicity of simultaneous events (emphasising synchronous releases). Using Markov Chains we can see how film diffusion (and film history) moves both forwards and sideways at once from a singular point of origin (Moretti 2007).

We restricted our research period to the years between 1956 and 1963, and two particularly well-known and popular Greek film production companies, Finos and Anzervos Films. Between 1956 and 1963 alone some 27 venues made up a thriving Greek cinema circuit throughout several Australian cities at a time when hundreds of thousands of Greeks migrated to Australia. Between 1952, when a bilateral agreement on immigration between Australia and Greece was signed, and 1974, some 220,000 Greeks came to Australia (Verhoeven et al., 2009). These years are considered defining ones for the evolution of the Greek film circuit, as mass migration ensured steady custom and proclivity of film production in Greece ensured steady supply (Yiannoudes 2010). Reliable

data for capital city screenings was available for this period from a single source, the Greek language newspaper *Neos Kosmos*. It was also during these years that the acquisition of newly abandoned cinemas began and major commercial alliances between rival distributors were developed within Australia, and with Greek companies such as Finos and Anzervos. Finos Films was the largest and most successful film production company in post-war Greece, specializing in lavish musicals. Anzervos Films, established in direct competition to Finos, developed a reputation for the production of melodramas. Data had already been collected and compiled for Greek films during this period for venues throughout Sydney, Melbourne and Adelaide (Verhoeven 2007).

2. BACKGROUND

For the project collected data included film title, production company, date of screenings, venue name, and address, including city of venue. Data was sourced from archival newspaper and oral history research as well as government records, including censorship documents, and theatre licence and company records. The data was initially stored in a project database called the Cinema and Audience Research Project (CAARP) database. For valid Finos films, a total of 18 cinema venues and 29 different films were extracted and transferred to the GIS database. Anzervos provided 24 films shown within 16 different venues. Venues were located via street address or actual GPS recorded locations where street address was not given. For the cinema venues, a letter was assigned from A through to W (Table 1). For each of the films numbered from 1 to 29 for Finos and 1 to 24 for Anzervos, patterns of cinema venues were derived from the dates of screenings.

Table 1: A list of cinema venues screening films produced by Finos and Anzervos 1956-63.

Code	Name	State	Address	City
A	Melbourne Town Hall	VIC	Swanston Street	Melbourne
B	Lawson	NSW	Corner Lawson Square and Gibsons Street, Redfern.	Sydney
C	Doncaster	NSW	216 Anzac Parade, Kensington	Sydney
D	Nicholas Hall	VIC	148 Lonsdale Street	Melbourne
E	Capitol/Koinoniko Theatre	VIC	CBD, Melbourne	Melbourne
F	Cathedral Hall	VIC	20 Brunswick Street, Fitzroy	Melbourne
G	Odeon Theatre	NSW	49 Canterbury Road, Petersham	Sydney
H	Savoy Theatre	VIC	170 Russell Street	Melbourne
I	Community Hall	SA	288 Franklin Street	Adelaide
J	National Theatre	VIC	177 Bridge Road, Richmond	Melbourne
K	Cosmopolitan Theatre	VIC	14 Glenlyon Road, Brunswick	Melbourne
L	Pantheon Theatre	SA	70 Wakefield Street	Adelaide
M	Carlton Theatre	VIC	235 Faraday Street	Melbourne
N	Castley Hall	VIC	Glengala Road and Steer Street, Sunshine	Melbourne
O	Victoria, Richmond	VIC	214 - 216 Victoria Street, Richmond	Melbourne
P	Rialto	QLD	Hardgrave Road, West End	Brisbane
R	Soldiers Memorial Hall	SA	147 Sir Donald Bradman Drive, Hilton	Adelaide
S	Pantheon Theatre	VIC	380 High Street, Prahran	Melbourne
T	Dendy	VIC	24 Church Street, Brighton	Melbourne
U	Sun	VIC	8 Ballarat Street, Yarraville	Melbourne
V	Maya	VIC	Buckley Street, Morwell	Morwell
W	Fitzroy Town Hall	VIC	Napier Street, Fitzroy	Melbourne

3. VISUALISING CINEMA CIRCUITS

In the analysis of cinema circuits, we need to consider movements from one venue to the next. It is also important that a time profile for movements are also incorporated to give an indication as to the frequency of movement for specific films.

Therefore four aspects are regarded as important in visualising a cinema circuit:

- the change from one venue to another;
- the time a film remained at an individual venue;
- the sequence of movement between consecutive screenings; and,
- a combination of time and sequence of movement.

We address each of these through the implementation of five separate visual approaches. The first of these examines how we may visualise movement of film from one venue to the next. The second approach creates temporal visualisation to show length of screening and delay between screenings from one venue to the next. The third approach revisits movement of film within and between cinema venues for individual films, whilst the fourth and fifth approaches combine both time and sequence of movement into single visualisations.

3.1 Visualising change in venue

For the Markov Chain analysis we were interested in following a sequence of movements of a particular film from one venue to another. This is shown in figures 1 and 2 where the first showing (that is the first venue) forms the root of the dendritic pattern. Subsequent movements can be followed through the pathway for individual films. When a second film follows part of the pathway as another but diverges further down the pathway, this is shown as a “bifurcation” or splitting in the pathway.

Figures 1 and 2 show portions of pathways for the sequence of movements for individual films (shown as 4 digit numbers) from one venue to the next (full sequences are shown in appendices A and B). The numbers in parenthesis indicate the number of films following a particular pathway, whilst the decimal numbers beneath the venue code gives the conditional probability of following a path to that venue. From Figures 1 and 2, it can be seen that the key difference between pathway patterns for Anzervos and Finos films is in the number of cinemas that films were shown at, which is generally greater for Finos (29 films screening at 18 different venues) than for Anzervos (24 films at 16 venues). The number of different venues at which films were permitted to launch was also greater for Finos (8) than for Anzervos (6). In addition, there are many more ‘bifurcations’ for the Finos ‘trees’ which indicates that these films were more likely to screen at a greater number of cinemas through the course of their release whilst for Anzervos these movements are generally more linear and do not persist throughout a “circuit” to the same degree. For example, the maximum number of alternative pathways a single circuit can move is three for Anzervos, where the film circuit BCBCA can move in one of three ways. For Finos circuits, a maximum of six alternate pathways can be taken for the circuit commencing BC. This bifurcation also occurs much earlier in the circuit indicating that more current films were shown more extensively throughout the Greek cinema network and that the distributors of Finos Films had working relationships with a greater number of film venues.

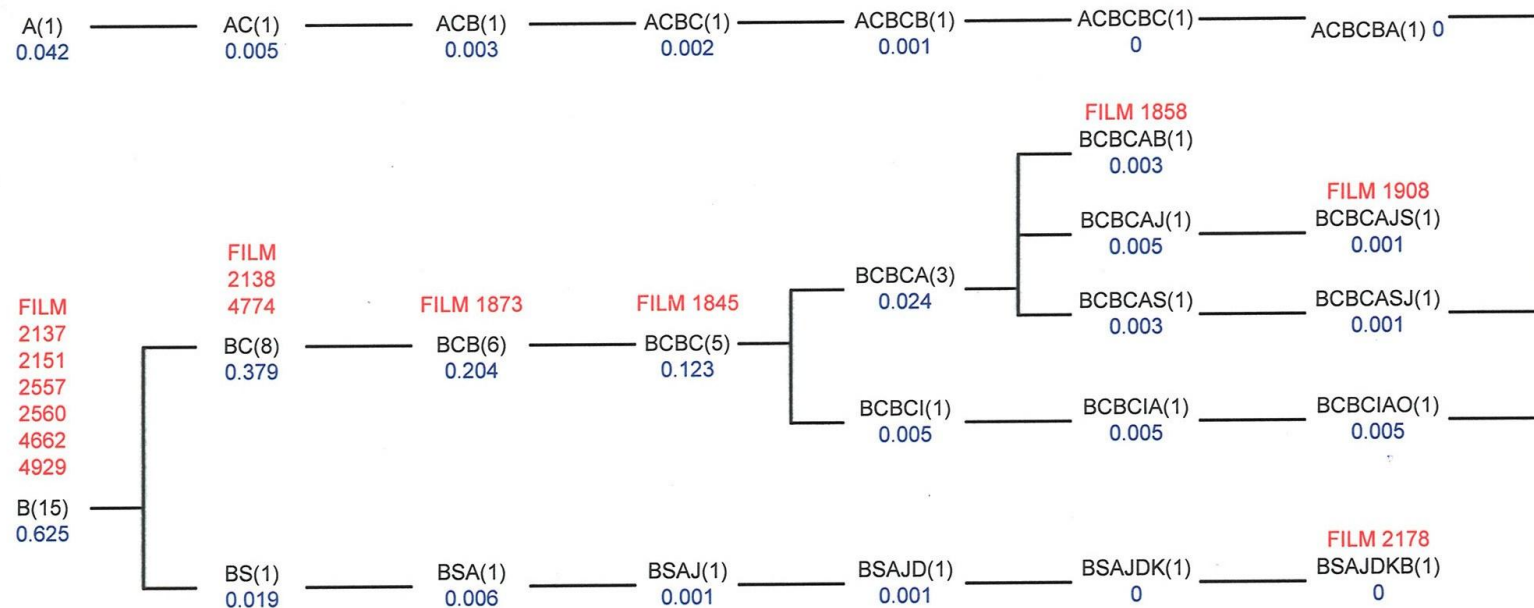


Figure 1: Portion of sequence of movements for Anzervos Films 1956-63

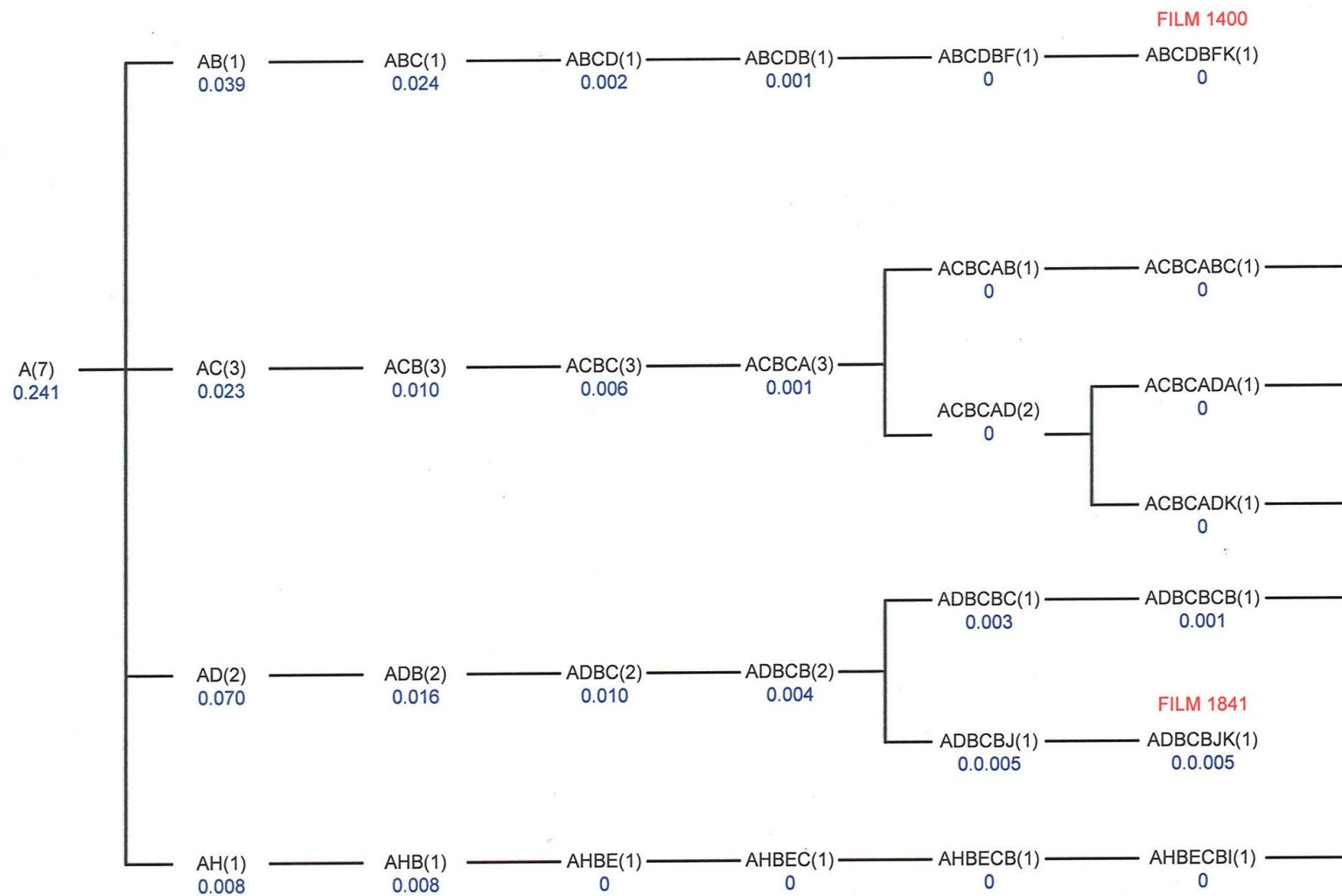


Figure 2: Portion of sequence of movements for Finos Films 1956-63

3.2 Visualising change and time at a venue

Whilst the pathways shown in figures 1 and 2, enable us to look into the sequence of venues taken, there is no way of knowing how long a particular film remained within a single venue. Figure 3 adopts a horizontal scale to show the times an individual film remained at each venue. For example in the Anzervos film “The Fort of Freedom” (film number 1858) it can be seen that this film commenced at venue B (Melbourne Town Hall) before proceeding immediately (the same day) to venue C (Nicholson Theatre) and then back to B two days later. It then moves back again to venue C 7 days later before moving on to venue A (in Sydney) 49 days later. It is here that visualising the time intervals between consecutive screenings and movement becomes difficult. The next screening is some 991 days later (from 03/04/1961 to the next screening back at venue B on 30/10/1963) more than 2 years later. Similar breaks can be seen with many films in the same way. Whilst it is common practice for “windows” (also known as “clearance periods”) or temporal intervals to occur between exclusive screening engagements, this lengthy break indicates that the film was treated to a repertory revival (not uncommon in the Australian Greek film circuit but reasonably unusual for the period in the mainstream industry (see Verhoeven 2011). To show duration at a scale of years would result in day-to-day movements becoming obscured. Whilst simple to implement and relatively easy to understand, it is in the implementation of this approach that it fails.

Anzervos Films

Ali Pasha And Mrs Frossini

B

BCB

BC

BCBC

The Fort of Freedom

B

BCB

BC

BCBC

BCBCA

Finos Films:

Music, Poverty and Pride

C

CPC

CP

Astero

B

BC

BCBC

BCBCBA

BCBCBAB

BCB

BCBCB

0

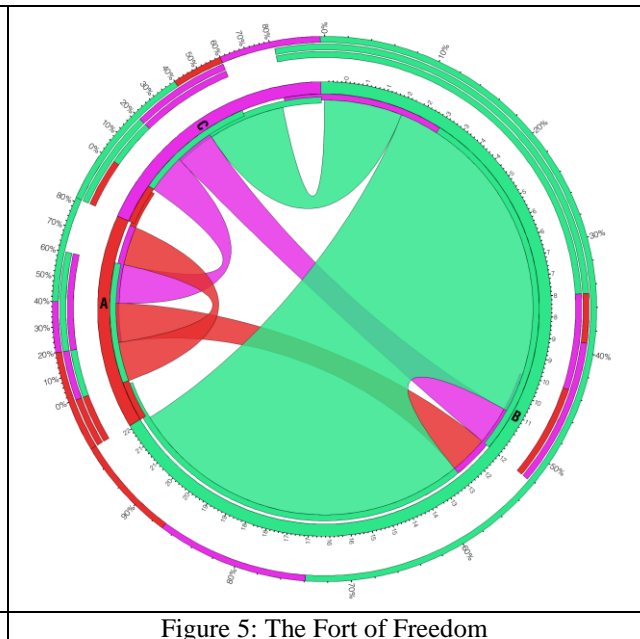
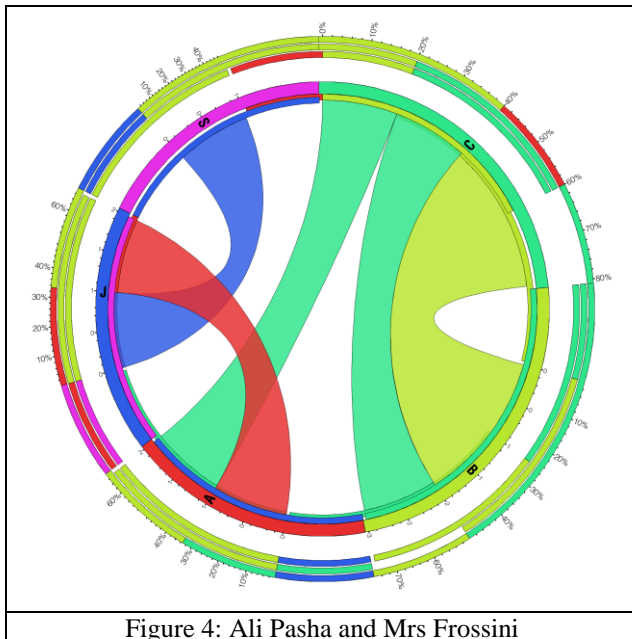
10 days

Figure 3: Temporal movements scaled along the horizontal axis for four selected films.

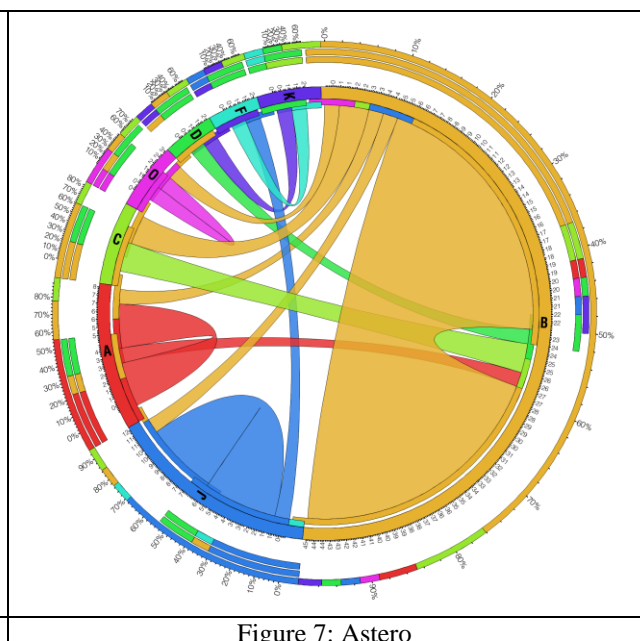
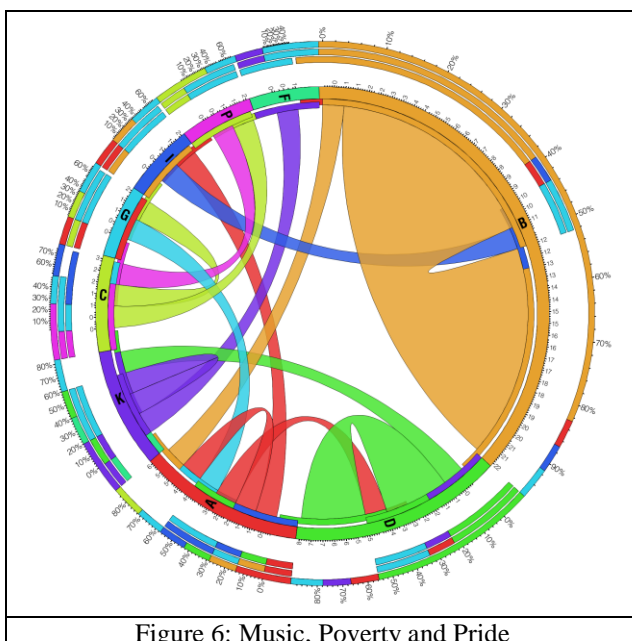
3.3 Visualising the sequence of consecutive screenings

Circos is one of a number of visualisation software packages that can be used to show relationships in a circular layout (<http://circos.ca/>). Circos was developed originally for identifying and analysing similarities and differences in genome structure and the sequencing of multiple genomes (Krzywinski 2009). The similarities in visualising genome sequences and cinema venue sequences were evident. The circular approach to represent connections between venues became easier to organise than using a linear method. Using freely available Circos software (<http://mkweb.bcgsc.ca/tableviewer/>) data was cross-tabulated for sequential moves between and within cinema venues, and the resultant text file uploaded to generate figures 4, 5, 6 and 7.

Anzervos Films:



Finos Films



These circular visualisations show how films moved from one venue to the next, and enable us to estimate the proportion of discrete movements made. For example, “The Fort of Freedom”, whilst making a number of

moves from venue B to venue C, the vast majority of screenings occurred at venue B (that is indicating a sequence or “movement from B to B). Finos Films, although demonstrating a similar B to B screening sequence, show a number of other apparently more specialised moves (say from J to F or B to J for Astero or C to P or G to A for Music, Poverty and Pride).

Hence it could be concluded that Finos Films had a much broader, or eclectic, venue repertoire than did Anzervos, who were more constrained to venues A, B and C.

3.4 Visualising the time and sequence of consecutive screenings at changing venues

Whilst the preceding visual approaches adequately show venue sequencing we have seen that temporal change is difficult to show on a lineal scale particularly where temporal scale varies. To overcome this problem we have developed two methods that enable variable temporal scales to be shown in the one diagram. In the first approach, by allocating the X-axis to show small scale time changes (of day durations) and the Y-axis to show months of years of temporal change, both scales can be easily accommodated in the one figure. For example the issue of the break in screening for the Anzervos film “The Fort of Freedom” shows the two year hiatus as a single vertical step of 33 months, whilst daily variation is shown across the x-axis.

Anzervos Films:

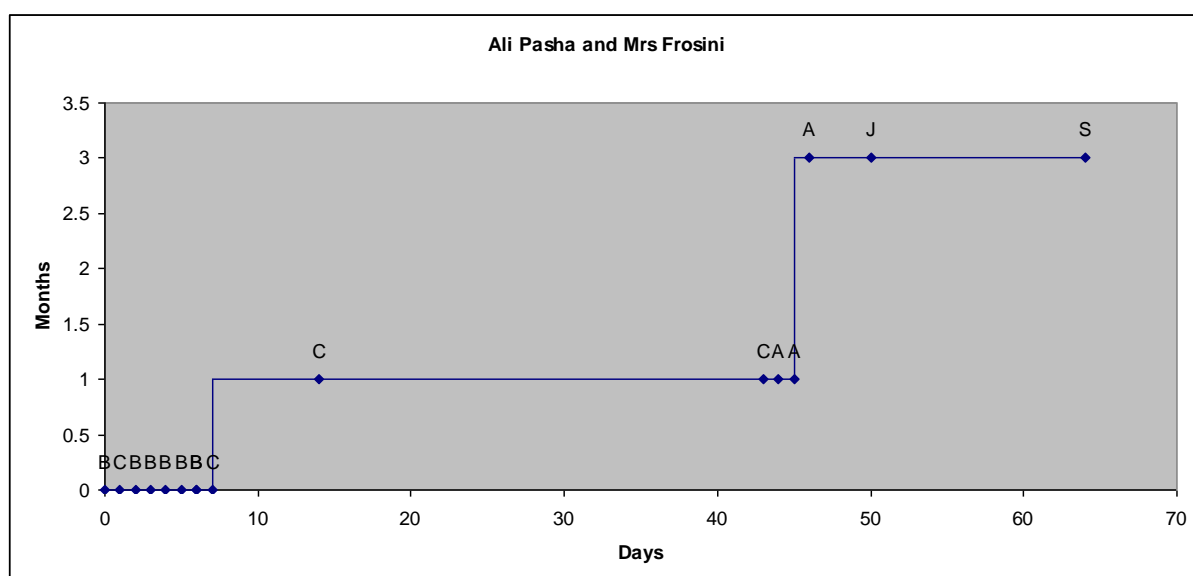
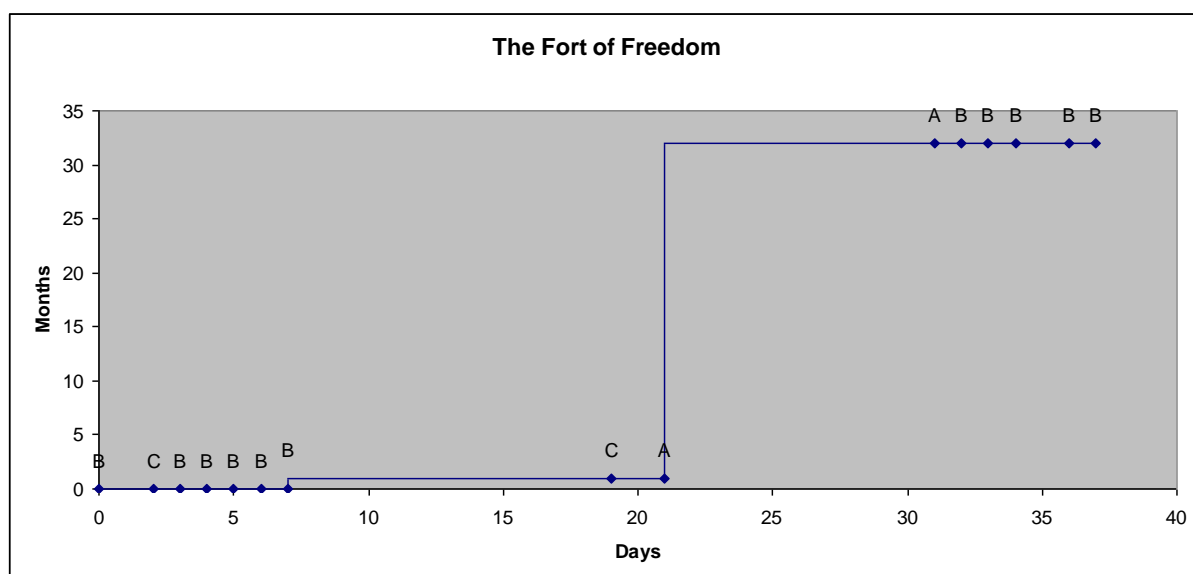
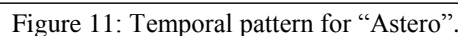
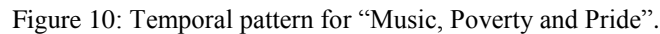




Figure 8: Temporal pattern for “Ali Pasha and Mrs Frosini”.



Finos Films:



In the second, and perhaps more aesthetic approach to visualise the temporal lag in Markov chain analysis we have used the visual metaphor of olive trees. Markov Chains are occasionally referred to as “trees” which they resemble when tilted ninety degrees. In this visualization, the lengths of branches correspond to the length of interval between screenings at consecutive venues (see Figures 12 and 13). In these figures, the olives convey the city in which films finished (where green is Sydney venue and purple a Melbourne venue). The leaf colour indicates the location of screenings (yellow is QLD, light green is NSW, darker green is VIC, dark brown is SA). The branch length is days between screenings and drawn to scale. A bushy tree indicates a ‘generative’ venue from which many films are launched into the circuit (see Figure 13). A sparse tree with few branches and olives indicates a venue lower in ranking, seldom launching films (see Figure 12). In the case of Melbourne Town Hall (Figures 12 and 13) we can determine that there was a privileged relationship between this venue and a particular type of film, namely high budget films produced by the studio Finos rather than the films of the rival studio Anzervos. This suggests that the Greek film circuit used deliberative strategies of segmentation, linking particular films to particular venues in order to create distinct market differentiation.

	
<p>Figure 12: Melbourne Town Hall Anzervos Films (Visualization: Michelle Mantsio)</p>	<p>Figure 13: Melbourne Town Hall Finos Films (Visualization: Michelle Mantsio)</p>

4. CONCLUSIONS

In this paper we have presented an interdisciplinary research project that was based around the analysis of spatial movements of a cinema “circuit” for two popular Greek film producers. Based on the results from an earlier study that used Markov Chain analysis to determine probabilities for sequences of venues that films took, this paper presents alternative methods for visualising these movements. Five different approaches were presented. Two of these satisfactorily portrayed venue sequence movements but could not adequately represent the temporal change (or lag) from one venue to the next. The final two methods presented did show two alternative methods that showed venue change as well as temporal lag. The first of these used a graphed approach whilst the second adopted a visual metaphor of an olive tree.

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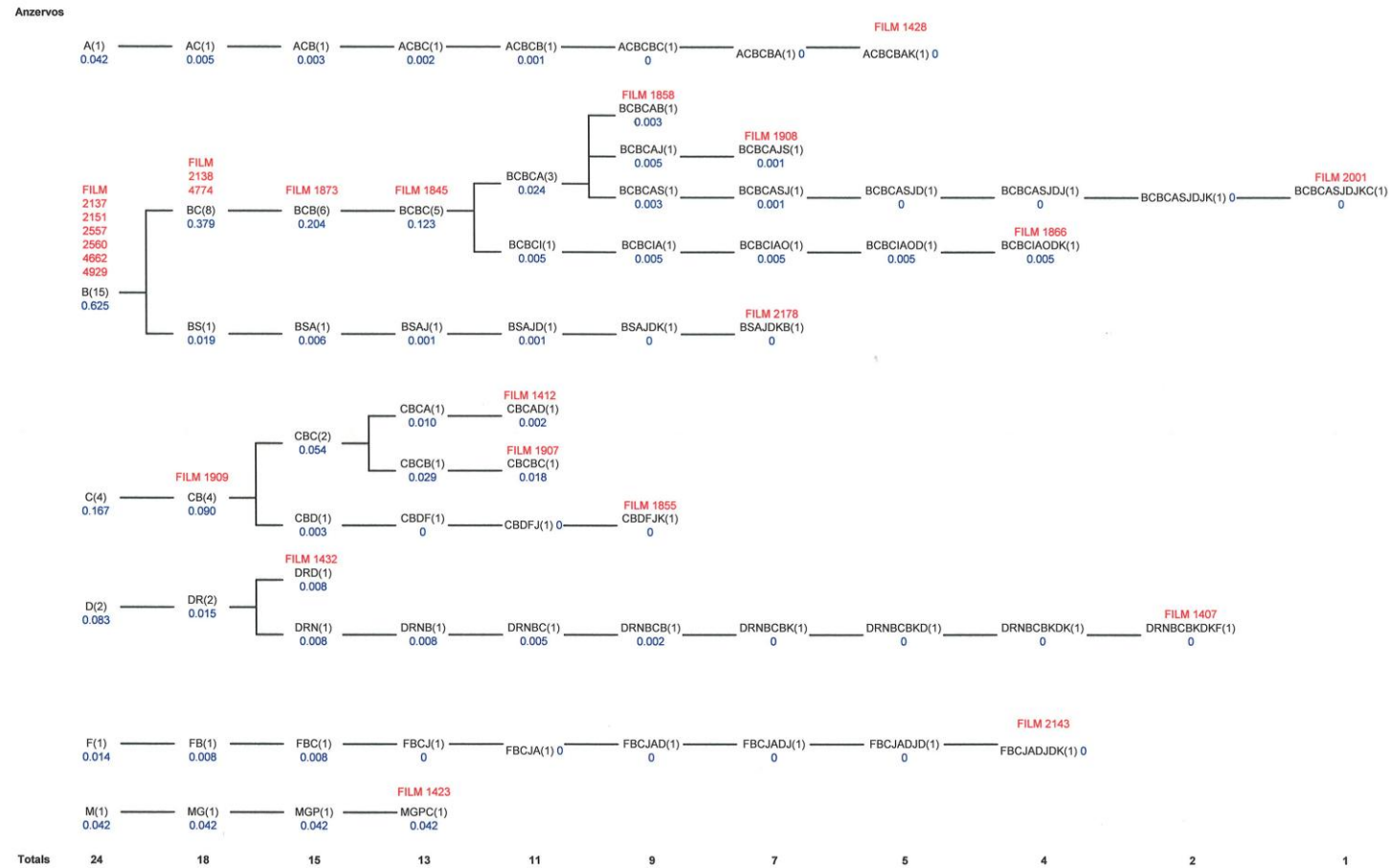
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Appendix A: Full sequence of movements for Anzervos Films 1956-63

