Falling Echoes: Expressing the Act of Falling in Dreams Through Generative AI

Sijia Liu, Kexue Fu, Xiaoke Zeng, RAY LC

City University of Hong Kong
Hong Kong SAR
sijialiu7-c@my.cityu.edu.hk, kexuefu2-c@my.cityu.edu.hk, xzeng36@cityu.edu.hk, LC@raylc.org

Abstract

Recurring dreams of falling often symbolize uncertainties and anxieties, reflecting a perception of losing control. On the other hand, exploring these dreams may empower individuals to confront such negative emotions. In this work, we interviewed 15 participants regarding their narratives of falling dreams. We analyzed these narratives to extract the patterns as keywords and phrases, which were then used as prompts to create videos for each pattern using the text-to-image tool Stable Diffusion Deforum. The outcomes from the generation were displayed in an exhibition, immersing audiences in the sensation of falling as depicted in the interviewees' dreams. This work underscores the capacity of GenAI to enable an expressive re-interpretation of common everyday experiences.

Keywords

Dream Visualization, Generative AI, Immersive Art, AIGC

Introduction

Falling dreams are often seen as symbols of losing control or facing uncertainties, reflecting anxieties about negative outcomes. [1] By delving into the narrative and symbolism of falling dreams, it has the potential to lead individuals to a deeper understanding of their own sense of control and empowerment related to real life. [2][3] However, the ephemeral and elusive nature of dream memories often makes them difficult to recall and interpret with accuracy [4]. A potential tool to describe, document, and prototype dream state recollections is Generative AI (GenAI) [5], which may be thought of as a collection of data that enables visual depiction of novel states from verbal description. This process may be used to record dreams, enabling dreamers to revisit and perhaps reinterpret their experiences with new clarity.

This work addresses the following research question:

RQ1. What processes do people take to imagine and interpret their own dreams of falling, and how is this represented by text-to-image GenAI?

RQ2. What do the contents of people's imagined AIGC reveal about their interpretation of their own state of falling in dreams?

To explore these questions, we developed "Fall Echoes," an immersive art project employing AIGC to generate visual interpretations of falling dreams. Informed by interviews with 15 individuals who had previously experienced such dreams, we used AIGC tools to transform their described experiences into visual scenarios. "Fall Echoes" allows exhibition visitors to engage with the sensation of falling, where their actions could change the speed of falling, replicating the experience of losing gravity during the interactive display. This project attempts to facilitate people's sensory reconnection with falling experiences in dreams. It explores a natural-language process to empower their reflection and reinterpretation of the falling experience in dreams. It reveals the potential of generative AI to enable individuals to express their dream memories, and potentially to interpret dream symbolisms in new ways.

Background

Recurring Falling Dreams

Recurring dreams often serve as a window into an individual's subconscious awareness. [6] As one of the most frequently occurring typical dreams, falling dreams are not usually isolated occurrences; [7] if a person experiences a falling dream once, it is likely they will have similar dreams again. [8] Psychological interpretations, as outlined in various dream dictionaries, suggest that falling dreams are frequently linked to an individual's apprehension about confronting inner emotions or a fear of failure. [9] In terms of physical health, these dreams are associated with 'hypnic jerks'—involuntary muscle twitches that occur as the brain misinterprets the sleeping state, leading to a sensation of falling. It can be triggered by various factors including caffeine consumption, physical exercise, and emotional stress, among others. [10]

Dreams with impactful content are often seen as intrusive and uncontrollable.[11] Negative dreams occur more frequently than positive ones, and their content is

often more intense than experiences in real life.[12] Falling dreams, which are commonly classified as negative dreams, are associated with anxieties, conflicts and fears in waking life, and manifest as a sense of loss of control for the dreamers. [13]

Challenges in Recalling of Falling Dreams

Recalling dreams allows individuals to potentially engage with and be affected by their waking life and sense of self. [14] Some dreams will be remembered, while others are easily forgotten upon waking. Although the causes of falling dreams are complex, the memories of such dreams are notably vivid and striking. [15] Many individuals can recall specific details or the emotions they felt during this type of dream.[16] Even if certain details fade, the sensation of falling often remains etched in the memory and could be recalled by dreamers. [17]

The memorability of falling experiences in dreams lends itself to the potential for tracking or recording these dreams. However, accurately capturing or describing these dreams still faces significant challenges. False and distorted memories in dreams cannot be avoided. People easily confuse details from dreams with real-life experiences, so the recalled sensation may not purely originate from dreams. [18] Articulating dreams into physical experiences through descriptive language also presents difficulties, particularly when recalling negative perceptions, which may simultaneously evoke negative emotions [19] Recording people's recollections of falling dreams may not be as accessible as anticipated.

Innovations in Dreams Visualization with AIGC

As generative Artificial Intelligence (AI) offers novel methods for visualizing and symbolizing elusive contents, image-generating AI models, such as Stable Diffusion or Midjourney, can recreate scenarios from simple verbal prompts. [20] This ability suggests that AIGC might be effectively utilized to provide tangible representations of abstract scenarios, such as future environments or dreams, which are often difficult to articulate or envision. [21] Recent artwork began to employ AI-generated content (AIGC) to visualize the dream contents, assisting in the recall of forgotten dream sequences and addressing the issue of inadequate descriptive language for dreams. [22]

Methodology

Pre-interview

To collect narratives of actual recurring falling dreams, we conducted preliminary interviews with 15 participants who have experienced such dreams. Participants were recruited through convenience sampling from academic institutions and the WeChat platform. The exclusion criteria included individuals who either lacked a specific falling dream experience or possessed research experience in related fields.

Pre-interview Questions

We conduct initial interviews with participants to gather narratives of recurring falling dreams. Drawing on prior studies on typical dream patterns, we designed the interview questions to probe into the frequency, sensations, and interpretations of falling dreams. [23] The interview questions are as follows:

- Have you ever had recurring dreams?
- Have you ever dreamed of falling?
- Have you dreamt of falling multiple times? Approximately how many times or at what frequency?
- If you have, please describe a falling dream that left a deep impression on you. You can use keywords like time, place, characters, etc.
- Have you ever had a real-life falling experience related to your dream?
- Has the dream of falling had an impact on your life? Is it positive or negative?
- Have you ever tried to interpret or understand your falling dream experience? If so, how did you interpret it?
- Do you think this kind of dream is related to your current life or emotional state?
- Does the sensation of falling evoke any particular emotions in you, like fear, excitement, release, or others?
- Do you wake up at the end of the falling dream? Or does it transition to another dream?

Workflow of AI Generated Dream Scenarios

We employed the Deforum Plugin within Automatic1111 (V.1.6.0) for Stable Diffusion (Version 2.0) as our Generative AI tool to produce videos that visualize the described falling experiences in dreams (Figure 1). Each video features a frame rate of 15 fps and a duration of eight seconds. We applied an open coding approach to the interview data to identify and categorize themes of falling dreams. [24] These narratives were then translated into prompts, including both the most common themes reported by participants (Table 1) and uncommon themes with specific details. We iterated keywords and phrases as prompts at every two frames. The selected descriptions for

formulating prompts included environmental features, architectural styles, and colors that are most common and readily interpretable by current models of generative AI. [25] In total, we generated 20 videos. Fifteen of them were individually tailored to each interviewee, based on their personal dream contents, while five videos were generated to represent common themes. For analysis, we selected 14 videos that were most relevant to the contents, while the remaining videos were not selected due to their failure to idealize the intended themes.
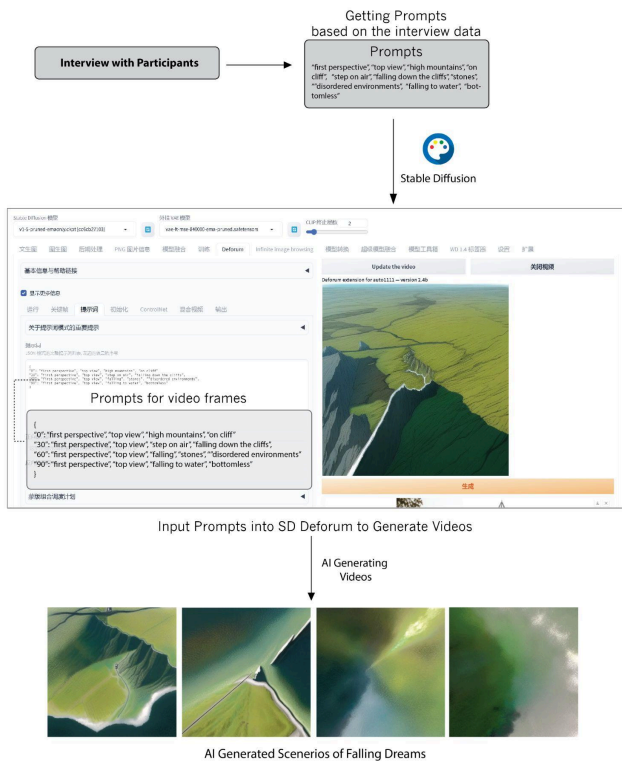

Figure 1. Workflow of Visualizing Falling Dreams with Generative AI, as Reported by Participant P14. P14 depicted her falling experience: "I was always at a high place, like a cliff? I believe. I stepped on air without any support. My falling process was long and helpless because it felt infinite. The surroundings during the fall were messy and disordered. There was water below, and I was afraid of drowning." Based on the narrative, we formulated the prompts such as "high mountain", "cliff", "bottomless", "disordered environments", "falling into water", and "stepping on air". These prompts were sequentially input into Stable Diffusion (SD) to generate the corresponding video frames.

Art Exhibition

We presented the AIGC-generated videos in an exhibition format. The 14 selected videos for analysis were displayed as a sequence in a projection mapping format. It allows the audience to experience the dream videos to immerse themselves in the diverse sensations of falling dreams.
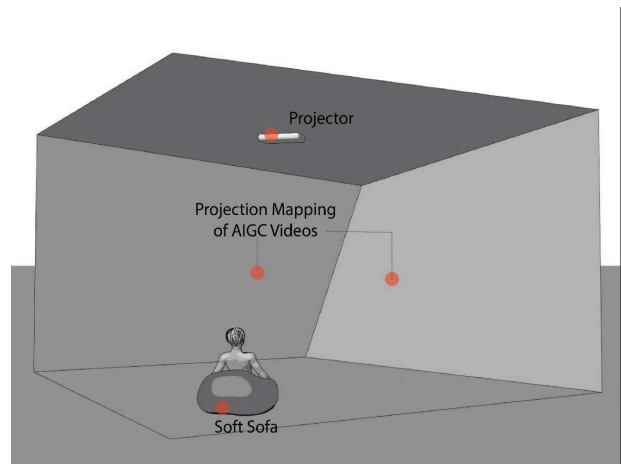

Figure 2. The design of exhibition set up

The exhibition area is designed to replicate the dark and immersive atmosphere of sleep. In this space, we provide comfortable sofas for the audience to relax on. The sofa is as soft as a bed, inviting people to unwind, while evoking the sensation of falling due to their plushness at the same time. We attempt to employ projections that immerse attendees in a simulation of falling dreams, making the experience as authentic as possible. (Figure 2, 3)

Figure 3. Exhibition venue of Falling Echoes. The audience was watching the projection of AIGC videos. (right)

This installation represents the first version of our artwork for the research topic. In future work, we plan to integrate interactions, allowing for a more dynamic and engaging experience.

Results

From Dream Descriptions to AIGC

The interview data revealed common themes in the content of these dreams, including missing steps, escaping and flying to fall, as well as falling from stairs, mountains, and high buildings, etc. (Table 1) These dream scenarios were

frequently mentioned by multiple interviewees. To depict the general contents of falling dreams, we utilized keywords related to these falling environments as prompts to visualize the video clips. (Figure 4)

Participants	Contents of Falling Dreams
P03, P05, P08, P11. P12	Missing A Step/Step on Air
P01, P04, P06, P07, P13	Buildings/Tower/Rooftop
P03, P11, P12	Stairs
P08, P10, P14	Mountains or Cliff
P09, P03	Escaping from Pursuers
P06, P08	Jumping from Danger
P04, P09	From Flying to Falling

Table 1. Common Themes in Falling Dreams as Reported by Participants

Figure 4. Screenshot from videos generated by Stable Diffusion, based on common themes in falling dreams interpreted by participants. Upper Left: A Stairway View. Upper Right: Over-the-Edge Perspective. Lower Left: Vertigo at the Cliff's Edge. Lower Right: Skyward View from Towering Edifices.

"Missing a step" or "Stepping on air" generally occurs in dreams about falling (P03, P05, P08, P11, P12). This sensation is often the sign of the falling process in dreams.

P05 states that even if other details are forgotten, the feeling of stepping on air was impressive and alerted him to the fact that he was falling. It can also serve as a precursor to falling in dreams, as described by one participant: "I can see my feet on the edge of a high place, and I know I would fall." (P12, Figure 4 Upper Right). Another participant shared, "I know the front is empty, and then I step on it to fall" (P03). Participants explained that high places are associated with the fear of falling. Thus, these predictions can be considered as being formed based on a combination of real-life and dream experiences, following repeated occurrences of falling dreams.

Experiencing a sensation of stepping on air and falling from stairs simultaneously is a phenomenon reported by multiple participants (P03, P11, P12, Figure 4 Upper Left). Falling from stairs is also a recurring theme in these dreams and may have a connection to real-life experiences, as some participants who had falling dreams had actual incidents related to stairs. For instance, P11 mentioned, "I used to fall down from the stairs, just like in my dream." Even though P09 and P13 did not explicitly mention stairs in their falling dream narratives, they recalled experiences of falling from stairs in their waking lives.
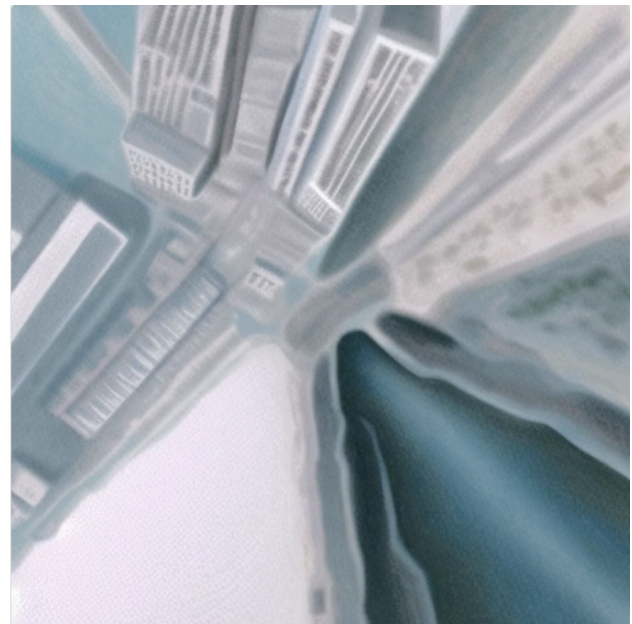

Figure 5. Screenshot from a video generated by Stable Diffusion based on dream experiences of P06 and P07, falling from the urban- style high buildings.

As participants provide more details about their dreams, AI-generated videos can depict them more specifically. Although falling from high buildings or rooftops is

mentioned by different participants, some of them can relate their dream experiences to real-life contexts or offer their own interpretations. These make it possible for the generated videos to incorporate these additional details.

P06 and P07, both of whom have experience living in dense urban cities, related their falling experiences in dreams to the tall urban-style buildings. (Figure 5) Another participant described her dream as: "I stood on a rooftop, but it felt like I was on a single plank bridge, and then I fell from it" (P01, Figure 6).

Figure 6. Screenshot from a video generated by Stable Diffusion, based on dream experiences interpreted by P01, falling from a bridge like high place.

Some participants shared details of their dreams that go beyond typical themes. These dreams not only feature special environments but also depict unique situations or stories.

"In all of my falling dreams, I would attempt to fly but failed and ended up falling. Once in my dream, I would try to escape from men in black who were chasing me in a Chinese forbidden city-style building. I tried to fly from one rooftop to another, but I lost control of my legs. As I fell, I could see the people who were chasing me above me." (P09, Figure 7) This account illustrates how the falling metaphor is often used to represent a loss of control, as evidenced by phrases such as "lost control of legs," and "unable to fly to escape". The presence of Chinese architectural features underscores the influence of the

dreamer's real-life environment, suggesting that their dreams are shaped by their personal experiences in China.

Figure 7. Screenshot from a video generated by Stable Diffusion based on dream experiences interpreted by P09, falling from a Chinese style building at night.

Interpretation on AIGC Dream Scenarios

The AIGC videos serve as a reminder to the participants of their dream experiences. Participants who initially provided general descriptions of their dreams often find most of the video clips strikingly similar to their own dreams. Some clips even align more closely with their dream experiences than the ones generated based on their descriptions. Participants note that the videos generated based on experiences shared by others jog their memories about similar but forgotten details within their own dreams.

P01 finds that not only does the video featuring a bridge, generated from her own experience, resemble her falling dreams, but the other video clips depicting a descending process can also be related to her dream experiences. P12 notes that the video generated in relation to her description is similar to her dream. However, she also feels that the other one closely aligns with her dreams: "But the one with the bridge also resembles my dream because the bridge broke at one moment, much like my feeling of sudden falling."

The participants who provided detailed interpretations indicate that the videos generated based on their dreams are the most accurate representations. P09 stated, "It is definitely the dream experience I had before, so vivid! All

of the elements are right. I can even recall the feeling of struggling on my legs." She also discovered that the AIGC videos reminded her of something she had overlooked while recalling her dream. "I had never realized that it was nighttime in my falling dreams until I watched the video. It recreated the nighttime scenery based on my story, and coincidentally, it was right." The participant found it intriguing that she had not realized the significance of this detail in her dream story until she viewed the AIGC video. Therefore, AIGC appeared to empower people to have new insights about their perceived dream experiences.

The AIGC videos were positively transformative for certain participants. P09 felt they built a more fantastic story than her dream. Instead of the stressful fleeing and chasing, the AIGC makes her falling dreams more like a fairytale, transitioning from the loss of control in the original dreams to a rollercoaster-style descent in AIGC falling dreams, which feels more akin to flying. P14, who always has very distressing falling dream experiences that leave her feeling helpless, found therapeutic relief in the AIGC videos depicting falls from green cliffs, which contrasted with her nightmarish falling experiences.

Discussion

RQ1. What processes do people take to imagine and interpret their own dreams of falling, and how is this represented by text-to-image GenAI?

Based on the interview data, several common themes emerge. Participants often describe sensations such as suddenly stepping into thin air, losing control of their movements, and experiencing nervous or stressful emotions during the fall. These physical and emotional experiences shape their interpretations of the dreams.

The dream environments also play a role in how participants interpret their falling dreams. For example, dreams set in high buildings may evoke feelings of living in an urban city, while dreams set in stairs may relate to their real falling experiences. Participants draw connections between these dream environments and their real-life experiences, finding parallels or symbolic meaning in their interpretations.

Text-to-image Generative AI (AIGC) technology can represent these interpretations by generating visual representations based on the narratives provided by participants.[24][25] The more details participants can recall and describe about their falling dreams, the more information the AIGC can use to create videos that align with their experiences. These videos can serve as vivid reminders of their dreams, capturing the essence of the falling sensation and the dream environment.

RQ2. What do the contents of people's imagined AIGC reveal about their interpretation of their own state of falling in dreams?

The contents of individuals' imagined AIGC videos offer insights into their personal interpretations of falling in dreams. From the interviews, participants described their falling experiences, highlighting sensations, emotions, and the surrounding environments they encountered in these dreams. When these descriptions were translated into prompts for generating AIGC videos, they facilitated a reconnection with the memories of these perceptions and details. Both P01 and P09 noted that the videos evoked feelings of losing control and experiencing weightlessness, similar to their dreams. By visually recreating these scenarios, AIGC videos not only evoke memories but also encourage deeper exploration and reflection on the dream state, potentially enriching recollections with additional details. For instance, P09 recalled that her dream occurred at night, a detail she remembered only after viewing the video. Furthermore, these AIGC videos can help participants connect their sensations in dreams with real-life experiences. Both P09 and P12 realized that their actual experiences of falling had parallels with their dreams, a connection they had not made until after watching the videos.

Moreover, the AIGC has the potential to reinterpret the falling dreams from a negative to a positive perspective. Falling dreams always evoke fear, vulnerability, or a sense of loss of control, as described by the participants during interviews. P14 characterized her falling dreams as distressing and bleak, while P12 found them frightening. However, the AIGC-generated videos can present alternative visual narratives, transforming these interpretations into more positive ones. P12 felt the videos were romantic and warm, contrasting with her initially terrifying dream experiences, and P14 likened the videos to entertaining amusement park rides, marking a significant shift from her original unnerving dream interpretations.

Limitation

Generative AI may not always capture every nuance of the scenarios depicted in participants' dreams, potentially failing to accurately represent specific moments. Its

efficacy is contingent upon the clarity and detail of the descriptions provided. Moreover, it may struggle to depict complex or abstract elements of dreams, which can be challenging to visualize.

We are also concerned about the potential induction of false memories. Providing individuals with a representation that only partially aligns with their actual dreams could inadvertently implant new [28], inaccurate memories, especially since generative AI has been scrutinized for possibly leading to such distortions. [29] As participants recall their dreams, these AI-generated visuals might influence their memory recall, even if their original memories are precise. The translation into AIGC could inadvertently alter or fail to preserve these authentic recollections.

The tangibility of dreams presents another challenge. Some participants described scenarios where they actively initiated a jump, transitioning into falling (P06, P08), or were pushed by others (P10), or experienced falling in a feverish state (P12). While these personal stories provide distinct perspectives on the experience of falling in dreams, visualizing these specific patterns with AI-generated content proves difficult.

Future Work

To improve our current project and explore future research avenues, we intend to add interactive modalities for presenting AIGC videos. Recognizing that physical movements during sleep may be related to the sensation of dreaming [30], we have added a Kinect system to detect the audience's movements, enabling them to engage with the videos. (Figure 8) The movements of the audience could change the view and speed of the projections, potentially enhancing the immersive quality of falling experiences and offering a sensation of control within dreams.

There is an existing research project that simulates flying movements in VR environments to explore the empowerment potential of flying dreams. [31] This research provides valuable insights into exploring self-efficacy and emotion in dreams through embodied movements. Drawing upon it, our future project may have the potential to explore the empowerment of self-control in falling dreams. Inspired by the existing project, we also plan to integrate virtual reality (VR) technology to create more immersive dream visualizations in our future work. Moreover, we aim to enhance the tangibility of dreams by employing multisensory and wearable devices tailored for

sleep and dream research [32], which could offer a more comprehensive dream experience.
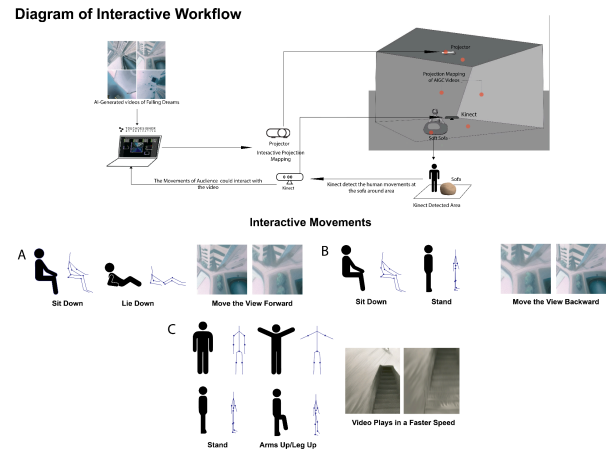

Figure 8. Planned Improvements for Art Installations: We plan to add a Kinect sensor to bring dynamic interactivity between viewers and the artwork. The audience's movements will alter the video projection: A. Sitting or lying down will cause the video to zoom in and advance forward. B. Standing or transitioning from sitting to standing will result in the video zooming out and retreating backward. C. Gestures such as lifting arms to resemble 'floating' or 'flying,' or lifting a leg as if stepping into the air, will speed up the falling sequences in the video. These interactive features are designed to intensify the immersive sensation of falling within a dream.

Conclusion

Our study explores how dreams can be reinterpreted using GenAI. After gathering and analyzing narratives from 15 participants with prior experiences of falling in dreams, we translated these descriptions into prompts for the Stable Diffusion Deforum. We generated videos depicting these falling experiences, which were showcased in an exhibition. The videos attempted to capture the sensation of falling and offered individuals potential inspirations to reinterpret their dream experiences. This endeavor underscores the potential of GenAI as a tool for the creative exploration of dream narratives. It forms a blueprint for empowering imagination of difficult-to-interpret human mental phenomena.

Acknowledgement

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