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Foreground-Background: Investigating Trajectory of Smell in Navigating Architectural Space

(Latar Depan-Latar Belakang: Menyiasat Trajektori Bau dalam Navigasi Ruang Seni Bina)

Ruth Kartika Purnasasmita & Yandi Andri Yatmo*

Department of Architecture, Faculty of Engineering, Universitas Indonesia, Indonesia

**Corresponding author: yandiay@eng.ui.ac.id*

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ABSTRACT

This study investigates the trajectory of smell in space as the basis of architectural design methods development. It began with the discussion that architecture often removes or overwrites the presence of smell based on its stimulating existence created from matter. In this study, the experience of smell is considered in the form of trajectory. This study highlights that—instead of understanding smell as one fixed occurrence in space—understanding smell through the idea of trajectories enables dynamic navigation of boundaries and movement in space. This investigation of the trajectory of smell could reveal layers of smell in space. These layers can be seen in the form of foreground-background compositions. This study investigates smell by conducting the process of smellwalking in the context of Mayestik, a local public market in South Jakarta to reveal such trajectories. In this study, the trajectories of smell are constructed by the smell's movement (the distribution of smell in space), human movement, and the existing layers within the space. The layers and trajectories of smell play a role as olfactory cues in navigating space, highlighting the dynamics and fragmentary characters of smell that are then translated into various acts of bodily responses. These findings suggest possible architectural programming operations based on the layers and trajectories of smell, considering the transactional relations between smell, the surrounding environment, and human movement.

Keywords: Smell; foreground-background; trajectory; movement; navigation

ABSTRAK

Kajian ini meneroka trajektori bau dalam ruang sebagai asas pembangunan kaedah reka bentuk seni bina. Ini bermula dengan perbincangan bahawa seni bina sering menghilangkan atau menimpa bau berdasarkan kewujudannya. Dalam kajian ini, pengalaman dengan bau dianggap dalam bentuk trajektori. Kajian ini menyerlahkan bahawa—daripada memahami bau sebagai satu wujud tetap dalam ruang—memahami bau melalui idea trajektori membolehkan navigasi dinamik sempadan dan pergerakan dalam ruang. Penerokaan trajektori bau mendedahkan lapisan bau dalam ruang. Lapisan ini boleh dilihat dalam bentuk gubahan foreground-background (latar depan-latar belakang). Kajian ini menyiasat bau dengan menjalankan proses smellwalking dalam konteks Mayestik, sebuah pasar awam tempatan di Jakarta Selatan untuk mendedahkan trajektori tersebut. Dalam kajian ini, trajektori bau dibina oleh pergerakan bau (taburan bau dalam ruang), pergerakan manusia, dan komposisi lapisan sedia ada dalam ruang. Lapisan dan trajektori bau memainkan peranan sebagai isyarat penciuman dalam menavigasi ruang dan menyerlahkan watak-watak bau yang dinamik dan serpihan yang kemudian diterjemahkan ke dalam pelbagai tindakan tindak balas badan. Penemuan ini kemudian mencadangkan kemungkinan kepelbagaian operasi pengaturcaraan seni bina berdasarkan lapisan dan trajektori bau dengan mengambil kira hubungan transaksi antara bau, persekitaran sekeliling dan pergerakan manusia.

Kata Kunci: Bau; foreground-background; trajektori; pergerakan; navigasi

INTRODUCTION

This study explores the potential of architectural design methods based on the presence of smell. Discussion of smell is often overlooked in architectural discourses. The smell is a fragmented stimulus based on the existence of particular matter in space (Malnar & Vodvarka 2004; Porteous 1985; Porteous 1990). While identifying the presence of smell in space, humans tend to categorise the smell only on its positive or negative term between the 'wanted' or the 'unwanted' (Henshaw 2014; Spence 2020; Xiao et al. 2018). The positive type of smell is identified as the 'wanted' smell whereas the negative smell is categorised as the 'unwanted' smell, such as the smell of trash and waste (Henshaw 2014; Spence 2020; Xiao et al. 2018). Such unwanted smells tend to be removed or deodorised.

As stimuli that are created from matter, the smell is also perceived based on its pleasantness —between the pleasant and unpleasant. Xiao et al. (2018) mentioned that there are six types of labelling the pleasantness of smell such as (1) purity, including the pure and mixed smell; (2) cleanliness, including the smell that represents the clean and dirty space; (3) freshness, including the smell that shows the space that is fresh or stale; (4) calmness which includes the smell that gives the sense of calm or annoying in space; (5) liking preferences which include the appropriate or inappropriate smell in space; and (6) naturalness which consists of the natural or artificial smell in space. The labelling of smell tends to discriminate the presence of smell (Brady 2005). All of these judgments and labels are associated with what kinds of smell that is considered accepted or rejected in space. Thus, it can be said that humans perceive smell only as stimuli created from matter that the architecture tends to remove or overwrite, specifically the 'negative' or the 'unwanted' ones. However, architecture should consider the various types of smell (Henshaw 2014) and see smell beyond its source of matter.

The smell can traverse physical boundaries (Drobnick 2002) and help navigate in space (Henshaw et al. 2018). Through the presence and the dynamics of smell, they increase human alertness in perceiving space (Malnar & Vodvarka 2004). Thus, the closer engagement between smell and humans becomes important in navigating space. This study then posits smell in the form of trajectories in navigating space that consists of layers. This study aims to reveal the layers and trajectory of smell in navigating space, seeing the smell beyond its source of matter. This study is done through *Smellwalking* which is conducted in Mayestik, one of the public markets in South Jakarta. The investigation involves bodily engagement with the smell to reveal the possible trajectories and the layers within that navigate humans in the existing context. The findings then suggest the architectural programming based on these layers and trajectories of smell. It involves the understanding and engagement between smell's movement, the surrounding environment, and human movement which posit the revealed layers and trajectory of smell as the olfactory cues that will further become the main architectural programming operations.

LAYERS AND TRAJECTORY OF SMELL

The understanding of layers of smell is derived from the terms base note, middle note, and top note (Henshaw 2014; Henshaw et al. 2018; Malnar & Vodvarka 2004). The base note consists of smells that are detected for the first time which are involuntary and could be evaporated for a long time (Henshaw 2014; Henshaw et al. 2018). The middle note includes the smells that are detected between the top note and base note whereas the top note consists of smells that temporarily occurred and could be evaporated in the air faster than the base note (Henshaw 2014; Henshaw et al. 2018). It can be said that these layers are constructed based on the durations and the compositions of smell in the environment. Furthermore, Henshaw (2014) mentioned that base note is categorised as background smell. Since there is a 'background smell', it also raises a question about the presence of the foreground smell. The term 'foreground-background' is derived from the term 'Figure-ground', one of the visual perceptions of Gestalt which allows having a double interpretation, highlighting the dominance of one element over the others (Koffka 1935). Therefore, this study sees the layers of smell in foreground-background compositions. Figure 1 shows how smell are composed in foreground-background layers based on its position and the characters of the physical elements. The background smell is considered as a low-intensity smell. Therefore, it is positioned on the back while the foreground smell is seen as the layer which is more dominant than the background smell in which it is brought to the fore. These layers are then composed within the trajectory of smell based on the existing context.

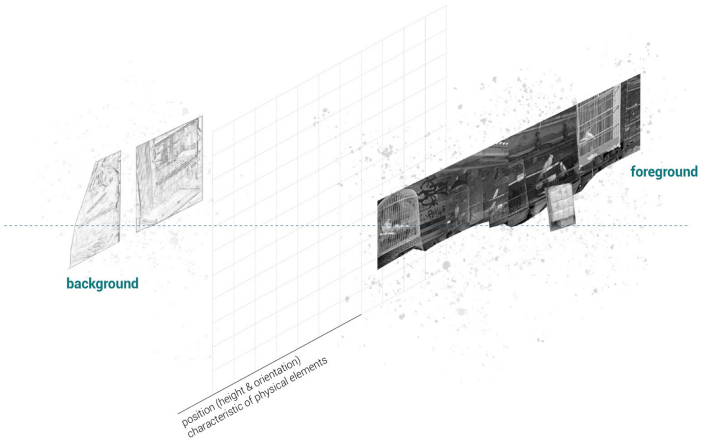

FIGURE 1. Foreground-background layers of smell

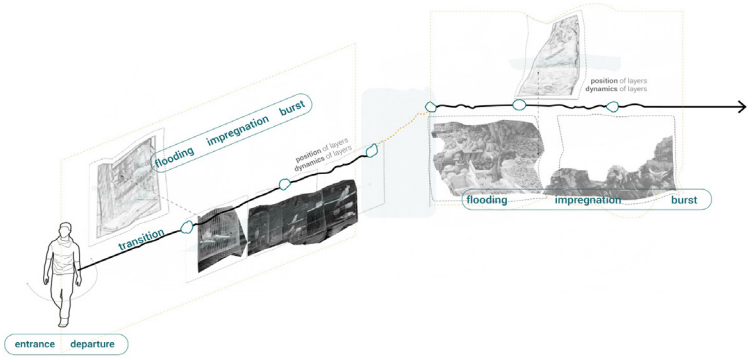

FIGURE 2. Relations between smell and human movement. Adapted from Henshaw (2014)

002) stated that smell could traverse visual and physical boundaries. It then requires human engagement in perceiving smell to reveal the trajectory. Wahid et al. (2021) see the understanding of trajectory requires the actor and the object's movement across space. It involves the contestation and temporality of human movement and other elements in space (de Certeau 1984; Henshaw et al. 2018). In this study, the relationship between both human and smell movement in the surrounding environment becomes important to investigate the overall smell trajectories further. To identify the smell's movement, Henshaw (2014) highlights the importance of how the smell occurred, moves, and is perceived by humans in space. There are several terms such as entrance, departure, transition, flooding, impregnation, and burst (Henshaw 2014). Entrance is considered when humans enter the space for the first time and start to perceive the presence of the smell while departure is related to several arrival points in perceiving smell in the context simultaneously (Henshaw 2014). Transition is identified when humans walk through the smell's movement. Flooding occurs when the smell dominates a certain area. Meanwhile, impregnation is a condition when the smell is attached or tried to move in a certain element, material, or space, whereas burst is when the smell spreads or releases in space (Henshaw 2014).

In other words, the entrance and departure are phases where humans came and perceived the smell for the first time in space. Transition is a phase where humans walk through and identify the presence of smell, while flooding, impregnation, and burst are when the smell moves and spreads in space. The trajectory of smell in this study focuses on the journey of humans while experiencing smell in space in which lies the foreground-background layers within. If the trajectory is seen as a whole, it will narrate the journey of sensing the smell in the environment as shown in FIGURE 2 which begins by detecting the source of smell (entrance and departure phase). Then, humans will sense and experience it by identifying the source of smell

(transition phase). It can be said that humans perform in space while experiencing the presence of smell. However, the smell itself also performs in space. It moves and traverses beyond physical boundaries by attaching to the surface, dominating certain spaces, and spreading to the surrounding area (flooding, impregnation, and burst phase). Thus, to investigate the trajectory of smell, the need to consider the transactional relations between smell's movement, the surrounding environment, and human movement is necessary which could help navigate humans in space.

METHODOLOGY

The investigation of smell explored in this study is conducted through an individual performance of *smellwalking*. It requires understanding and experiencing space in a specific context using olfactory as the main sense (Henshaw 2014). In particular, *smellwalking* involves sniffing and walking in the context with the potential presence of various smell. The *smellwalking* process serves as the tools to capture all the data related to smell in the context, allowing the source to be mapped (McLean 2018 in Henshaw et al. 2018). It affects how the place is experienced using the olfactory system (Allen 2021; Henshaw 2014).

The s*mellwalking* is conducted in *Mayestik*, a public market in South Jakarta, specifically the corridor of the market where it has high trading activities which involve different types of smells to occur. These variations of smells are possible to unveil the dynamics of the source of the smell in space (Malnar & Vodvarka 2004; Porteous 1985, Porteous 1990). The variety of smells in Mayestik led humans to feel disoriented and need to be navigated while passing through it. The context of this study is then divided into two main spots, considering the starting point of the journey. The entrance or the starting point of doing the *smellwalking* is necessary to define the whole journey and the constructed trajectory. Different starting point performs a different arrangement of layers and olfactory experience.

This study took place during the daytime which allows various smells to occur. Particularly, from the smell of food. It began with identifying the source of smell by sniffing along the corridor. While sniffing, the source of the smell and the olfactory experience including the human body's response and engagement are captured, recorded, and mapped visually. These actions are needed to capture and unfold the smell events that occur during the journey (Allen 2021). Then, the foreground-background layers were identified based on the intensity, position, and openness of the source of smell, revealing the trajectory of smell in navigating space. When the layers and trajectory are revealed, they are translated into several human actions of noticing (bodily responses) the trajectory of smell. These responses include how the smell's movement influences human actions while walking and sensing in the context. It is then investigated to see what types of navigation could direct humans in space based on the understanding of smell as dynamic trajectories. The bodily responses will then become the olfactory cues that will further inform the architectural programming operations as the body engages and choreographs with the smell while walking through the context.

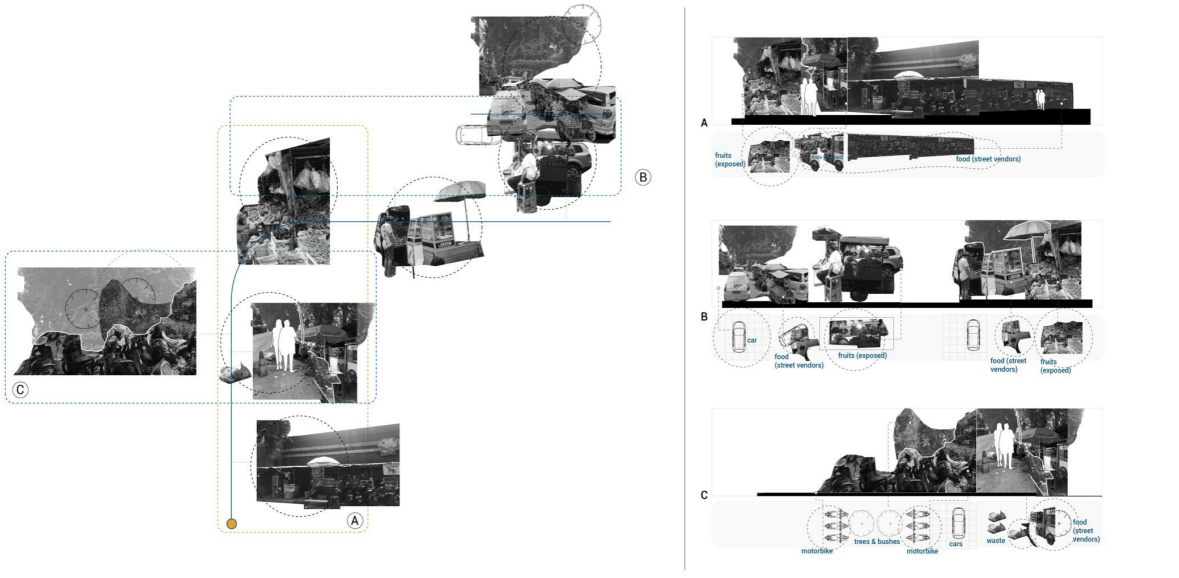

FIGURE 3. *Smellwalking* journey in Mayestik (spot 1)

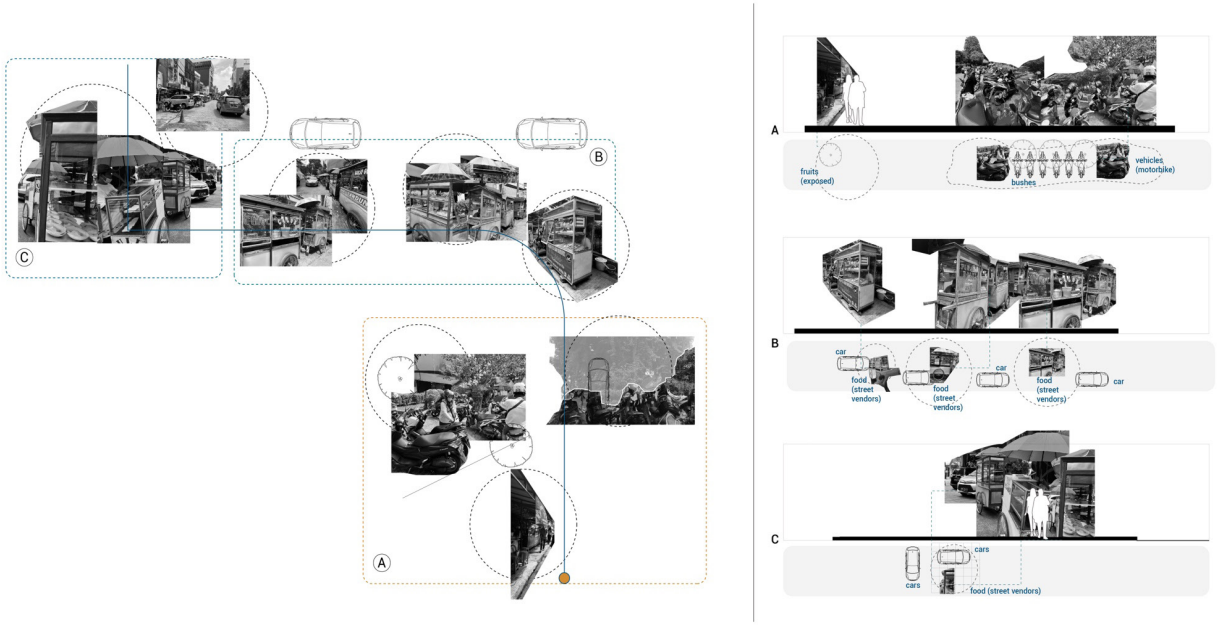

FIGURE 4. *Smellwalking* journey in Mayestik (spot 2)

RESULT AND DISCUSSION

IDENTIFYING LAYERS WITHIN THE TRAJECTORY OF SMELL

This study focuses on the layers and the trajectory of smell. The foreground-background layers could be mapped by identifying the source of the smell. Song and Wu (2022) identify it by investigating its position. It should consider the orientation and heights of the source of the smell. It also could be identified by investigating the density of smell including the size and openness of any physical elements related to the source of the smell (Song & Wu 2022). Moreover, Henshaw and Mould (2013) see that the character of space and or physical elements involve how the source of smell could be identified. Therefore, to investigate the foreground-background layers of smell, it becomes important to identify the position and the openness of the source of the smell. It includes the identification of heights and orientation of the source of the smell and the physical elements related that bound the smells.

During the process of *smellwalking*, it was less crowded. This condition influences the activities and the smells that were detected in each spot where there were various food street vendors found in the context. The chosen context, which is the corridor in Mayestik is divided into two spots. On the first spot (FIGURE 3), some smell came from fruits, savoury and sweet food from street vendors, motorbikes, trees and bushes, and waste while on the second spot (FIGURE 4), there were the smells of fruits, savoury and sweet food from the street vendors, paper, and traffic fumes from motorbike and car found in the context. FIGURE 5 and FIGURE 6 show the position and the openness of the sources of the smell in each spot which are influenced by the height, orientation, and the characters of the source of the smell.

Based on the investigation, the layers are revealed into three conditions which are (1) foreground with high intensity or foreground unmute, (2) foreground with medium intensity or foreground mute, and (3) background. The foreground unmute indicates there are various sources of smell in the context. They are fully opened, accessible, and located on a higher level or human noise level so that the smell could dissolve easily in the air, allowing humans to sniff and react to the released smell easily. The foreground mute type of layer indicates that the source of the smell is not fully exposed in the air since several physical elements bound them. The background smell indicates that the smells are muted by the foreground smell. Only the low-intensity smell is detected in the context.

FIGURE 5. Identifying the position and openness of the source of the smell (spot 1)

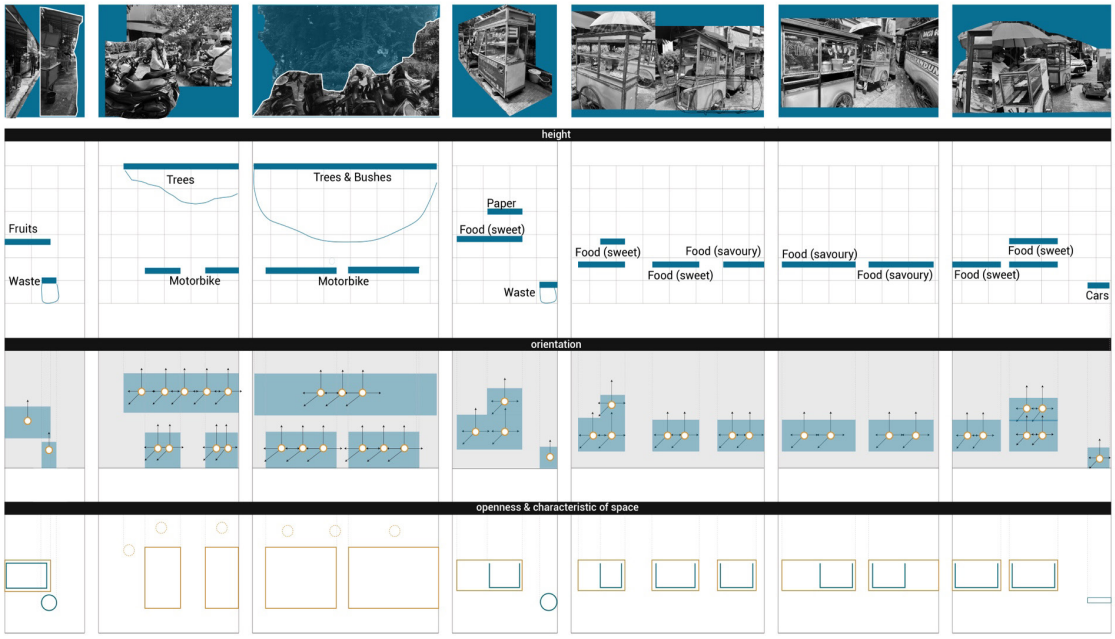

FIGURE 6. Identifying the position and openness of the source of the smell (spot 2)

The trajectory of the first spot in Mayestik started with the occurrence of the background smell, followed by the combination of foreground mute and unmute, then the combination of foreground mute and background, and ended with the presence of the foreground unmute. While on the second spot, the trajectory began with the presence of the foreground unmute followed by the foreground mute type of smell, and ended with the presence of the foreground unmute. Along the trajectory of the second spot, there is also the combination of the foreground mute and background, showing that the type of layers within the trajectory can be mixed based on their occurrence, position, and openness in the context.

The resulting trajectories reveal the position and order of layers showing the intensity of smell and its movement in the context. This study then sees the relations between the whole and parts of the trajectory. When we see the trajectory as a whole, there lie several parts which are the foreground-background layers. It emphasises the characteristics of smell that are fragmentary and dynamic. It shows the particular and total aspects that will then mediate humans and the source of smell, allowing humans to act and reflex in certain movements based on the dynamic layers within the trajectory. It also encourages humans to move around and be physically alert (Sennett 2018) with the presence of smell in the context.

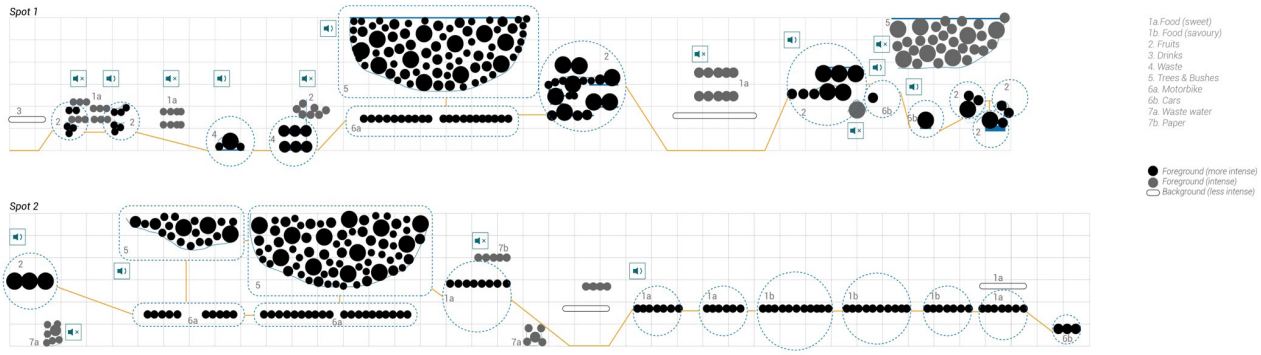

FIGURE 7. Mapping *foreground-background* of smell in Mayestik

TRANSLATING THE TRAJECTORY OF SMELL: DYNAMIC NAVIGATION

This study then translates the constructed trajectories of smell in navigating space. The resulting trajectory allows various humans' bodily responses in perceiving the smell and layers differently based on the foreground-background composition. Thus, this study translates the trajectory of smell in navigating space by referring to human actions, responses, and movements towards the smell's movement while conducting the *smellwalking* in the context. Mustikawati et al. (2019) see human movement actions as tours operations during the wayfinding journey which involved several body movements. This study found four bodily responses, composed of foreground-background layers within the trajectory of smell.

(1) When the layers are identified as the foreground unmute, the smell actively moves and spreads through the context. It triggers humans to move to a different point and look into the source of smell until they can identify it by turning their heads and body. When the foreground unmute is identified, it becomes the main signage in navigating space. For instance, it is experienced when the smell of waste is detected in spot 1. Humans simultaneously move to a different point and then turn their heads and body to locate the source of smell which requires more active movement and actions. (2) When the layers are identified as the foreground mute type, the smell moves and spread through the area. It needs humans' closer attention and engagement to be able to sense it. Since it is considered as the foreground mute, it requires humans to walk slowly toward the source of the smell to unfold the smell that could be hidden (Allen 2021). For instance, it is experienced when the smell of food in spot 1 filled the area during *smellwalking.* The presence of the smell triggers humans to look closer and walk slowly toward the source of the smell. It is because the smell's intensity is moderate which is not as high as the foreground unmute type.

(3) When the layers are identified as the background type, the smell is hard to sense, triggering humans to be in pause mode while sensing and walking through it. It acts as a transition between other layers of smell due to the low intensity of the smell. It could act to neutralise the olfactory sensory while sensing the smell and it requires less human movement. For instance, it is experienced when the smell of puddles is detected in spot 2. The intensity is low which requires humans to pause to be able to sense the smell.

(4) When the layers are identified mixed and overlayed along the trajectory, the smell with the higher intensity shifts the position of the smell with the lower intensity.

This shifting of smell plays a role as a marker of position to direct and inform humans to walk through it—from the most dominant to the lesser ones—since it has a high and dynamic movement of smell. For instance, it is experienced when the smell of water (background) and traffic fumes from cars (foreground unmute) occurred in spot 2. While *smellwalking,* the smell of traffic fumes as the foreground unmute shifts the position of the smell of water, allowing humans to walk through it to experience this shifting position. Figure 8 and 9 show how the foreground-background layers (part) are composed as a whole trajectory during *smellwalking* in Mayestik.

Various body performances are constructed along these translated trajectories, including human actions and smell movement. The more active the smell moves; the more dynamic humans' active movement and engagement are triggered. It is considered a diachronic experience according to Aasen (2019), allowing humans to move around to track the source of the smell. This diachronic experience creates a spatial direction (Aasen 2019) that could be achieved by sensing and experiencing the smell totally as the body needs to be physically aware of its presence and absence (Allen 2021). The bodily responses from this study (move, look and engage closer, pause, shift, and then walk through) become the olfactory cues in navigating architectural space. They play roles as responses toward the presence and movement of smell in the environment. These actions were markers that signify the spatial dynamics that transformed through space and time (Wahid et al. 2021).

The olfactory cues then work as humans' reference to help orient themselves in space and as a signage of the upcoming event (Koutsoklenis & Papadopoulos 2011). They are seen as information that could help in wayfinding. Therefore, the understanding of the olfactory cues is not limited to the physical presence of the building (Koutsoklenis & Papadopoulos 2011). It could be expanded by seeing the dynamic layers and trajectory of smell that translated into various bodily responses. Based on the understanding of the trajectory of smell, this study suggests architectural programming which focuses on the movement of smell and how it has transactional relations between smell, humans, and the surrounding environment. The architectural space could be dynamic and fluid (Paramita et al. 2022) responding to the smell movement, human actions in the context toward the smell, and the temporality of the smell's trajectory.

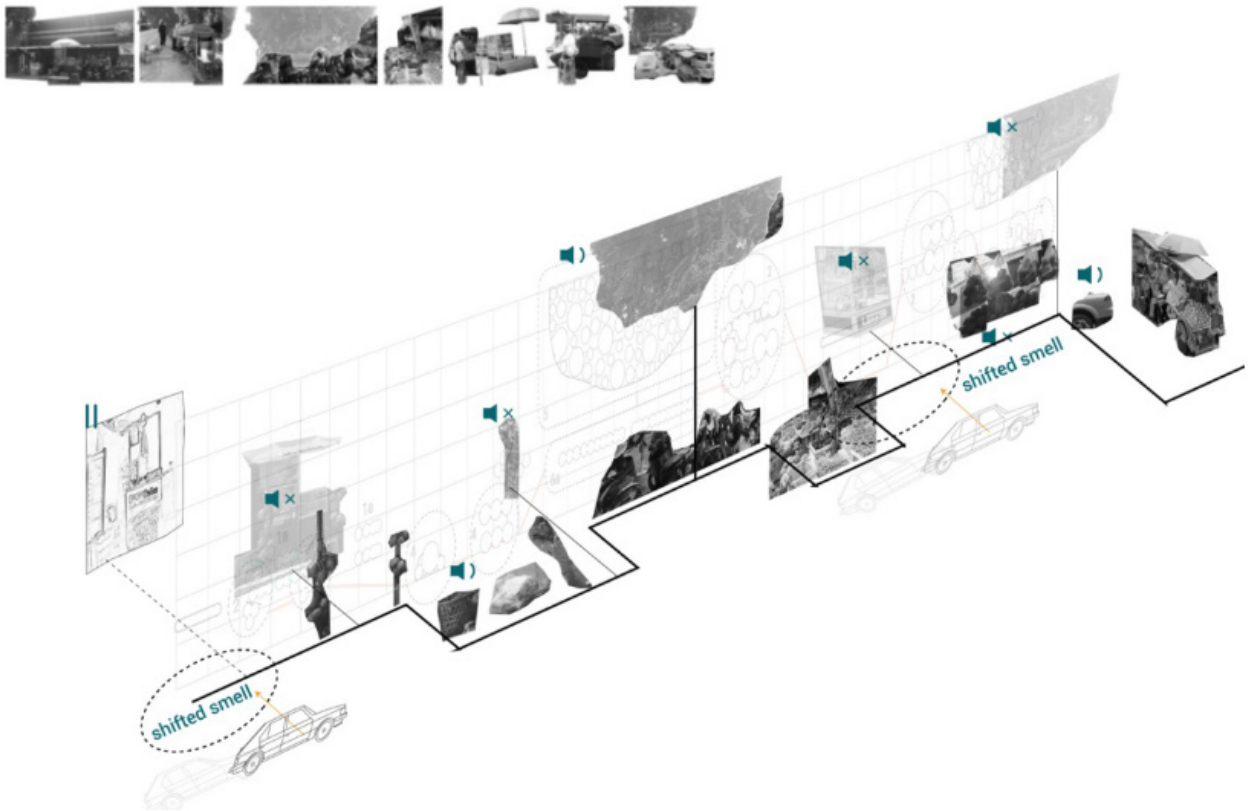

FIGURE 8. Revealed layers within the trajectory of smell (spot 1)

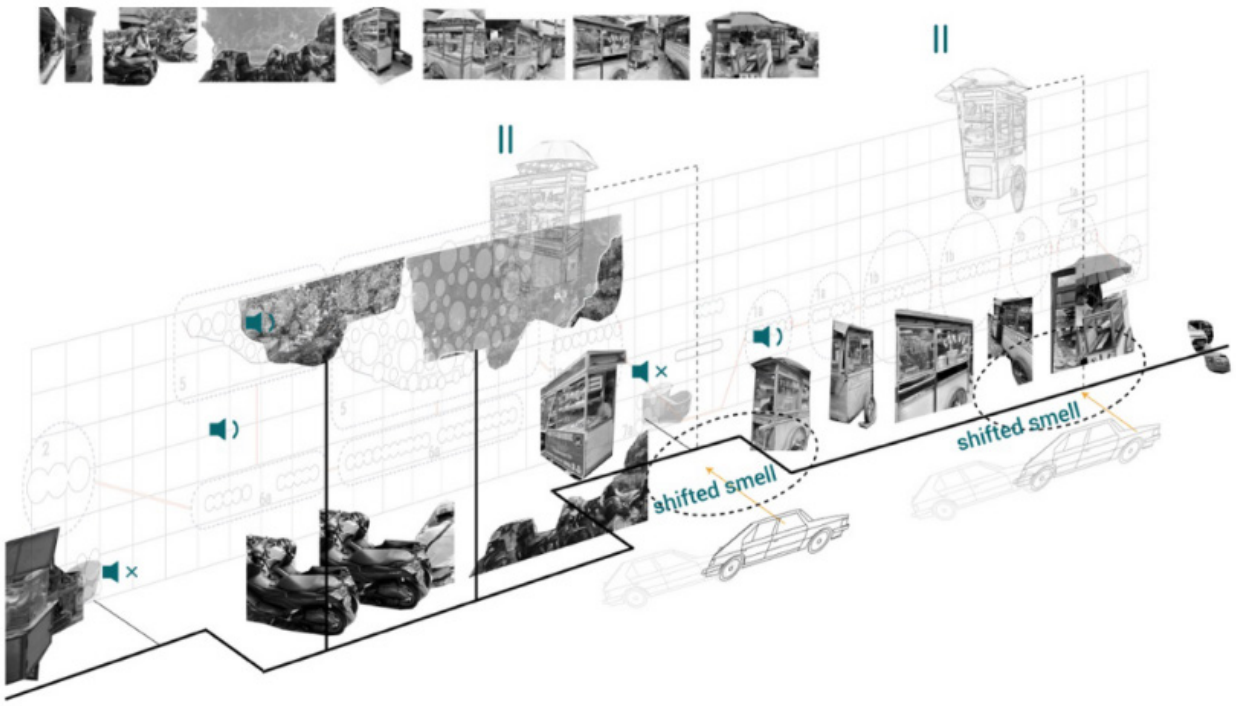

FIGURE 9. Revealed layers within the trajectory of smell (spot 2)

CONCLUSION

This study shifts our understanding of the role of smell in architecture which was previously seen as single-occurring stimuli created from matter to dynamic trajectories that consist of layers in foreground-background compositions. It shows how smell's fragmentary and dynamic characters could inform and trigger human actions and movement in navigating architectural space, allowing them to act and reflex in certain ways. The foreground-background layers are identified based on the intensity, position, and openness of the source of smell, namely, foreground unmute, foreground mute, and background.

This study took place in Mayestik, South Jakarta by conducting the process of *smellwalking*. This study found how the layers of smell are composed as trajectories based on experiencing the existing context toward the source of the smell. The trajectory of smell (whole) needs to be seen into layers (parts), allowing the human to have a closer engagement with the smell in navigating space. The switching between the whole and parts is needed to reveal the particularity and totality while perceiving smell in architecture that sees beyond the source of matter.

The dynamic navigations that are translated as various bodily responses play roles as olfactory cues in navigating architectural space. These bodily responses in this study include moving, looking and engaging closer, taking a pause, shifting, and walking through the context. They are narratives that show the transactional relations and stories between smell's movement, human movement, and the surrounding environment from unfolding the foreground-background layers and the trajectory of smell. The findings will then be further developed into architectural programming operations. However, this study is conducted based on the existing condition which is highly influenced by uncontrolled variables, such as the weather, climate condition, and crowds at the specific time the observation took place. Further micro investigation through experiments using controlled variables to the source of the smell is needed to expand wayfinding vocabularies and operations in developing architectural programming. Moreover, different subjects and numbers of participants could also perform bodily responses differently which will enrich the vocabulary of wayfinding operations for architectural programming.

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