

Films as source of everyday life and energy use: A case of Indian cinema

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1. Introduction

Predicting the future of energy demand lies in understanding the everyday life that sources domestic energy consumption. Yet approaches to effectively capture the everyday life in domestic environments are a blind spot in current energy research. An argument has been made for a paradigm shift to look at energy practices as a social construct rather than as a simply rational behaviour [1, 2, 3, 4, 5] but qualitative data collection in private homes to understand household practices, occupant schedules and underlying cultural norms can be slow, labour intensive and expensive. As identified by Sovacool, there is a need for innovative human-centred research methods to capture human dimension of energy use and to understand the habits of energy consumption [7].

This paper introduces a new, experimental method of cinematic analysis to understand everyday energy use, transitions in material culture and the adoption of new technologies at home, as a support for the exploratory research design phase. It proposes the use of fiction films as source of data. The aim is to tap into this existing, but largely underexplored cinematic reservoir of post-occupancy information, which provides an alternative to the time-intensive production of new moving image material.

Film is an art of recording that is always imbued with a pre-existing reality associated with a social and physical context, within given cultural, political and environmental circumstances. Spatiality in cities have been investigated with cinematic explorations [8, 9, 10, 11]. However, cinematic analysis can be applied to understand the materiality of homes, cultural norms, the use of space and occupant schedules. Film can further capture transitions in the adaptation of new technologies and frequencies of their use, also within those socio-cultural contexts that are difficult to access.

This paper describes the findings of a project that was built upon the approach developed for the AHRC *CineMuseSpace* project. Central to both projects is the understanding that fiction films can provide a crucial understanding of everyday life in domestic environments. Films expose everyday gestures and large fragments of our everyday lives. The main hypothesis is that filmmakers have archived, expressed, characterized, interpreted and portrayed hundreds of thousands of buildings and the lives of those inhabiting them. In other words, films constitute a comprehensive lived-in building data: an archive of lived and practiced spaces that is, so far, an untapped resource in energy studies. This may first seem paradoxical as films are about fiction, but films can be construed as a form of ‘equipment for living’. Films can make us notice what otherwise would go unnoticed and magnify events. Film scenes are made of basic real-life ingredients, cut and re-arranged to form another type of reality. Key to the research explored here, was to extract and interpret these nuggets of everyday realities. It required studying the encounter between the everyday life, characters’ gestures, patterns and behaviors, and the everyday physical environment, mitigated by the gaze of the filmmaker(s). While the cultural dimension was not central to this study, it cannot be ignored. Crucial to *CineMuseSpace* framework was the recourse to anthropologist Philippe Descola. In Descola’s [12] classification, India (as well as China and Japan) are part of an analogistic¹ tradition, as opposed to Western naturalism. This analogistic cultural pluralism is visible in Mumbai chawls with its networks of correspondence between seemingly discontinuous elements present in a complex constellation of correspondences. In Mumbai *chawls* emulate the traditional housing culture but in a vertical setting.

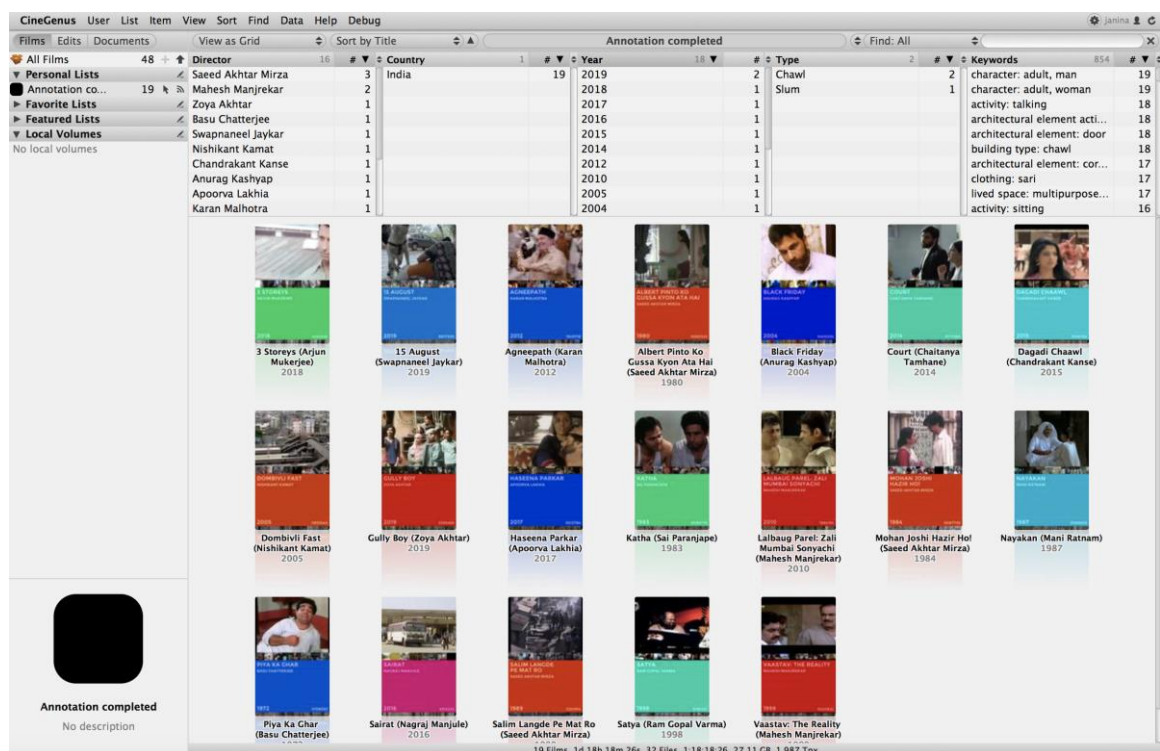
¹ To hold an analogical point of view of the World implies perceiving all those who occupy it as being different from one another. Instead of merging entities sharing the same substances within the same class, this system distinguishes all the components of the World and differentiates them into singular elements. Such a World in which each entity makes up a unique specimen would become impossible to inhabit and to imagine if one did not strive to find stable correspondences between its’ human and non-human components [2] – evident in India with the example with the ubiquitous sacred cattle inhabiting the city.

Chawls appeared in the Mumbai's housing landscape during the late 19th century and persist to exist within the neo-liberal city [13, 14]. Chawls were traditionally built to house the migrant textile industry workers in one-room tenement units. Later when the textile industry closed in the 1960s, and entire families migrated to the city, these chawls became familial housing units for the working class, and later lower income class. Chawl architecture consists of a series of multipurpose one-room tenement units of not more than 20 sqm each, attached by a common corridor with shared toilets on each floor. Such arrangement of spaces has given rise to a cultural network of interdependencies which still thrives. These arrangements are clearly being broken up in new low-income habitat model of slum rehabilitation (so called SRA) housing but to a certain extent it survives in the chawls 'mixed model' spatial arrangement.

Using the chawl film typology as a case study, this paper asks: how can we understand domestic energy use through film? The paper is structured as follows. Section 2 describes the research methodology, the database and the keyword ontology. Section 3 describes the results based on the analysis of 19 Indian films, located in chawls. Section 4 concludes and reflects on the methodology.

2. Methodology

The project performed the first case study of transferring and adapting a new digital methodology that originated in the *CineMuseSpace* project. The aim of the study was to investigate how cinematic analysis could be adapted in exploratory research stage in energy studies. This methodology is an interdisciplinary approach that advances qualitative and quantitative moving image analysis through new software frameworks. The methodology operates by creating a central database for film analysis in which a detailed time-based annotation technique is employed to examine fiction films in order to gain novel insight into domestic everyday practices across different cultures. The digital tool at the core of this approach was developed through collaboration with Jan Gerber and Sebastian Lütgert and based on their pan.do/ra database technology. The resulting digital approach allows to segment cinematic raw data into analytic, interactive fragments that are then tagged with a defined set of keywords (see Fig. 1). All scenes located within a chawl building complex were specifically extracted and analysed.



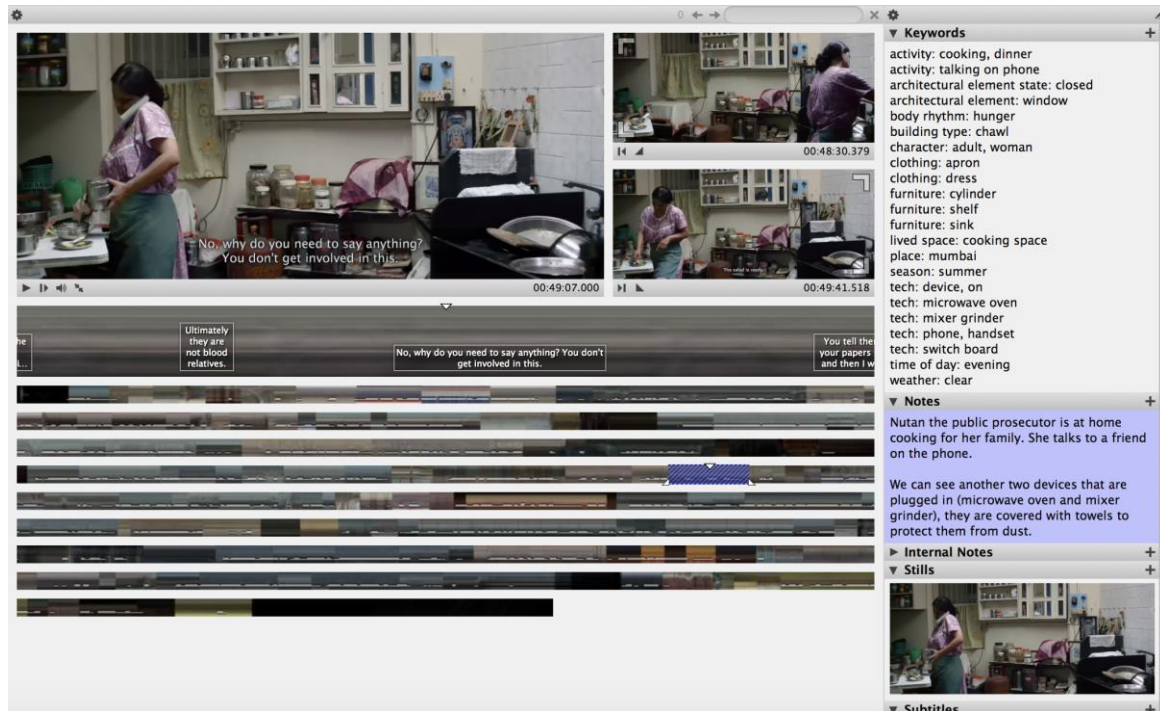


Fig. 1 Database overview of all films (top) and the film analysis in progress (bottom)

For the project's cinematic analysis, a film canon of 19 feature-length fiction films was selected. This research adopted a deductive approach to film selection, identifying a suitable dataset and systematically sampling it on order to examine specific research questions, in this case understanding the energy use and domestic practices. The 19 films were shortlisted based on an initial selection and assessment of more than 60 films and after a consultation with an expert on Indian cinema Ashish Rajadhyaksha, the author of the *Encyclopaedia of Indian Cinema* (1994/1999). To allow for a geographically focused analysis, films set in Mumbai were selected for the study. We further limited the study to films that were relevant based on domestic scenes taking place in chawls in Mumbai (typically 20% and 30% of scenes taking place in chawls) and the availability and sufficient technical quality of the film. The choice of 19 films was dependant on the following

- The availability of the film in sufficient resolution either on DVD or online.
- The location of the film was primarily in the chawl (i.e. the film's plot was staged primarily in the chawl).
- More than three characters in the film were interacting with the interior and exterior spaces in the chawls.
- The characters in the film were interacting within the chawl space as larger part of the narrative.

The fabric of the chawl building typology remains roughly the same in films made over the four decades but the domestic technologies evolve drastically. It is therefore crucial to have a longitudinal perspective to understand the evolution of the domestic practices over time. The selected films were all filmed after 1970s. By covering four decades, the project specifically generated a longitudinal study of the role of old and new technological devices on everyday life habits in the specific context of the chawl building typology. This longitudinal study aimed, on one side, to analyse the impact of emerging, new technological devices, such as mobile phones, on energy consumption patterns in the chawl context. On the other side, the historical breadth of data also enabled an assessment of the persistence of older technologies and their growing availability to lower income families, such as the television set, fridge and radio. Given the rise of more affordable small-scale electric appliances in the last two decades, the selection of films especially featured

recent cinematic releases that reached international success (such as the Netflix distribution *15 August* by Swapnaneel Jaykar, 2019), which were added to include contemporary representations of energy-consumption practices.

To trace energy consumption in one specific housing context, the building typology of the chawl was consistently applied as the main priority for selection to generate a cohesive and conclusive data pool. A third of the selected films were shot in real locations but half had a mix of location shooting and studio sets. Typically, the street scenes would be shot but in-situ chawl interiors would be reconstructed. Studio sets are not always easily identifiable, being exact replicas of traditional chawls. The scenes selected for final data extraction were either staged within the chawl or were recreated to depict a chawl scenario. However, the analysis focuses on how characters are perceived to interact with technologies in their homes. Our assumption is that in order to depict the everyday life, or normality, in a chawl environment, the sets represent a typical setting. This was validated by real life photographs captured during field visits. Hence if the chawl in a film represented the typical built environment elements that one would find in a chawl, then those scenes were coded in the database. It was ensured that the final selection of films (see Fig. 2) was representative of the socio-economic and cultural conditions of chawl environments in Mumbai.

Title	▲ Director	Year	Language	Duration
3 Storeys	Arjun Mukerjee	2018	Hindi	1h 34m 5s
15 August	Swapnaneel Jaykar	2019	Marathi	2h 4m 6s
Agneepath	Karan Malhotra	2012	Hindi, Marathi, En...	2h 54m 6s
Albert Pinto Ko Gussa Kyon Ata Hai	Saeed Akhtar Mirza	1980	Hindi	1h 49m 37s
Black Friday	Anurag Kashyap	2004	Hindi	2h 41m 13s
Court	Chaitanya Tamhane	2014	Marathi, Gujarati, ...	1h 51m 16s
Dagadi Chaawl	Chandrakant Kanse	2015	Marathi	1h 54m 51s
Dombivli Fast	Nishikant Kamat	2005	Marathi	1h 48m 8s
Gully Boy	Zoya Akhtar	2019	Hindi	2h 30m 59s
Haseena Parkar	Apoorva Lakhia	2017	Hindi	2h 2m 45s
Katha	Sai Paranjape	1983	Hindi	2h 15m 32s
Lalbaug Parel: Zali Mumbai Sonyachi	Mahesh Manjrekar	2010	Marathi	2h 26m 21s
Mohan Joshi Hazir Ho!	Saeed Akhtar Mirza	1984	Hindi	2h 1m 15s
Nayakan	Mani Ratnam	1987	Tamil, Hindi, Engli...	2h 28m 37s
Piya Ka Ghar	Basu Chatterjee	1972	Hindi	2h 14m 35s
Sairat	Nagraj Manjule	2016	Marathi	2h 53m 58s
Salim Langde Pe Mat Ro	Saeed Akhtar Mirza	1989	Hindi	1h 46m 59s
Satya	Ram Gopal Varma	1998	Hindi, Urdu, Marathi	2h 40m 4s
Vaastav: The Reality	Mahesh Manjrekar	1999	Hindi	2h 20m

Fig. 2 List of the films analysed in the project

The extracted filmic information from this film canon and its' metadata were gathered in a database and can as a result be juxtaposed in new combinations and mined for quantitative and qualitative examinations. The detailed analysis of the depicted activities and the forging of novel connections between the film fragments (see Fig. 3), and their analytic metadata can yield insights into patterns of everyday life inside chawls, including recurrence of daily activities, energy consumption practices, gender balance in domestic activities or occupant interaction with architectural elements.

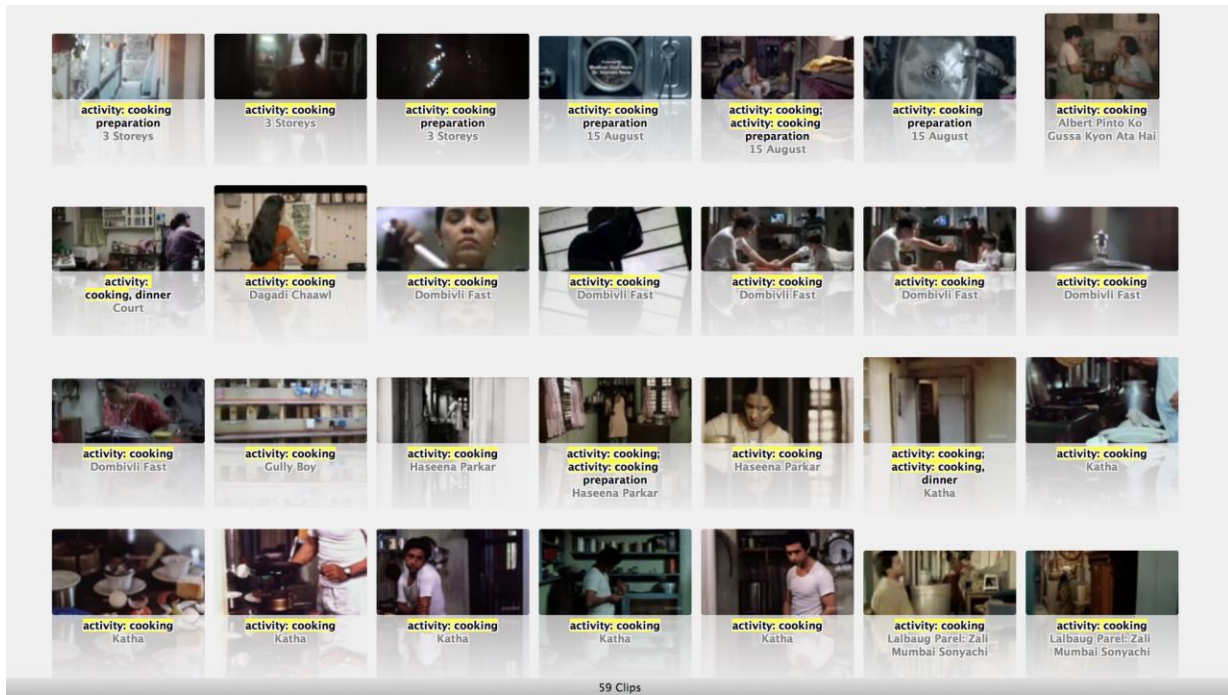


Fig. 3 Database search for 'cooking' practices to compare activity, gender, energy use and other themes across the films

At the core of the methodology is a detailed keyword ontology that is applied to each extracted film segment. A rhythm analysis is performed, which examines both the circadian circumstances and the specific environmental context of a given depicted daily life activity. For the specific focus of this project, the keyword ontology was adapted and tailored to precisely identify energy usage, technology consumption, gender balance and financial pressure related to everyday activities in the chawl context (see Fig. 4).

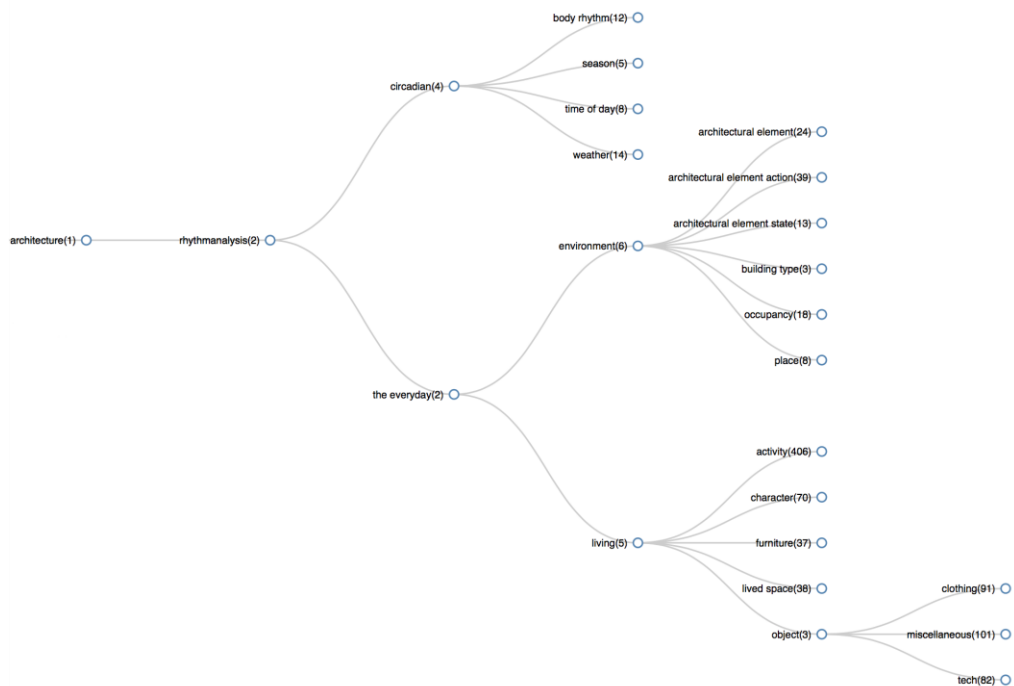


Fig. 4 The keyword ontology adapted to identify energy use patterns

1 Under the first main branch of the keyword ontology, circadian rhythms are examined, with
2 attention given to seasons, time of the day, weather and bodily rhythms of the depicted humans.
3 This allows the identification of rhythmic patterns and divergences in daily activities, such as how
4 multipurpose rooms diverge in use by time of day, or how energy consumption varies by season.

5 Under the second central branch, the physical environment is scrutinised, from the geographical
6 location of the chawl, the larger building structure and its' occupancy, down to individual
7 architectural elements and their varied uses (e.g. windows being opened to ventilate the room).
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10 The final principal branch of the ontology focuses on the type of domestic practice, who performs
11 it, and in which space it takes place. Types of practice include, for example: cooking, talking,
12 reading, switching on an appliance, or culturally specific activities such as making *rangoli*. A
13 dictionary of culturally specific terms was generated to ensure a shared understanding and
14 consistent labelling. The list of activity keywords relating to financial discussion topics was
15 expanded to include topics such as employment, money and feeling of financial pressures or
16 pressure from landlords. The next set of keywords considered the gender and age of the characters
17 engaged in daily activities, as well as their social role, relationship and standing. This aspect is
18 essential to capture the social fabric in the close-knit chawl environment. Lived spaces were marked
19 up to define where practices are performed (see Fig 2.5). The multiple purposes of the one-room
20 units were considered, from the as bedroom to dining or office/retail space. Outdoor and communal
21 spaces were also tagged to examine how the everyday life moves and flows over from private to
22 public spaces.
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27 Finally, the smaller, more tangible units of everyday life were annotated, including specific items of
28 furniture, clothing, stove types or vehicles. 82 technology keywords were applied (see Fig. 5),
29 ranging from kitchen tools to consumer technology, including mobile phones, fans and lamps.
30 Overall the keyword ontology encompassed a total number of 854 keywords that were then applied
31 to the analysis of film segments and data mined in the final stage of the project.
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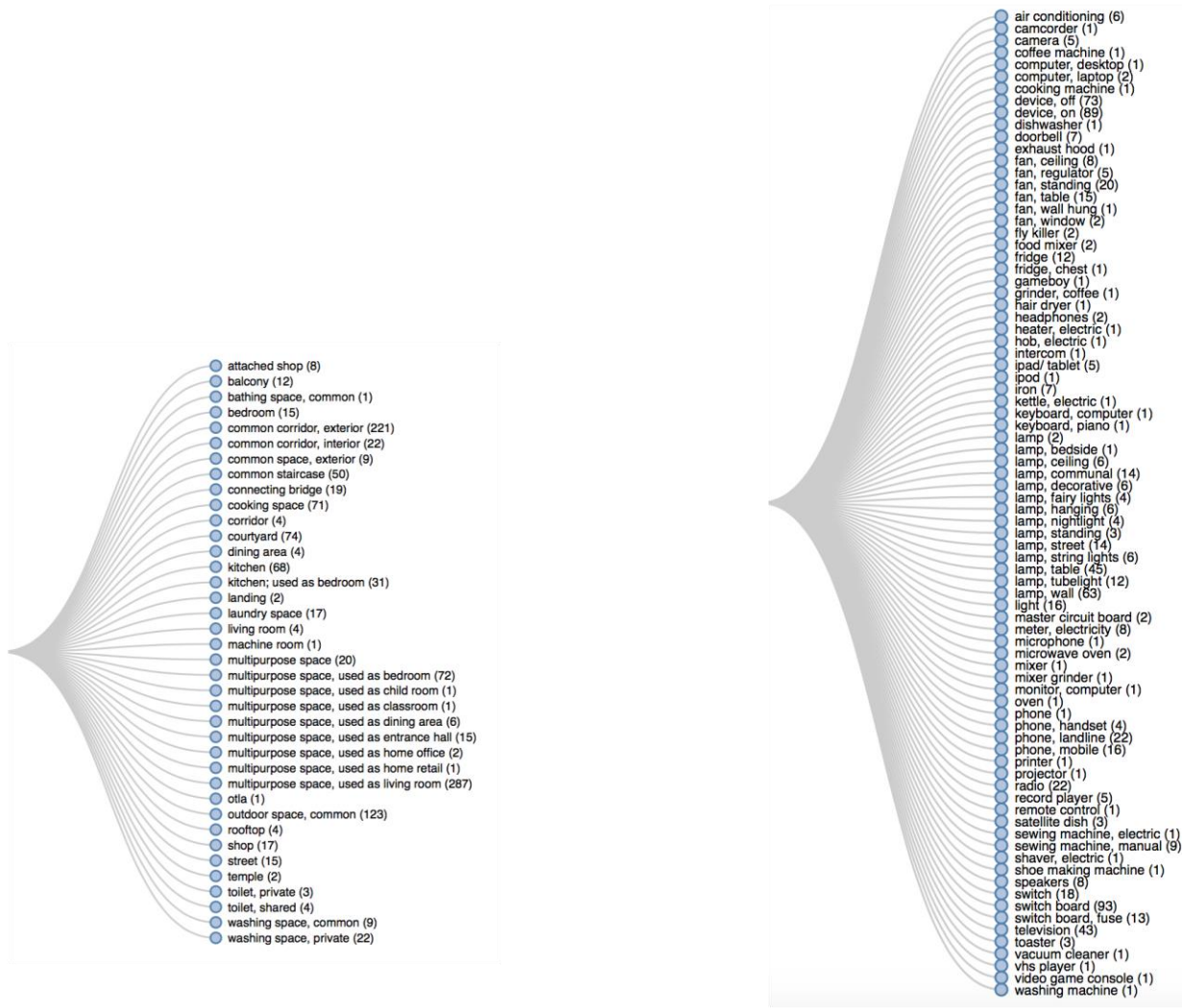


Fig. 5 Extracts from the 'lived space' and 'technology' keyword lists

In the next stage, the extracted keywords were systematically processed using a latent semantic analysis and text-mining technique, in order to understand the interdependencies of space, energy use and domestic practices, focusing on the multipurpose space, the kitchen and the courtyard. The relation of each of these spaces was then studied in correspondence with the character of the space, practice performed and time of use. The relationships were illustrated as word clouds based on frequencies and semantic maps based on co-occurrences of the keywords. The choice of the keywords that should be included in the analysis such that it represents high significance the “term frequency-inverse document frequency” measure was used.

It is worth noting that video recordings is an increasingly used resource for many social science researchers [15, 16, 17, 18]. Jewitt [15] identifies three features of video that underpin its potential for social science research: 1) ability to capture temporal structures and real-time sequential records; 2) a fine-grained multimodal record; and 3) its durability, malleability and share-ability. Yet video data is time-intensive to collect and analyse and researchers (see Goldman and McDermott [19]; Snell [20]) have argued for the use of systematic observation software to code video data. The way we performed the data-mining of fiction films has some overlaps with video coding, as practiced by the social sciences, but with focus on fiction films.



Fig. 6 BDD chawls in Mumbai

Finally, observations on site (see Fig. 6) were used to verify the findings from the film analysis and to create an embodied understanding of spatial practices and circumstances. The method can be described as a three-step process. Firstly, the films were viewed to gain initial knowledge of Mumbai and chawl environments. This implied acquiring insight into the usage of quotidian spaces, including what kind of appliances the households have and how they use them. Site observations anchored previous filmic, second-hand experiences of the chawl environment in reality (a form of *déjà vu*) and allowed to comparisons to film: adding a deeper reading of the place, including a personal physical and emotional experience of the environment. In turn, the physical experience of the location fed back into our reading of the mediated text – we recall the smell of cooking, the warm neighbourly conversations and the felt spatial dimensions of the rooms we experienced on site as the films are watched again, completing the auto-ethnographical cinematic experience. The experience of having seen the place in person acted as a memory recall [21], it re-awoke the memories and experiences of a researcher which gave a much stronger emotional and physical connection to both the films and chawls as the object of study. It should be emphasised that we advocate the use of this three-step process in the exploratory stage of the research, as a preparation for the fieldwork where the data can be triangulated with interview data and surveys.

3. Results

We believe there are three reasons why the approach we adopt is a reasonable and unique way of gaining insights into energy use in low income (and other types of) homes over a long period of time (four decades, in our case). The results in this section are presented under three headings: 1) longitudinal and dynamic trends in the use of technology; 2) “reality made more real” - demonstration of architectural use of space and life of chawls in use; and 3) films beyond the subject matter.

3.1 Longitudinal and dynamic trends in the use of technology

The coding process enabled the analysis to move from the early stage of reviewing whole events observed in the film to increasingly shorter fragments. These fragments form the unit of our analysis, each one has a clear start and end point. In total there were 21,871 of annotations in the coding process. This is based on counting every keyword (based on the ontology described in Section 2) as 1 annotation occurrence. The total time annotated in 19 films amounted to 12 days, 20 hours, 53 minutes and 16 seconds.

The shortest annotation we used was less than 1 second (0.22 seconds) and the longest annotation in one sequence was 10 minutes and 4.8 seconds. Therefore, the mean annotation duration was less than one minute (50.84 seconds), the standard deviation being 55.68 seconds (see Fig. 7).

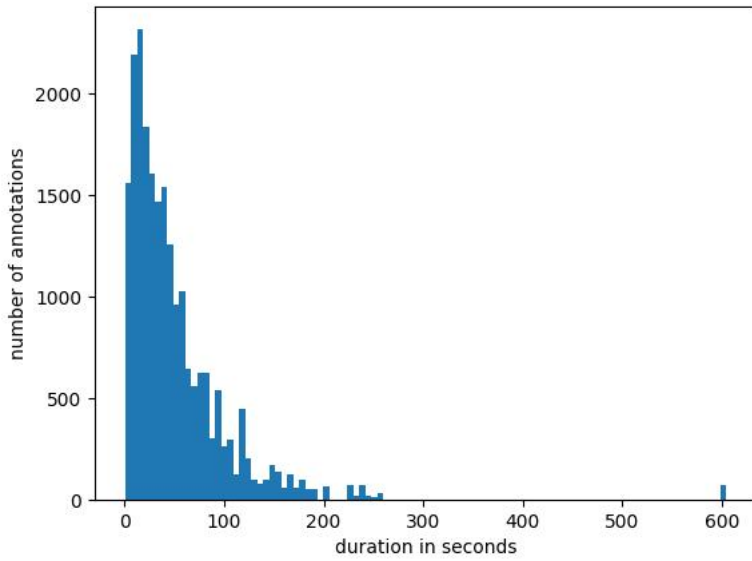


Fig 7. Overview of the number of annotations by duration.

The use of appliances in domestic scenes was annotated according to the ontology keyword list. It was noted that electric appliances are an important part of the film set, in the background, but not necessarily actively used in the scenes. Fig. 8 shows how much screen time each appliance got in all films. The size of the text is proportional to the time on the screen. The films confirm the site observations on site that chawl households, usually perceived as low or lower middle class, are shown to have all basic appliances not only for necessities (fridge, cooking devices, switch board, lamp) but convenience (TVs, mobile phones, ipads).



Fig. 8 Domestic technology used in the films

Notably, unlike observed on site, there are no AC devices in the film fragments despite the perspiration observed in the analysis of body rhythm. There is also very limited use of fans – ceilings are recurrently omitted from the framing and no ambient sound of fans can be perceived. This might be linked to wider film production practices, such as predominantly horizontal aspect ratios used in the industry. Given that many of the interior chawl settings are constructed in a studio, ceilings are recurrently left-out to allow lighting rigs and mobility of camera technology. The ceiling is also an architectural element that is seldomly included in the filmic narrative due to the lack of physical interaction with ceilings we experience in everyday life, compared to, for example windows and doors. In addition, from a sound design perspective, the sound of fans has the potential to disrupt the clarity of the dialogue and other sound effects. As a result, ambient noises from technology are rarely observed in films, except where they benefit the narrative or emotional development of a scene. Unlike TVs or mobile phones, comfort technologies like fans are less functional as narrative devices to drive forward the story. As a result of the points noted above, it

can be concluded that thermal comfort continues to be an ‘invisible’ part of energy use. However, climatized AC environments were observed in key scenes that took place outside the chawl, such as in *15 August*, where the progressive thinking, US based suitor takes the female protagonist to an air-conditioned, Western style café for a date. This café is clean and well-lit – in contrast to the love rival’s dark room in the chawl that is presented without entertainment or kitchen appliances.

Fig. 9 demonstrates the evolution of existence and use of technology in low income domestic environments. There have been fairly diverse range of energy intensive technologies (appliances) that has been used in the *chawl* environments. In the 1970s and 1980s the most dominant appliances were ceiling fans and lamps. It was also evident from the frequent representation of switch board which work as control devices. Mostly, scenes depict manual control of thermal comfort by using the switches for turning on/off of the electrical devices. Early 1990s and beginning of the 21st century (2000-2010) saw the inclusion of television sets in the living environments. It was evident that modern appliances like food mixer or toaster were fairly new addition in these domestic environments and depict luxury appliance than more frequently used welfare appliance like fan or fridge. The chronology of the technologies that appeared also shows the increasing affluence of the people living in the *chawls*. In between 1970s and 1990s the devices that appear depict low-income status. However, from year 2000 onwards the device range showed a similarity in assets with the low-middle -income households. This means the energy footprint is increasing among the people belonging to the bottom of the pyramid and hence hints towards the strength of such data base to understanding the transition of technology in the low-income domestic spaces. It was more difficult to understand the evolution and existence of renewable energy technologies which can be found with a larger database.

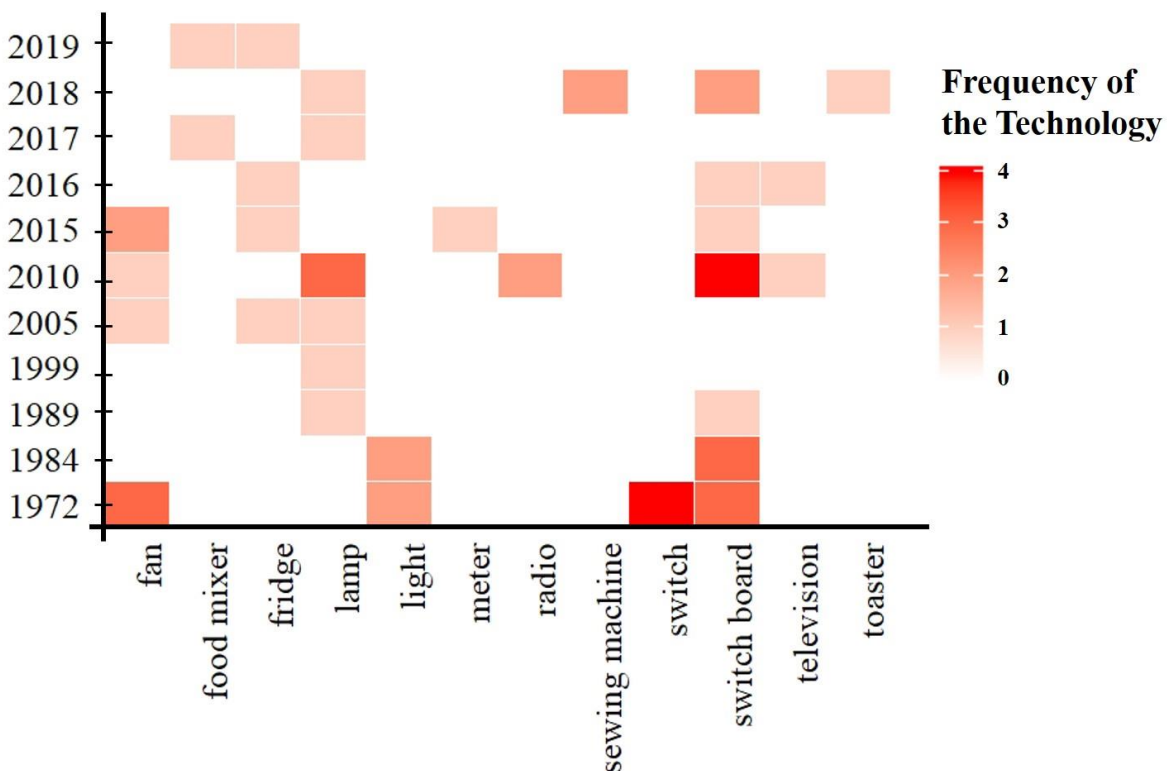


Fig. 9. Frequency of the use of technology used in the films

Television was present in high number of the annotated scenes, although it is not always on and is sometimes seen in the background protected from dust by a cloth, suggesting its prestigious status at home. In the films the TV is at the nexus of practices at home: sitting, serving, talking, greeting, hosting, drinking and eating are all take place by the television (see Fig. 10). Western studies presume watching TV as a separate practice to take place in evenings, but in this context it is often

on in background and watched while eating or socialising, most commonly present in morning and afternoon scenes – nearly as a wallpaper or a painting. The use of the TV was similarly observed on site and during the daytime (see Fig. 11).

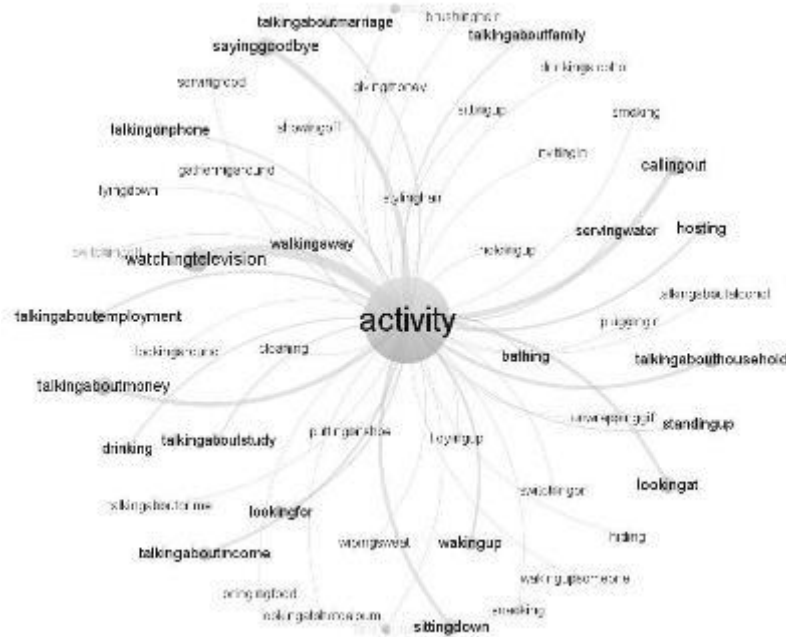


Fig. 10 Practices observed by the television



Fig. 11 Eating dinner by the television in *Dombivli Fast* (Nishikant Kamat, 2005) (left) and television as a wallpaper, as observed on site (right)

The equipment annotated in films was either a single stove *chulha*, or a double/four LPG stove (Fig. 12). This aligns with observations on site (Fig.13), the Indian government has been active in promoting LPG in cooking although many households use multiple fuel sources based on their economic situation and cooking practices for traditional dishes.



Fig. 12 Cooking practices in *Sairat* (left) and *Court* (right)



Fig. 13 Chawl kitchen in BDD chawl

It would be hard if not impossible to simply observe in-situ how actual behavior in homes changes over such a long period of time as covered in these films. Alternatively, if we were to, through interviews, ask people to retrospectively remember or imagine how their behavior has changed, this would lead to all kinds of well-known memory biases and lacunae that would result in incomplete, even biased data. Our method, on the other hand, allows us to collect the evidence embedded in films over a long period of time to capture dynamic trends in a practical yet representative manner.

3.2 “A reality made more real” – demonstrations of architectural space and life of chawls in use

Under the central branch on the ontology, the use of architectural space was analysed. Fig. 14 shows in which spaces the fragments filmed in chawls took place, most of them in the private tenement here referred to as multipurpose room. The size of the text is directly proportional to its occurrence in the movies, minutes and seconds filmed in the space.



Fig. 14. Chawl spaces in the film fragments

The furniture in each space was annotated according to the ontology. Bed, chair, cupboard and water storage were the most common items observed in the scenes filmed in multipurpose room. Although the films most commonly showed the space used as living area, the furniture did not reflect that. Instead a bed was most commonly observed as the space was used as a bedroom, with movable chairs and a small table or a stool. To accommodate sleeping areas for all household members, extra mats or mattresses were used which were kept rolled up in a corner during the day.

The final principal branch of the ontology focused on practices, who performs it, and in which space. The analysis of the multipurpose space allowed us to observe that it was not only used as living and sleeping but also as a dining area, the family sitting on the floor, or set up movable chairs or beds with a table. Some films showed a home office or coaching school classes in the space but this was in contradiction with the observations on site. This use of the same space for several purposes, and movable rather than fixed furniture, is a characteristic of vernacular housing in India

and Pakistan (see Khalid and Sunikka-Blank, 2016). The practices observed in the multipurpose space reflect same type of diversity (see Fig. 15), the stronger the line the higher the frequency in the films. Most common practices were socialising, sitting down, watching TV and talking about marriage, studies or employment. Other practices like reading a newspaper, playing music, drinking or talking on the phone expanded on the use as a living area while annotations of grooming, styling hair and drying body reflect on bedroom or dressing room like use. A character analysis was applied to identify dominant users of the multipurpose space. Adults, both men and women, were the most common characters, with roles of father and mother respectively.

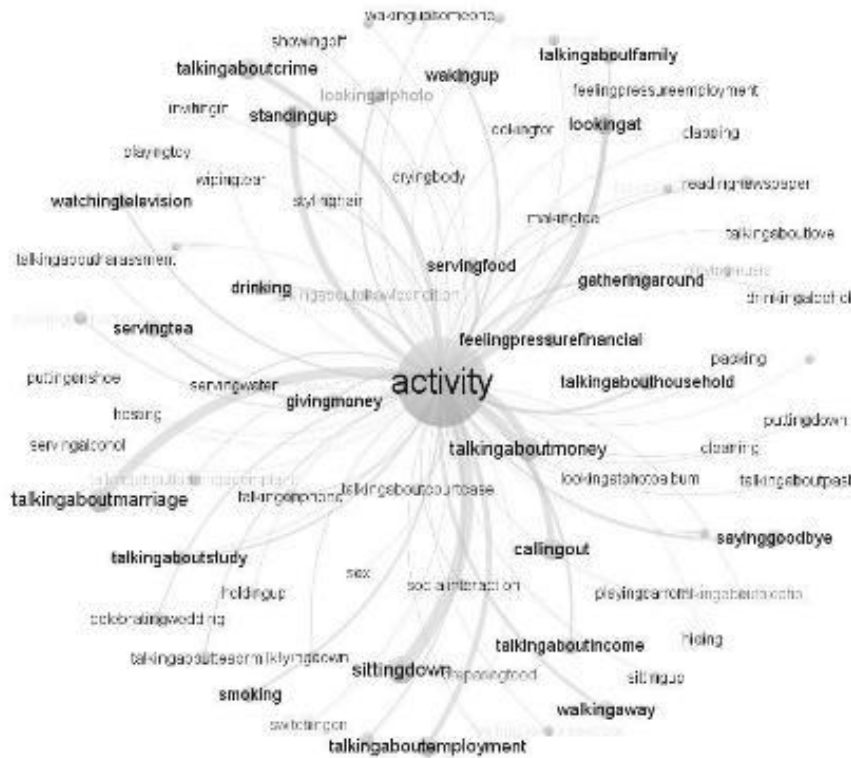


Fig. 15 Practices performed in the multipurpose space

A typical chawl has common toilets and washing/laundry area and may have a small washing area in each room. In the films, a private washing space was very common with a shared toilets and laundry space (e.g. cleaning teeth was presented as a family practice: “do not waste water”). Private toilets too were depicted in some of the newer movies but were not observed on site. The use of the washing area was most seen in the morning and sometimes in the midday and evenings (see Fig. 16).



Fig. 16 Brushing teeth in Black Friday (Anurag Kashyap, 2004)

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A main characteristic in chawls is the semi-public courtyard, closed or an open space between the buildings (see Fig. 17). The courtyard is often circulated by public corridor space to access the rooms (see Fig. 18). In some films the chawl was purpose-built as a set constituting an ‘ideal’ chawl, such as in *3 Storeys* where corridors have beautiful timber railings, bright colours and decorative elements – this beautifully preserved detailing is not present on site.



Fig. 17 Open space between buildings in BDD chawls (left) and in the opening scene of the Court (right)

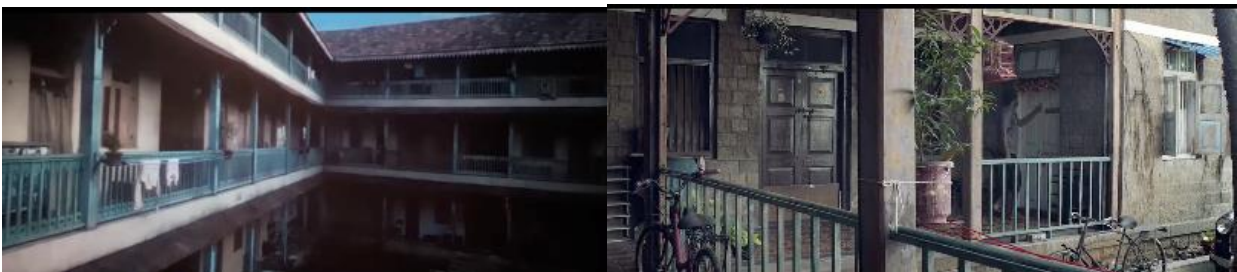


Fig. 18 The corridor space that was a purpose-built studio set for 3 Storeys t (left) and in 15 August (right)

The analysis reveals diverse, accommodating use of the corridor space, in films and on site (see Fig. 19). The corridor is a place to socialise, read newspapers, or play. It can accommodate private practices such as drying or styling hair, preparing for cooking, or talking about personal issues like family or financial conditions. In *15 August*, we see an old man sleeping in a bed under a mosquito net. In *15 August*, the ground floor corridor is used like a stage in a theatre play, where the camera observes events from a distance, similarly to an audience - the camera is often static and observing from a distance, capturing interconnections of the social life that unfold before the camera.

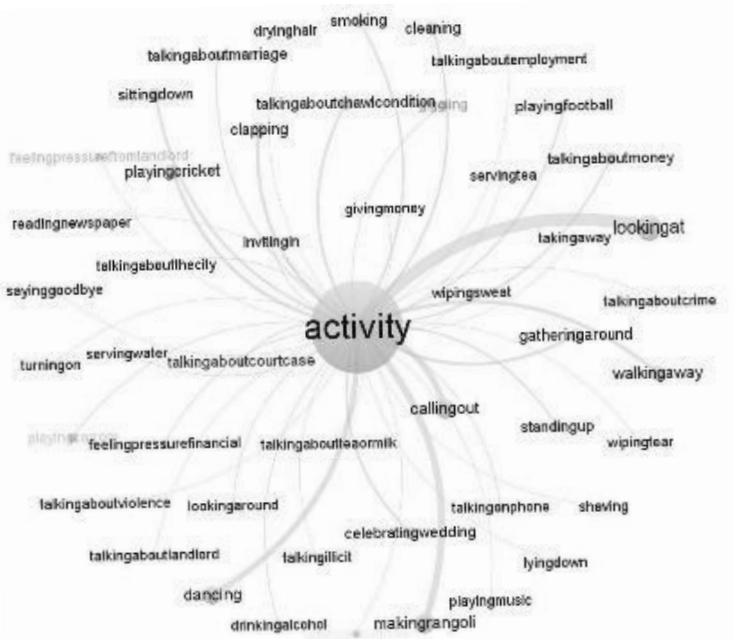


Fig. 19 Practices performed in the semi-public, outdoor courtyard

In the films the courtyard is used for gatherings and parties, often acting as instrumental setting for the plot, enabling flirting and romance among the residents (e.g. *3 Storeys*) or the celebration of festivals such as the Independence Day (*15 August*) (see Fig. 20). The active use of the courtyard space was observed on site, including a stage built in the courtyard in BDD chawls. This type of multi-purpose outside space that is a semi-public and a culturally acceptable gathering place for women is missing in the new slum rehabilitation housing and is being requested by the inhabitants.



Fig. 20. The courtyard in 15 August for the Independence Day festivities, with traditional rangoli (left) and similar space on site in BDD chawls, with a stage (right).

It is worth noting here that we chose a particular genre of narrative Indian film that is very much a part of a wider tradition of realism in world cinema. Specifically, the tradition of Indian film we draw on is heavily inspired by *Italian neo-realism*, *cinéma vérité* (France) and *kitchen sink drama* (UK). As such, these films aim to represent reality as effectively as possible and provide “a reality made more real” by the use of the aesthetic device of the camera. The findings suggest that this tradition of Indian film offers a vast library of demonstrations of the architecture and life of chawls in use. We argue that feature films would actually be a more reliable and unbiased documentary source of behavior in homes over a period of time. Documentaries are likely to be making a polemical point and hence run the risk of being subject to the biases of the filmmaker. Feature films on the other hand focus on the narrative and its emotional impact. To make the emotional impact greater, it is necessary for the backdrop of the home and the behavior in it (i.e the set) to be as real and believable as possible. As such, we believe that the feature films we chose to focus on provide a more real and accurate reflection of the behavior we wish to capture.

3.3 Films beyond the subject matter

It is fundamental to understand that movies are not produced in a social vacuum. Every movie, regardless of theme or subject matter, reflects the values, attitudes, concerns and interests of the social milieu in which it was made. As a result, we believe that we can learn a great deal about a given society by examining the films which it has generated. For example, in all films men were more often in control of entertainment appliances, TVs, ipads or laptops, than women. In a typical scene in *Court* (see Fig.21), man's position of 'normality' at home is to watch television while his wife (a lawyer) is working. Notably she has no laptop or other appliances, she is using a pen and paper. In new films such as *Gully Boy*, a mobile phone is an important part of the narrative. When a female protagonist uses her smart phone, it is for secretive romance (*15 August, Gully Boy*) or family problems (*Sairat*), to show how modern and independent she is, perhaps also hiding something from her parents. In *15 August*, the 'ideal' suitor's iPad gets a lot of screen time and is a device to show his wealthy, modern life abroad (see Fig. 22).



Fig. 21 Father and the children watching the television at dinner in *Court*, while the mother is cooking in the kitchen



Fig. 22 Socialising in the multipurpose room when the 'ideal suitor' is showing off his life in the US on his iPad in *15 August*

The films suggest the reinstatement of gendered domestic and entertainment practices. Cooking was one of the key practices annotated, right after talking, sitting, looking or walking. Kitchen appliances are used as an expression of domesticity but also settled status of the family. In *Sairat*, living in slums, the protagonist couple manages to move to a chawl and have their proper home. Electric appliances in their house, TV and kitchen appliances, and cooking with LPG are used to portray this transformation and living a good life. This is reflected in how the scenes are filmed: using an unhurried, wider frame of a woman cooking in her kitchen, including a close view of her utensils and appliances, even a grinder mixer. A similar staging of a woman in her own kitchen, surrounded by her appliances, is used in *Court* (see Fig.12). She is a well-educated lawyer but shown cooking, and later serving her family, husband and two children, who are eating and watching TV (see Fig. 21). Despite of her high social status, cooking practices normalize her as a good wife and a mother. Women's traditional role at home leads to them having far more influence than men on domestic energy use and films can offer an angle to household dynamics that is not easily accessible for researchers. Film fragments can record an event including expressions, body posture and gestures, including a perspective on household dynamics, influenced by gender norms.

If in most films, such as *Court*, *Sairat*, *Gully Boy* and *3 Storeys*, women's cooking is used to portray a woman's normal duties and "being" at home, by contrast, male protagonists are rarely seen using

1 kitchen appliances. In the opening scene of *15 August*, the male protagonist (an eccentric and sulky
2 artist, who is not approved by his girlfriend's or even his own parents) is shown making tea for
3 himself in his kitchen (see Fig. 23). In this way he is introduced as a single, lonely and
4 unconventional character, also his room in the chawl is presented as dark and messy, without
5 appliances. By contrast, his love interest, an independent female protagonist is forced to adopt a
6 traditional gender role to make and serve tea to her 'ideal' suitor's parents when they come to
7 discuss a marriage proposal (see Fig. 23). She has also been asked to dress in a sari instead of her
8 own Western clothes.
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18 *Fig. 23 Eccentric man preparing tea in his kitchen (left) and female protagonist girl serving tea for her suitor's family (right) in 15*
19 *August*
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22 The kitchen is the setting for a tense key scene in *Sairat* as static, long scenes of the female
23 protagonist cooking in her kitchen precede a highly violent ending. In *Sairat*, kitchen scenes and
24 appliances communicate several functions in the narrative: firstly, they demonstrate the settled
25 status of the family after all hard luck; secondly, they show that the woman who ran away from her
26 family is still following cultural conventions (male visitors are invited to watch TV while she cooks
27 tea: "watch TV if you like"); and thirdly, they contrast this safe position in the house with the
28 eruption of violence that is even more shocking and unexpected when it happens in the kitchen,
29 preceded by an unhurried, everyday routine of a woman making tea in her own house. The scene is
30 an example of how carefully constructed everyday life in film constitutes a baseline which provides
31 fertile ground from which the drama can erupt.
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35 Even in lighter hearted narratives, such as *3 Storeys*, the privacy of the home is mixed with
36 women's experiences of unhappy marriage and domestic abuse that take place behind closed doors.
37 In *3 Storeys*, the husband slowly closes the door of their tenement and locks it before a sinister
38 scene (that is not shown but hinted at) and earlier he has been seen drinking alcohol while his
39 submissive wife quietly cleans up their room. It has been argued that the privacy of a concrete
40 building removes the social control of domestic abuse that is no longer audible to neighbours.
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44 The dialogue observed in the annotated scenes include pressures of financial struggles,
45 unemployment in the family, pressure from the landlord to pay the rent or in some cases eviction.
46 These financial hardship themes were typical for these films but less common in Western cinema,
47 suggest that also dialogue could be included in further analysis.
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49 50 **4. Conclusions**

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52 This study introduces a new method of cinematic analysis to understand everyday life at home,
53 transitions in material culture and the adoption of new technologies. The research extends the
54 approach of the AHRC *CineMuseSpace* project to the field of energy studies and proposes film
55 analysis as one option to prepare for research questions and fieldwork, especially in contexts that
56 are otherwise difficult to access for religious, cultural or social reasons.
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60 The analysis focused on 19 Indian films, located in chawls in Mumbai. The detailed keyword
61 ontology developed to understand domestic practices and energy use was applied to each extracted
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1 film fragment. The first branch of the ontology focused on circadian rhythms in relation to seasons,
2 time of the day, weather and bodily rhythms. Under the second branch the environment was
3 scrutinised from occupancy patterns to architectural elements. The third branch focused on
4 practices, followed by the annotation of the smaller units of everyday life, including furniture,
5 clothing and technology. The coding was followed by site observations Mumbai and the second
6 viewing of the films, drawing from the embodied knowledge gained on site (e.g. temperature,
7 humidity, spatial and emotional experience).

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9 We believe there are three points to demonstrate the usefulness of this method. First, it gave us an
10 understanding of actual behavior in homes revealed by films across the time period of four decades.
11 Second, Indian cinema offered a vast library of demonstrations of the architecture and life of chawls
12 in use. The analysis gave an understanding of the presence and use of technology at home,
13 household dynamics and nature of overlapping practices. Third, movies are not produced in a social
14 vacuum and reflect the values of the social milieu in which they are made, revealing social
15 structures and gender norms at home.
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18 A sceptic may then ask: why choose feature films and not documentaries. This is a fair question and
19 one to which we gave a lot of thought. After much deliberation and reference to the literature we
20 concluded that feature films would actually be a more reliable and unbiased documentary source of
21 behavior in homes over a period of time whereas documentaries are likely to be making a polemical
22 point. Fictional films are firmly grounded in domestic routines and therefore a rich source of
23 information on everyday life at home. They need to create a baseline of “normality” that allows
24 narrative eruptions. However, we fully acknowledge that the film analysis needs to be supported
25 with interviews and surveys on site. There are also issues with problematizing the impact of films
26 on the location and site observations are needed to ensure that building typology in film is
27 representative, whether it is a purpose-built studio set or filmed on location. The method cannot
28 replace traditional data collection on site but it can complement it and give it depth.
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32 It is acknowledged that the database used in this study was limited. Expanding this study into a
33 larger dataset could provide information for linking a film-based analysis to energy use predictions,
34 especially in a domestic low-income environment and another genre such as television mini-series
35 or the daily soaps could be appropriate.
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39 Is such a detailed level of coding then necessary? Choice of fragments is an essential, and possibly
40 problematic, part of film analysis. For us, the keyword ontology made the fragment selection
41 process and annotation more objective and transparent. The coding helped us to organise, classify
42 and reduce the data and was useful in three respects. First, it gave a quantitative understanding of
43 the fragments (e.g. how long a certain appliance is present, what is the length of certain practice in
44 certain location). Second, it narrowed down the key scenes for the further analysis. Third, once
45 coded, we have a database that can be easily resampled for further analysis: the database offers
46 material for a study on the cultural history of appliances, such as the presence of telephone or
47 television in the scene and how this has changed (or transformed practices) through time.
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51 Further, by resampling key scenes from the film database, it would be possible to generate a
52 sequence of events of a typical day within the chawl that can then be used and tested as a basis for
53 dynamic occupancy scenarios in energy simulation but this requires a wider corpus of films than
54 what was feasible in within this study. The fragments can also be resampled not necessarily as a
55 chronological order but to enable the viewer to comprehend repeated practices in different homes.
56 Ethnographic documentary has been used in the teaching of anthropology for a long time already
57 but the use of films in teaching energy studies has been limited. The way in which films can
58 visualise ‘invisible’ energy use can be also used as a participatory planning tool to empower
59 stakeholders in low income communities who often struggle to express themselves verbally and
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may use very different word to professionals [22], to overcome communication barriers in participatory planning.

We fully acknowledge that our hypothesis requires a leap of faith. It is indeed potentially risky to engage with other disciplines, but interdisciplinary research can also be richly rewarding. Working and staying within a discipline is a safe way of ensuring the continuity of a set of collective practices (technical, social, professional and cultural). The CineGenus approach could be construed as an ‘indiscipline’, a moment of breakage or rupture, when traditional practices and methodologies come into question (see: Mitchell [23], p. 541). At best this study may prove to be a useful methodological innovation that paves the way for others in the social sciences. At the very least it can show the potential of arts and humanities to reconceptualise and personalise highly technical energy studies.

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