Cinematic rhythmanalysis of architecture: mining moving images for post-occupancy studies

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Faced with the impossibility of extensive post-occupancy studies to enhance knowledge of everyday rhythms in domestic environments, this article explores an alternative technique by tapping into the medium of fiction film. Holding at their core significant evidence of everyday life, fiction films may offer the potential to reveal how domestic practices vary between different demographics, cultures, seasons, building typologies, or times of day. This article discusses a pilot study of 106 fiction films, which were analysed via a new digital methodology involving systematic time-based attachment of meta-data in a searchable database. Utilising the ensuing cinematic data, several types of architectural rhythmanalyses are carried out as a starting point, and the concept of an architectonic of cinema is established through case studies. From the varying rhythms of everyday activities to cultural differences in the use of architectural elements, the article proposes a range of quantitative and qualitative insights achieved by strategic data mining of the global cinematic archive. It explores how cinema may reveal the ‘lived’ aspects of ‘lived spaces’ and hence offer architects a new avenue to more fully grasp the domestic everyday as architectural experience and interaction.

A case for cinematic post-occupancy studies

The way in which we interact with our domestic environments on a daily basis is rarely taken into detailed account when new homes are conceived. Even rarer are extensive studies that reveal how domestic architectures are used by ordinary people for daily activities across time and space. The field of architecture, so Alex Lifschutz and John Habraken point out, lacks: collectively maintained knowledge of the way the built environment behaves over time because they do not see it as a living organism with its own laws. We are the only profession that has no formally documented body of knowledge about the subject of its interventions. Yet we do intervene.1

The resulting risk is a ‘thudding disappointment as a gap opens up between the image of architecture and the reality of its […] occupation’.2 This can lead to a growing divide between the architectural profession and the occupants of its

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oeuvres. To prevent an ensuing ‘deep suspicion of the architectural object as a marketable commodity’, Steven Harris and Deborah Berke recommend that ‘resistance lies in the focus on the quotidian, the repetitive, and the relentlessly ordinary’. Similarly, Jeremy Till calls for ‘a critical understanding of the present in all its complexity […] to reveal the spatial and temporal inscriptions of present-day social practices […] so as to know how to operate within them’. Given the persistent lack of funding for such an — ideally large-scale and continuous — observation of the everyday in all its permutations, the question becomes: How can we find alternative routes to observe and understand the multiplicity of everyday occurrences in domestic buildings across the world?

Even in our own life, the everyday vanishes from our focus and fades into its own white noise, going by largely unnoticed. According to Richard Deming, ‘the very situations that make up the ordinary recede from our ongoing consciousness like the sound of a ticking clock that one no longer notices’ and, as a result, ‘at least one other undiscovered country is the daily life we live in’. Since the ability to examine the rhythms of the everyday is limited in real life due to our missing attention to the mundane, it becomes ‘necessary to get outside them’, for example through ‘technique’ in order to generate a renewed awareness — in line with Henri Lefebvre. Given the impossibility of extensive post-occupancy studies of everyday rhythms, an alternative technique explored in this article via a pilot project is to systematically extract the evidence of the ordinary from one of the most proliferating art forms of the last century — the medium of fiction film. Such a strategy, so we propose, could enable a deeper understanding of patterns of inhabitation and may reveal such nuanced facets as the gender balance at play in domestic activities (Fig. 1), the influence of age on habits or the impact of socio-economic circumstances.

Tapping into this unintentional cinematic archive of post-occupancy data was the aim of our AHRC-funded project CineMuseSpace: A Cinematic Musée Imaginaire of Spatial Cultural Differences (2017–2020), a pilot cinematic cross-cultural study of everyday life in domestic environments. The project was the first large-scale filmic study of domestic everyday life across several cultures and it was based on the concepts developed in Cinematic Aided Design. The project turned cinematic daily rhythms into data, in order to analyse patterns of repetition and disruption in the portrayed interaction with domestic spaces. The pilot study zoomed out from the internal analysis of singular films to a lateral analysis across films, times, and cultures to explore the bigger pictures that may be revealed. What could films suggest as answers to a variety of questions such as: At what time and how often do people bathe or wash themselves? How regularly do families eat together in different countries? How do teenagers use windows in the summer? How do all of these activities recur or differ by culture?

Central to our pilot project was the notion of spatial post-occupancy potentially being revealed in the filmic medium. This is a poignant consideration given that the architectural profession acknowledges that in practice ‘its take-up is very low, with only 3% of British-based architectural practices regularly undertaking post-occupancy evaluation’. This is despite being generally acknowledged by the profession that understanding how a building is used is ‘illuminating’.
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Our own take hence explored a different form of post-occupancy, since filmmakers are clearly not interviewing users as practitioners would — instead they show on the screen how buildings might be used in real life.

Cinema, as Louis Delluc notes, ‘alone offers […] the spectacle of real human activity’ and has the ability to capture ‘the profound beauty of the passing moment’ that is everyday life. Throughout history, cinema has interacted with architecture and domesticity — from the recording of existing buildings to the construction of new domestic environments for the camera. In this process, cinema has swung its pendulum from extraordinary imaginations of inhabitation (such as in German Expressionist films of the 1920s, in which architecture came to play a character in its own right) to a more direct, but no less orchestrated, capturing of everyday life in cities during the city symphony movement. Through these diverse avenues — some more abstracted than others — cinema brought renewed attention to the everyday life of buildings that would have otherwise gone unnoticed. As Anthony Vidler, drawing on Walter Benjamin, concludes, ‘the only way to render architecture critical again was to wrest it out of its uncritically observed context, its distracted state, and offer it to a now attentive public — that is, to make a film of the building’. This here also touches on — but is not to be confounded with — the issue of realism. As Colin MacCabe points out, in film, ‘realism has been the dominant aesthetic since the Second World War’, aiming to ‘represent reality as effectively as possible’ — ‘the possibility as such of the representational relation is taken for granted’. Summarising the views of early film theorist André Bazin, MacCabe remarks that ‘what is in question is not just a rendering of reality but the rendering of a reality made more real by the use of aesthetic device’. In this vein, our project hoped to make post-occupancy ‘critical again’ and open up a potential, alternative path towards exploring architectural inhabitation, made more real by the application of various aesthetic and narrative devices, through its cinematic rendering.

Our pilot study functions as an initial step in this exploration. Here, we specifically focused on films released after 1950. All films were carefully assessed to extract even the smallest nuggets of post-occupancy data across the varied spectrum of our canon. Even an abstract scene, so we hypothesised, might contain relevant information as to the movement of bodies in time and space, the use of appliances, or the customs of inter-human relationships in everyday life.

This cinematic staging of the domestic ordinary in fiction films engages directly with the everyday and acknowledges its own artificiality — in contrast to documentary films and news items, which cloak their artificiality and subjectivity as part of their discourse. Fictional cinematic narratives derive from, and often begin with, the everyday, offering an anchoring point and baseline to the audience before dramatic disruptions set extraordinary events in play. For example, in The Big Shave (dir. by Martin Scorsese, 1967), the ordinary beginnings of the daily ritual of shaving — shown with meticulous precision over the film’s first three minutes — can reveal much about the intrinsic details of such a mundane activity in its cultural and temporal context, from the accessories used to the spatial situation and the routine gestures performed.
everyday routines are not the main focus, filmmakers recurrently fill the background of their mise-en-scène with the banal to set the stage for the narrative occurring in the foreground. A scene in the Indian film Court (dir. by Chaitanya Tamhane, 2014), for example, shows the protagonist Narayan leaving a building after finishing a tutoring lesson. Here, the contextual domestic setting offers an ample display of everyday activities in the cultural context of Mumbai’s lower-class housing units, the chawls. Children play on the floor of the common outdoor space, while men engage in a board game, and a woman sorts rice from stones, whilst being surrounded by chili and laundry drying (Fig. 2).

These examples illustrate that fiction films hold at their core significant evidence of everyday life. Furthermore, films can reveal how the practices of everyday life have changed over time and vary between different cultures. As Lefebvre notes, ‘[o]ld films show that our way of walking has altered over the course of our century’, and ‘[e]verybody knows from having seen or appreciated this that familiar gestures and everyday manners are not the same in the West (chez nous) as in Japan, or in Arab countries’, as these ‘gestures, these manners, are acquired, are learned’. As societies introduce work patterns, transport schedules, best practices, and other factors such as globalisation and advances of everyday technologies shape daily existences around the globe, the medium of film has captured countless situations that constitute these manifold and changing everydays across countries.

In his treatise on rhythmanalysis, Lefebvre muses on the sensitisation to these rhythms of the everyday through the use of new interdisciplinary techniques. Will the (future) rhythmmanalyst have to professionalise himself? Will he have to set up and direct a lab where one compares documents […]? […] He must recognise representations by their curves, phases, periods and recurrences. In relation to the instruments with which specialists supply him, he pursues an interdisciplinary
Similarly, the CineMuseSpace project developed a new, interdisciplinary methodology to strategically unearth the everyday rhythms preserved in the medium of cinema. Tapping into the rapidly growing field of digital humanities, the project developed a digital database for the time-based annotation of films to serve both quantitative and qualitative insights in various potential areas of post-occupancy study.

The CineMuseSpace database allowed the project to upload hundreds of feature films into a shared research platform. This digital research tool was created in collaboration with Jan Gerber and Sebastian Lütgert, building on their Pan.do/ra database technology, and the data mining was supported by Nishad Sohoni. The project’s geographical focus was primarily set on Europe, USA, China, and Japan, with an auxiliary pilot project entitled CineGenus (2019–2020) covering India. The filmic canon for the study was selected based on a timeframe spanning from 1950 to the present day, and each film had to have over 15% of its total running time focusing on the domestic everyday. Additionally, the narrative action had to be set in the film’s time and country of production. This resulted in a selection of a test set of 106 fiction films, which were then screened for domestic everyday life content. The filmic fragments containing everyday life material were extracted through time-based attachment of metadata, including keywords, analytical free-word text, and still images (Fig. 3). The application of a consistent list of keywords to code everyday-life activities across the pool of films, resulted in the extraction of 6584 film clips.

It requires a degree of interpretation and observation from the viewer to gather all this data on display, a form of spatial ethnographical study. Having first surrendered to the pleasures of the film, and beyond perception alone, we must apply our judgement to fully grasp what a film has to offer. We must watch with our voluntary attention, instead of letting the movies direct us, suggests Thom Anderson in *Los Angeles Plays Itself* (2003). It implies watching a movie over and over again. Only then will a multiplicity of meanings appear. Cinema provides a way of reasoning on the screen; it is a thinking tool.

But such an interdisciplinary pilot study, as carried out in CineMuseSpace, also comes with its own limitations, ranging from issues of accuracy in the source material to constraints introduced by the scope and methodology of the study. Dealing with cinematic material inevitably brings various factors to the process. The filmic production unites multiple crew members with diverging life experiences that all influence the everyday that is constructed on screen — for example, an affluent director might tell the story of an underprivileged youth. Activities will also be aesthetically treated for the eye of the camera, spatially reconfigured due to the filming logistics, or narratively enhanced for dramatic purposes. Treatment of the everyday also diverges by genre, with plot devices, such as action scenes, musical numbers, or shocking horror moments, invariably shaping the portrayal of the mundane. As a result, the everyday occupancy information is not always straightforward to discern, as it can operate across various layers of the material at hand and in different
manners. To account for this, the application of a multi-layered analysis system proved useful for our project. For example, CineMuseSpace introduced a rating system of both the ‘everydayness’ of actions and the ‘everydayness’ of environments across the temporal fragments of each scene, and each activity was split into a separate analytical segment (sometimes as short as one second of a door being slammed). This enabled us to retrieve all relevant threads of post-occupancy information and account for possible aberrations.

Within a limited pilot study, a further selection had to be made as to the films analysed. Given the temporal spread of seventy years that the project handled, only a small number of films could feature for each decade, and not all countries could be consistently represented. Factors such as availability, especially of foreign films, had to be factored into the sampling process. A major criterion applied in the final selection was the amount of domestic everyday scenes featured across the temporal spectrum of the film. We prioritised films with a high everyday content of more than 80%. This allowed us to collect the highest possible yield of domestic occupancy data across a limited pool of films. However, it also brought about an unintended bias of the study towards the movement of ‘slow cinema’, which became heavily
represented in the sample pool from all geographical regions. It also has to be acknowledged that a limited data set of 106 films cannot account for the diversity of everyday experiences that coexist in a country, or even within a single building, and our study is only an initial step in what we hope to be a much wider and detailed application of cinematic architectural methods.

Our initial study chose to concentrate on the home as the ideal vehicle for revealing spatial cultural differences and similarities in everyday life, as it best reflects ‘how profound is everything involving the house, the “home” and domesticity, and thus everyday life […] the loftiest values of art, ethics and culture’. In the course of studying our filmic canon, we identified a cross-cultural taxonomy of dwellings, most of them anonymous and banal everyday homes. One of the few exceptions is Exhibition (dir. by Joanna Hogg, 2013), where we follow D and H’s circadian rhythms gently unfolding over ten days in a house that harks back to the early Corbusian days of the Modern Movement. The powerful presence of the house is both a commentary on Modernism and on everyday life in a Modern house. It reveals Modernism as lived space and provides a unique understanding as to how Modernism might work on an everyday-life basis. It is as if Le Corbusier’s teaching came alive; it is a gift for architects.

In all cases, the home is the encounter between everyday life and an everyday environment. Every film holds some revelations as to how we may interact with the everyday environment — and invariably does so in slightly different ways. The everyday is the backbone of our lives, it structures our lives, it is life itself. We are made of those little gestures that are so peculiar to every one of us. It is part of our DNA and no two people have the same daily routines, despite potentially inhabiting the same type of flat or house. How we use stairs, open doors, look at or through windows, sit on a chair, or eat a meal will differ from person to person. And while we tend to think that the environment shapes us, the reverse is also true. Benjamin states that ‘the apartment, the home becomes a sort of cockpit. The traces of its inhabitant are moulded into the interior’. In other words, everyday life moulds the fabric as much as the environment moulds us. The constant interaction between the two, the chafing and rubbing of our bodies onto the fabric of the building, gradually produces traces. The stone steps of our homes are gradually eroded by the constant passage of its inhabitants; the bannisters on the staircases lose their colour where our hands have been in daily contact; the walls acquire marks of our passage — finally, the physical structures of our environment incorporate our presence. In other words, our everyday environment embodies our everyday life. This encounter between everyday life and the everyday environment imprinted in the fabric of the building can be rendered visible and defamiliarised in films — for example, in Ballet Mécanique (dir. by Fernand Léger, 1924), where an old woman mounts and remounts the same staircase.

There are many different ways of classifying the rich filmic material that gives potential indications of everyday inhabitation. One of them is to derive a typology of the everyday home, for example, a cinematic typology of terraced and semi-detached houses. While this form of cataloguing is clearly useful in
revealing broad societal trends, we must resort to close scene analysis to grasp the potential spatial ethnographical angle that film may offer. A key example is Jeanne Dielman, 23, Quai du Commerce, 1080 Bruxelles (dir. by Chantal Akerman, 1975). The film follows the life of a middle-aged woman living in a flat in Brussels over three days. The careful and detailed spatial occupancy could be interpreted as making a reference to Ernst Neufert’s Architects’ Data of prototypical home layouts. However, our interpretation can be construed as a novel form of post-occupancy studies that goes far beyond Neufert’s conventional, Western vision. By extending this analysis to our wider film corpus, we were able to create a catalogue raisonné of everyday-life activities, a first effort towards a cinematic encyclopaedia of lived domestic situations, a form of ‘diversified’ compendium of living as revealed by the medium of cinema across a range of cultures (see Fig. 4).

We also took inspiration from another model of architectural standardisation, Rem Koolhaas’s Elements of Architecture, which formed part of the Venice Biennale of Architecture in 2014, an exhibition that presented ‘micronarratives revealed by focusing on the scale of the detail or the fragment […] used by any architect, anywhere, anytime: the floor, the wall, the ceiling, the roof, the door’. Concentrating on a few key building elements — walls, doors, corridors, stairs, floors, and windows — our ‘architectonic of cinema’ extends on this precedent by chronicling how the varied functions of architectural elements are cinematically practised and rendered visible, casting light on the components of buildings that are frequently taken for granted. However, by adding bodily actions to architectural elements, they stop being passive nouns; architectural tectonics become imbued with affect and emotions on the cinematic screen. By adding time and space to building elements, they become verbs in actions, a new way of construing architecture. The architectonic of cinema is not taught in schools of architecture, but perhaps it should be.

Part I: a cinematic rhythmanalysis of the everyday

CineMuseSpace utilised a detailed keyword ontology to examine the built environment, its associated activities, inhabitants, and the impact of rhythms in the sample pool of films. A main branch of this ontology focused on the rhythmanalysis of the cinematic everyday, specifically the circadian rhythms found in films. Here, in line with Lefebvre, ‘[i]t is a question of hunger and thirst, sleep and waking, sex and intellectual activity, etc’, and their repetitive rhythms. According to Lefebvre, such a ‘rhythmanalytical study […] deepens certain aspects’ of everyday life, such as those rhythms ‘modeled on abstract, quantitative time, the time of watches and clocks’ and the interacting ‘great cosmic and vital rhythms: day and night, the months and seasons, and still more precisely biological rhythms’. Accordingly, four analytical categories were introduced in the project’s methodology to tag and dissect the domestic rhythms embedded in the filmic material (Fig. 5). Keywords were applied to mark the following:
body rhythm: encompassing the bodily patterns of respiration, hunger and excretion, and sleep and sleeplessness, among others. These markers are used until ‘[d]isorder and illness, at the worst death, take over the operation’ — signified by keywords, such as ‘disruption, illness’.

Figure 4.
Extracts from the CineMuseSpace Catalogue Raisonné of Everyday Life Activities
As these keywords combine with the annotation of everyday activities (from an ‘everyday’ branch of the ontology), it becomes possible to discern the alignment or misalignment of natural, circadian rhythms with the concepts of abstract time introduced by society, such as work and school hours and transport schedules. Following Lefebvre, ‘[c]yclical repetition and the linear repetitive separate out under analysis’, but the application of a targeted rhythmanalysis ontology to the film clips further reveals how they ‘interfere with one
another constantly’, giving ‘rise to compromises, sometimes to disturbances’.\(^{31}\)

Based on the meta-data created in the annotation stage of the project, several types of rhythmanalysis can be generated as a result: from internal examination within a single film, to lateral investigations of spatio-temporal patterns and differences across films and cultures, and even archaeological explorations of change over time.

In an internal investigation, two modes of rhythmanalysis ensue from retrieving the data relating to the rhythmic factors of everyday life within a singular film: the differing repetitions of one activity and the space–time diary of a set of characters. An internal, qualitative analysis of repetitive rhythms related to one activity, for example, reveals the subtle changes to the activity of waking, such as in Paterson (dir. by Jim Jarmusch, 2016). In the eight days of Paterson’s life that play out on screen, he exhibits a clear morning routine — waking up naturally at the same time every day, eating the same cereal at the kitchen counter, and leaving the house in his uniform for work. As the week progresses, disruptions creep in, illustrated visually in the film’s mise-en-scène via the diverging waking positions of the main characters (Fig. 6). We find him distracted on Thursday morning by the revelation that his partner Laura knows about his nightly bar visits. On Friday, he oversleeps and finds her baking in the kitchen instead of lying in bed. Finally, all the little disruptions build up towards the weekend, which sees Paterson’s life thrown out of kilter by the loss of his poetry notebook. Incapable of sleeping, we witness him awake in bed with emotions running high, until his routine is re-established by the gift of a new notebook.

The internal rhythmanalysis brings to light not only the activity stages of his daily routine, but furthermore the little unpredictable differences in ordinary repetition, as ‘there is no identical absolute repetition, indefinitely […] there is always something new and unforeseen that introduces itself into the repetitive: difference’.\(^{32}\)

A dissection of the rhythms of the everyday can also serve to build up space–time diaries illustrating routines of the characters, such as Jeanne Dielman’s routine of cooking, cleaning, eating with her son, and prostituting herself in the afternoon. Even if less prominently featured in the narrative, these snippets can be gathered either in the duration of a single day, as in the case of the weekend day of the unnamed Berlin-based family depicted in Das merkwürdige Kätzchen [The Strange Little Cat] (dir. by Ramon Zürcher, 2013), or aggregated across a range of days or months, such as the slowly derailing routines of Tom and Gerri Hepple laid out over the course of Another Year (dir. by Mike Leigh, 2010).

Both modes of analysis can be expanded into a lateral investigation across films and cultures to build up compiled space–time diaries, such as a global diary of the daily activities of women with its microscopic differences. From waking, washing, and making breakfast to cleaning, cooking, playing with the children, having dinner with the family, watching television, and going to sleep, the cinematic everyday of women can be recorded across the range of films.
Beyond the rhythms of the everyday, a collection of space–time diaries across films may allow to carve out the main activities that constitute daily life across the globe. These can then be compared in depth to unearth potential insights into spatial cultural differences, including how the differing sizes of bath tubs, spatial bathroom layouts, building occupancy, or gender and age influence the activity of bathing in different countries (Fig. 7).

Another possible route of analysis, is an archaeological approach, focusing on the changes in everyday behaviour brought about by factors such as globalisation and the evolution of technology. To cite just one example, this approach allows us to track the growing mobility of communication activities in the home introduced by the change from static landlines to mobile phones and laptop video conferencing, with conversations now taking place on stairs, beds, or even kitchen floors.

Part II: quantitative and qualitative insights into architectural elements

A filmic analysis of the various architectural elements in different countries holds the potential to reveal the diverse functions associated with windows, walls, doors, or floors in everyday life, from their more hands-on to their symbolic roles. Going beyond ideas of ventilation and lighting, filmic windows, for example, expose manifold permutations of the activities of
observing, communicating, or escaping. Using a quantitative approach to cinematic architectural elements can hence yield insights through a range of avenues, for example into the most utilised or underutilised elements in everyday life, the diversity of actions linked to individual architectural elements and the hierarchy and prevalence of these actions in domestic daily scenarios. We have here chosen to illustrate our initial findings by focusing on key architectural elements that produced a high yield of cinematic data.

A cinematic rhythmanalysis of architectural elements could potentially give an indication of the most exploited architectural elements by time of day or season. For example, mapping the most popular architectural elements in the filmic scenes by summer and winter (Fig. 8) reveals that the door is the dominant element of the winter, while floor and window are dominant elements of the summer. The door in these winter scenes often serves to enter the warmer interior environment. Similarly, the fireplace is only given screen time in the winter, when its warming function benefits everyday life. In contrast, elements serving cooling functions, such as windows for ventilation and colder floor surfaces, rise in popularity during the warmer summer months. The window is used more actively in the summer with over 350 instances across the 106 films, compared with just over 150 instances in the winter. The floor is highly utilised in the summer (around 530 instances), while the winter only sees limited floor usage, primarily in Japan (100 instances). Such a simple analysis of the filmic data, not only gives us information on the architectural elements that everyday life seems to centre around according to season but further demonstrates the validity of using such an abstract cinematic data source, as results appear in line with real-world thermal phenomena and observations.

Going beyond an overall rhythmanalysis of architectural elements, the cinematic data can further serve to measure the frequency and diversity of actions associated with each key element. Taking the example of the door (Fig. 9), it can be examined that films not only highlight main activities, but also render visible the diverse uses that inhabitants have developed for the door. In terms of principal activities, the data highlights that ‘walking through’ is the...
most recurrent action involving the door, with over 1000 scenes including this activity in the analysed corpus. However, when it comes to the second-ranking activity, an interesting insight occurs. The act of ‘opening’ doors is perceived as almost equally prevalent, coming in at 920 instances, but in contrast, the act of ‘closing’ doors only appears in half the number of instances, 480 times. This filmic data echoes the fact that privileging the entrance is reflected in the architectural vocabulary — we refer to the entrance hall and not the exit hall. Similarly, the architectural drawing conventions in plans show doors opening inwards, rarely outwards. The cinematic data in addition suggests that we most consciously experience the door in the act of getting access to places or new insights, while the act of closing the door behind us seems to register less consciously — except in situations of extreme emotions. Such an instance can be found in L’amie de mon amie [Boyfriends and Girlfriends] (dir. by Éric Rohmer, 1987), when Blanche enters her apartment in upset and pushes her body against the door to close it, before throwing her keys on a table, kicking off her shoes, and tossing her bag on the floor. Here, the scene exemplifies how the door acts as a protective barrier between our private space and the public realm, as the character effectively shuts the door on the world to finally let her emotions out. Emotional connection to architectural elements, according to the cinematic data, seems to play a role in our conscious encountering and awareness of them in different uses. A connected correlation can be found in the act of ‘(un)locking’ doors, where for every door being ‘locked’ an equivalent of 2.3 doors is ‘unlocked’ on the cinematic screen.

Focusing on the diversity of uses, our data mining suggests that over sixty different actions are associated with doors in everyday life — at least according to cinema (Fig. 10). These actions highlight disparate activities, such as ‘leaning against’ doors, ‘shouting through’ doors, ‘knocking on’ or ‘touching’ doors. Further, they reveal the range of intensities in related actions — from simple ‘shutting’ to ‘slamming’ doors. They also highlight directionality of use (‘in’, ‘through’, ‘out of’, etc.), and even movement velocity — from ‘sneaking through’ to ‘hurrying out of’ doors. In addition, unexpected actions become visible through this cinematic analysis, revealing women ‘posing in’ or physically
‘blocking’ door frames for men, inhabitants ‘marking’ or ‘painting’ door surfaces for individualisation, children ‘playing through’ open doors, and the ‘sliding’ of letters under closed doors. As a result, for each architectural element, cinematic data may suggest which actions have the highest or most obscure recurrence, and what their potential permutations are.

One often overlooked aspect of the door is the threshold.

Transitional, symbolic and functional, the object ‘door’ serves to bring a space, the space of a ‘room’, say, or that of the street, to an end […] The threshold or sill of an entrance is another transitional object, one which has traditionally enjoyed an almost ritual significance (crossing a threshold as analogous to passing through a lock, or ‘graduating’). The way the threshold is treated cinematically varies according to culture and temporal context. In the Taiwanese film Gu ling jie shao nian sha ren shi jian [A Brighter Summer Day] (dir. by Edward Yang, 1991), the threshold retains its ritualistic significance, as guests idle in the open door without entering and are joined within the threshold by the head of the household for a strained conversation. Filmed in one static take, the threshold here signals the host’s reluctance to let them pass further into the family’s private realm. In the UK,
Figure 10.
Word cloud of actions associated with doors in films; font size correlated with the number of instances

Mike Leigh often uses the door threshold as a site of tense and emotional scenes — as in the scene between Jason and Samantha in _All or Nothing_ (2002); but perhaps even more poignant is the scene between Ronnie and Mary in _Another Year_ (2010). Performed in shot/reverse shots across the dialogue, the cinematic door signals what Bachelard calls ‘an entire cosmos of the half-open’ — a place of hesitancy between cold and miserable versus safe and cosy. Thresholds are neither here nor there; they are places of indecisions and rejections, but also of freedom, as in the freedom to stay or leave. Thresholds are not really designed, as they are the bits in-between two spaces, but they are real places that are sometimes temporarily inhabited, places of possibilities that may or may not occur. They only exist as a simple line on a drawing, they are almost invisible and immaterial in plan, and yet they are very real. On the other hand, cinema has long inhabited and experienced such transitional spaces. The threshold’s full architectural potential has yet to be investigated as an element of architecture in its own right.

Cinematic data may also hold the potential to reveal _cultural differences_ in the use and perception of architectural elements. A particular case in point is the use of the floor in everyday life. Out of 901 instances of floors shown in the project’s scenes in total, 753 are from films produced in China and Japan. While the floor is the architectural element most used in everyday life as we stand and walk around our domestic environments, it is seldom actively used for other purposes in the cinematic examples from Europe and the USA.
Further, in these films the floor is often omitted from cinematic framing, due to
the eye-level height employed by the camera whilst centring on domestic activi-
ties. Hence, even if inhabitants are sitting on chairs rather than standing, the
floor is not captured by the filmic gaze, as inhabitants rarely get physically
close to the floor. In contrast, Chinese and especially Japanese scenes show
over 500 instances of inhabitants sitting on floors and around 280 instances
of kneeling. In Japanese films, both polite and informal forms of squatting
on the floor are central to everyday activities, ranging from eating around
low tables and watching television to children playing with toys. This is illus-
trated in Dare mo shiranai [Nobody Knows] (dir. by Hirokazu Koreeda, 2004),
where much of everyday life plays out on the floor as a group of siblings
grow up without adult guardians. Sister Kyoko regularly plays with her toy
piano on the tatami mat and her brother Shigeru with his cards. The siblings
sleep, eat meals, and read story books to each other on the floor, while
laundry is also folded on the tatami. As Kyoko accidentally spills her mother’s
nail varnish on the floor, the red trace in the wood grain of the architectural
element even comes to signify the siblings’ longing for parental care.

In Europe, in contrast, the few instances of inhabitants squatting on the floor
seem to reveal a physical incompatibility of bodies trained for furniture-sup-
ported sitting — resulting in various slouching poses and raised buttocks on
screen. Relaxation or physical practicality is, hence, rarely associated with the
element of the floor. Upon zooming in on these few filmic instances, it can
be noted that these scarce interactions with the floor ensue from unfortunate
circumstances in the narratives, rather than a deliberate wish to encounter the
element of the floor up close. In the Finnish film Kauas pilvet karkaavat [Drifting
Clouds] (dir. by Aki Kaurismäki, 1996), the main characters Ilona and Lauri
Koponen are forced to work on the floor due to financial struggles, which
lead to their furniture being repossessed. The only situations during which
floors are utilised more actively in European and American scenes, so the cine-
matic data suggests, are times of crisis. In the Swedish Höstsonaten [Autumn
Sonata] (dir. by Ingmar Bergman, 1978), little Eva is upset about the departure
of her mother and curls up on the floor in a corner. Extreme emotions lead to
unusual uses of the floor similarly in The Florida Project (dir. by Sean Baker,
2017). Here Halley, a single mother living in a motel with her six-year-old
dughter, stomps on her floor in anger and frustration to annoy her downstairs
neighbours. It seems that, in times of turmoil, the floor sees a détournement of
conventional use.

Cinematic data also highlights how architectural elements have varying con-
notations linked to inhabitant privacy and authority between cultures. The door
delivers an exemplary case study of this. In the USA, the door to a child’s room
remains a barrier of privacy that parents respect to a certain extent, as they
announce themselves before entering and frequently request permission to
do so in various scenes. This is illustrated in Boyhood (dir. by Richard Linklater,
2014), as mother Olivia rushes in anger and concern towards the bedrooms of
daughter Samantha and son Jason, but still knocks on the teenagers’ doors
before entering — even when the door is already standing open. In China,
the importance of authority and a different spatial understanding of privacy can be found, as parents open the cinematic door to their children’s bedrooms and enter without prior announcement or permission. In *Qiao zhe yi jia zi* [*What a Family*] (dir. by Haowei Wang, 1979), Mr Hu and his wife barge into their son’s bedroom while he is still asleep. Here, the authority of the parents to manoeuvre the architectural elements of the everyday trumps the privacy afforded by them to other family members according to the film. As the wife jokingly reminds Mr Hu: ‘Don’t exhibit your authority at home’.

Initial findings of cultural variances in the cinematic data also appeared in the demarcation of personal space associated with the window. In various European and American scenes, the window is suggested to extend the private space of the domestic owner. With the privacy of the inhabitant radiating outwards from this architectural element, it is often approached only from a distance. Hence, communication through windows recurrently takes place remotely, and tools are utilised to facilitate the transmission of messages. In *Le fabuleux destin d’Amélie Poulain* [*Amélie*] (dir. by Jean-Pierre Jeunet, 2001), young Amélie and Nino communicate with the outside world by using a torch and sun reflection on the glass. In contrast to this, Chinese scenes recurrently portray people contacting through the window directly by approaching from the outside to a close proximity and looking in. An example of this can be found in *Da qiao xia mian* [*Under the Bridge*] (dir. by Chen Bai, 1984), when Quin Nan’s uncle knocks on the window during a rainy day, pressing his face against the wire surface. In these Chinese filmic instances, windows are represented more as a public access-point that can be approached, peaked into, and knocked on, without regard to ownership. These initial findings suggest cultural variations in the cinematic treatment of architectural elements across different countries.

The *CineMuseSpace* project also produced an analysis of emotional associations of architectural elements. The project employed an adapted version of the Self-Assessment Manikin (SAM)\textsuperscript{36} to apply a valence and an arousal rating to the cinematic segments based on a scale of 1–5 (sad to happy, and calm to aroused). This served to identify the range of emotions and their intensities in association with lived spaces, activities, and architectural elements in the cinematic narratives. The overall findings indicated that all architectural elements had a slight tendency towards negative emotional portrayals; as a result, the quantitative analysis was not able to reveal conclusive differences between elements.

In contrast, a qualitative analysis of the scenes tagged with extreme emotions, such as ‘exceptionally sad’, gave more useful insights. An analysis of ‘walls’ by valence 1 (extremely sad) and arousal 1 (calm) revealed that this architectural element was often used as a visual metaphor for the entrapment of women in everyday life in European narratives. Female characters, such as those in *Elena* (dir. by Andrey Zvyagintsev, 2011) and *Das merkwürdige Kätzchen*, are staged on the frontal plane of the shot with a wall immediately behind them, producing a flat space limited by the wall that suggests inescapability and monotony. Often these shots remain static, both in the camera...
movement and character activity, with women caught up in deep thoughts on the circumstances of their everyday life. In contrast, scenes ranking at 5 on both emotion scales (extremely happy and aroused), show walls in active use, often related to creativity, ranging from Jason in *Boyhood*, showing off his wall graffiti to another student, to the father in *Le fabuleux destin d’Amélie* relishing in the removal of wallpaper.

Windows act as the metaphoric counterpart to the wall, symbolising the mental escape gained by looking out of them. Here, again, we find a privileging of one directionality in the cinematic use over its counterpart. In contrast to doors that are predominantly entered, windows are most utilised in an outward direction. A statistical analysis reveals that around 95% of cinematic cases show the act of ‘looking out’ of windows (Fig. 11). As suggested by Yoshiharu Tsukamoto, the ‘timeless essence of a window lies in its ability to be practical and, at the same time, bring a poetic sense of imagination to us’.

In the cinematic data, especially middle-aged women are found engaging in prolonged looking out of windows without grasping specific sights in their gaze. Shown in a solitary moment, the characters are immersed in contemplation of their life while gazing through the glass panes or open window shutters. This activity is predominantly found in Europe and the USA, with the only Chinese example of the corpus appearing in the film *Shijie* [*The World*] (dir. by Zhangke Jia, 2004), when Tao looks out of a shared-dormitory window. Women are often framed from the back with the window visually extending their mental and physical space (Fig. 12). In comparison, men are mostly found looking out of windows for a prolonged time while smoking or eating, actively looking at or interacting with something outside. This illustrates
that cinematic data can potentially suggest divergences in domestic patterns, not only between cultures but also between different gender and age groups.

In our analysis, windows, together with floors, appeared to suggest cultural differences more than other architectural elements. The filmic instances portraying windows across the various countries in the filmic corpus seem from initial assessments to be congruent with Yi-Fu Tuan’s observation:

Go to an American home in exurbia, and almost the first thing you do is drift toward the picture window. [...] The American is not rooted in his place, however lovely. His eyes are drawn by the expanding space to a point on the horizon, which is his future. By contrast, consider the traditional Chinese home. Blank walls enclose it. Step behind the spirit wall and you are in a courtyard with perhaps a miniature garden around the corner. [...] But you have no distant view. Nowhere does space open out before you. Raw nature in such a home is experienced only as weather, and the only open space is the sky above. The Chinese is rooted in his place. 38
Cinema has translated admirably such a fundamental philosophical stance. Think of the voyeurism deployed in the apartment block in *Rear Window* (dir. by Alfred Hitchcock, 1954) or the numerous window scenes in the Modernist house of *Exhibition*, compared to the introverted everyday lives taking place in the traditional Beijing Hutong-Siheyuan courtyards in *Lao pao er* [Mr Six] (dir. by Hu Guan, 2015) and *Shiqi sui de dan che* [Beijing Bicycle] (dir. by Xiaoshuai Wang, 2001).

A ‘culturally-sensitive’ and ‘emotion-centred’ analysis of the architectural elements of everyday life demonstrates that quantitative analysis of the cinematic data does not always tell the whole story, and qualitative analysis of individual scenes brings the necessary fine grain that makes up the multiple facets of domestic life. Further, the initial cinematic findings appear to align with the idea that ‘real architecture is an exchange of feelings and meanings between the space constructed of matter and the mental space of the subject’. As such, it could hold the potential to ‘sensitize the architectural profession itself for the subtleties of this interaction’, in order to ‘encourage architects to expand the emotional contents of their spaces, designed to be actually dwelled and lived in’. 39

Towards grasping the ‘lived’ in lived spaces — what is post-occupancy in film, and how can it be useful for architects?

As a result of these initial findings, the CineMuseSpace project posits that cinema constitutes a formidable encyclopaedia of architectural spaces and building elements, and how they are used. We contend, but this has yet to be qualified, that films bring a unique reservoir of post-occupancy studies, so far unexploited by the architecture profession. So let us go back to the notion of post-occupancy evaluation (POE) — a perennial issue within the architecture profession. Indeed, Ian Cooper’s question, ‘Post-Occupancy Evaluation — Where Are You?’ 40 remains just as relevant as it was twenty years ago. And while it is unlikely to be adopted by the RIBA as a valid method, our claim is that crucial aspects of POE can be found in films, hiding in plain sight. Interestingly, the notion of POE has evolved with time and ‘in the early days the emphasis was on energy, including energy use and air tightness, as well as building-user surveys’, but since ‘there has been a move to broaden the analysis in order to understand “the way people use and behave in space”’. 41 Studying the way people behave in space is not usually part of an architect’s brief, but it is gradually becoming more popular — in particular under the influence of Japanese architects Momoyo Kaijima and Yoshi Tsukamoto from Atelier Bow-Wow.

The Japan Pavilion at the Sixteenth International Architecture Biennale in Venice in 2018 celebrated Atelier Bow-Wow’s work through an exhibition of drawings gathered together under the name of ‘architectural ethnography’, an approach to observing and recording the human environment, which they developed since the late 1990s. 42 Central to their architectural
ethnography approach is ‘the exploration of a method of observing and drawing architecture and urban space from the viewpoint of the people who use it, rather than the architects and planners who are involved in its construction’. They have further integrated a behavioural method of observation by inserting ‘actors’ inside perspectival drawings to ‘depict rooms in houses that are inhabited by people going about their daily lives’. Further commenting on the Graphic Anatomy drawings, K. Michael Hays has argued that ‘you have two spaces, the space of building materials and techniques and the space of human activity and interaction’, which correspond to two times — ‘the before of conceptualization and construction and the after of occupation’ and are here ‘brought together in the architectural imagination’. This process of combining different moments in time within one drawing, the space of representation — planned anteriorly — and the space of occupation — observed posteriorly — is relevant in helping to understand our POE claim. Atelier Bow-Wow’s architectural ethnographical approach is key to the first conceptualisation phase of design. The observation of people’s behaviour in space helps them to design by listening to the voices of the users. This crucial ethnographical phase allows them to subsequently use the ‘behavioural capacity of space’ to potentially intensify and/or modify patterns of occupations through design parameters. Their drawings of observed posteriorly space of occupation, whereby in a house that ‘might be lived in by three or four people, you might see six or seven people in one drawing, demonstrating different living behaviours’, is a form of fictional POE as the building is yet to be built and occupied.

In film, we witness fictional behaviours, shot in existing spaces or in studios. We speculate here that a similar architectural ethnographical approach of observing actors in film space can provide crucial clues for POE. Of course, Atelier Bow-Wow’s approach is based on empirical material, as is most ethnographic research, but the field of ethnographic research has been evolving in the last ten years or so. Some anthropologists have moved away from field work in order to study alternative constructions of cultural life, such as emergent online virtual worlds, and cinema has also become more widely acknowledged as a source of visual anthropology. So, if architectural ethnography is recognised as a valid approach, there is no reason not to entertain the idea of data mining films for the same purpose. Film ought to be construed as a source of cinematic architectural ethnography — or cinematic spatial ethnography — from which key aspects of POE, namely how people behave in space, can be harnessed.

However, the question of fiction and drama within the notion of a cinematic spatial ethnography remains to be addressed. In other words, how valid is this approach, if cinema is after all a fictionalised account of reality? As stated by MacCabe above, cinema renders a reality made more real by the use of the aesthetic device. In this context, it means that the camera, through framing, helps us to focus. As argued by Maurice Merleau-Ponty, in the real world ‘our field of perception is infinite as it is deployed on the
whole horizon’. Ethnographic observation is not as obvious as it may seem, as over the infinite horizon, one has to train one’s attention to focus on what is relevant and what is not. As remarked by Georges Perec in his practical exercises for street observations: ‘Do you know how to see, what’s worthy of note? Is there anything that strikes you? Nothing strikes you. You don’t know how to see.’ By contrast, Léger notes: ‘The dog that goes by in the street is only perceived. Projected on the screen, it is seen, so much so that the whole audience reacts as if it discovered the dog for the first time […] that’s the value of framing an image judiciously’. In other words, through careful framing, cinema offers a simplification of reality. Patrick Keiller points out that cinema differs from other art forms such as ‘the novel in that it was visible, and in that usually the spaces of the new world were made by photographing fragments of the old one’. This process of transformation from old to new is the product of cinematography. It is a phenomenon referred to as photogénie whereby ‘mysterious transformation […] occurs when everyday objects are revealed, as if anew, in a photograph or on the motion picture screen’. Thanks to this transformative process, unique to cinema, a new ‘dog’ emerges out of the cinematographic framing in Léger’s example. Similarly, by restricting the field of vision, film intensifies the expression of everyday lives and environments, allowing for a novel spatial ethnographic approach. That said, and as highlighted in the previous sections, our proposed method of observations and annotations also requires training.

But we should not oppose one observation method against the other; cinematic spatial ethnography is not a replacement for architectural ethnography — if anything, the two approaches may complement each other. Cinematic spatial ethnography is something else, but it also brings something more. For example, in our CineGenus project, the camera penetrates the domestic intimacy of the Mumbai chawls in a way that no architect or ethnographer would be allowed to enter. At that global scale, CineMuseSpace is an anthropological enterprise, the comparative study among diverse human society; our detailed ethnographic studies are a subset of this larger endeavour. In terms of POE, our project exemplifies that film can contribute to understanding the way in which people use and behave in space, but it can clearly not monitor energy consumption in buildings. However, there are many films that can complement learned articles on environmental issues, such as Home (dir. by Ursula Meier, 2009) which explores the unhomeliness induced by worsening surrounding environmental conditions. Cinema also offers something more in the shape of affect and emotions, and this can enlighten the more elusive qualities associated with architecture.

In CineMuseSpace, every film we studied was a form of cinematic spatial ethnography, as we delved into close-ups of micro-situations. Cinema, as our initial findings from this approach suggest, can reveal various ‘lived’ aspects of ‘lived spaces’. It may hence present an avenue for architects to more fully grasp the domestic everyday as an
architectural experience. In everyday life, a ‘work of architecture does not stand across from us like a picture; instead, we ourselves belong to architectural reality, so that instead of being mere beholders, we enjoy the status of “actors”’ and since we continuously ‘experience architecture as a situation, the role of its elements is explained more fully through a characterization of our intercourse with them than through their description as mere objects’.55 Our initial project findings give a first indication that a cinematic approach may hopefully serve architects to not only comprehend our interaction with domestic environments more fully, but also to understand the semantic affect of the elements of architecture’s syntax. What Neufert has done at a level of syntax, our architectonic of cinema is doing at a semantic level. Neufert provides a list of equivalent signals as physical signs, while we show a potential range of their syntax. In other words, Neufert’s and Koolhaas’s approaches see everyday spaces and elements as signifiers — ‘what you see is what you get’ — a door is a door made of wood that rotates and allows the passage between one space and another. In contrast, through the concept of an architectonic of cinema, the door is revealed as a signifier augmented by affect, resulting in the signified, which is a mental concept. Hence, the architectonic of cinema is a place to examine what architecture is to be ‘about’ or ‘about to be’ rather than ‘be’ — it complements it, of course; it does not replace it. Future extensions of our pilot study could move towards the inclusion of much larger global sample pools across filmic genres to increasingly mitigate data bias, but also more refined targeted studies of specific demographic groups, buildings, or geographical regions to gain deeper insights into distinct post-occupancy contexts. The CineMuseSpace research project opens up potential new research avenues — it is by no means an end in itself but a beginning. Clearly, our endeavour is ambitious, yet modest in its current achievements. But the value of the work is to propose a novel framework. Many more films have to be analysed, and there is no doubt that future developments in machine learning will provide the crucial tools to achieve our aims. As such, a cinematic analysis of the rhythms and multiple facets of everyday life in the built environment might in the future offer a nuanced, and also readily available, avenue for post-occupancy study. As a result, the carefully observed cinematic ‘works [œuvres] might return to and intervene in the everyday. Without claiming to change life, but by fully reinstating the sensible in consciousnesses and in thought. [Accomplishing] a tiny part of the revolutionary transformation of this world’.56

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