Visualizing Future Visions

A Pattern and Case Study on Creative Utilization of Image Generation with Generative AI

Takashi Iba [*1], Kiyoka Hayashi [*2], Kazuki Hioki [*2], Sae Adachi [*1]

*1 Faculty of Policy Management, Keio University
*2 Graduate School of Media and Governance, Keio University

Abstract

In this paper, we propose leveraging generative AI's capabilities to generate visual representations of future visions. These envisioned futures, previously unrealized and challenging to depict, are now accessible through the advanced technology of generative AI. By translating verbal instructions into photorealistic images, we can now create tangible representations of prospective futures. This advancement signifies a democratization of visualizing future visions. Within this context, we introduce a pattern of practice called "Future Vision Image Generation" and showcase concrete examples from our exhibition, illustrating the potential of this practice.

1. Introduction

Amidst the rapid expansion of generative AI, concerns are mounting over the possibility of AI encroaching upon opportunities for humans to demonstrate their diverse capabilities. The latest AI systems are competing with and even outperforming humans in a range of tasks and in some domain areas (Bubeck *et al.*, 2023), which implies that significant current employment opportunities will be replaced by AI (Briggs & Kodnani, 2023). There are also concerns about the risk that AI leads to lost decision-making opportunities (Ahmad *et al.*, 2023) as well as a decline in our own skills due to "Overreliance on AI" (Buçinca *et al.*, 2021).

Nevertheless, if we continue to engage in creative activities and harness generative AI for endeavors beyond the reach of traditional tools, we can potentially leverage generative AI as a force for creative collaboration. This paper delves into such creative applications of generative AI, particularly focusing on employing its image generation capabilities to visualize future visions.

In the following, to provide one idea of an approach to use generative AI for visualizing future visions, we will present a pattern of Future Vision Image Generation. This pattern was identified based on our, the Iba Laboratory's, activity to visualize the future image of Creative Society which we are aiming for, utilizing generative AI. This activity will also be shown as a case study below.

2. Pattern

Future Vision Image Generation

You would like to share your envisioned future with others.

▼ In this context

While verbal descriptions often fall short in fully conveying complex ideas, commissioning professionals to create illustrations or photographs for future visions incurs significant costs. Since these visions represent states yet to occur and tend to be vague, it's inherently difficult to share one person's perspective with another. Explaining complex ideas through words often falls short, and attempting to express them through illustrations or photographs incurs significant costs in terms of time and effort, especially when collaborating with artists.

▼ Therefore

Leverage the capabilities of generative AI to craft and showcase images that embody your future vision. Advanced generative AI systems, such as ChatGPT Plus DALL-E 3, Bing Image Creator, and Adobe Firefly, can transform written narratives into visual depictions. To do so, clearly articulate your future vision in words and input it as a prompt to generate an image or images. Revising your prompt and generating images several times may be necessary to accurately capture the visual representation of your vision.

▼ Consequently

Even though you're portraying scenarios that have yet to manifest, you will be capable of visually communicating your future vision to others. You'll have the ability to generate varied scenes and characters, enabling you to customize the imagery according to your audience's needs. Also, transforming your ideas into words can further clarify your vision. This practice of visualizing individual future visions not only fosters more dialogue about the future but also promotes collaborative efforts toward a collective tomorrow.

3. Case

The case we introduce here is our exhibition at the "SFC Open Research Forum" (ORF) in November 2023. The ORF is an annual event held at Shonan Fujisawa Campus (SFC), Keio University, where the authors belong. It serves as a place to widely present the results of various research activities to industries, national and local governments through exhibitions and sessions. This year's theme was "Nature of SFC: On The Ground."

3.1 Iba Lab Exhibition at ORF2023

At the forum, the Iba Laboratory presented an exhibit with the theme of "Living in a Creative Society." We have long maintained that the successor to the information age will be what we term a 'Creative Society' (Figure 1). We now believe we are truly on the cusp of entering this

Creative Society. Here, individuals will start to create their own objects, methods, practices, and even lifestyles (Iba, 2013, 2016). We foresee a transition from a world of uniform, externally imposed options to a time where individuals tailor their surroundings to their personal preferences. Furthermore, the future we seek is not one constrained by technology but one in harmony with nature, fostering a more humane, vibrant, and fulfilling way of life.
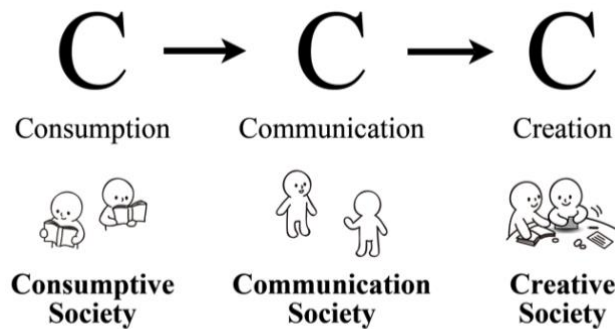

Figure 1: Social Change to the Creative Society (Iba, 2016).

Although we stand at the threshold of the Creative Society era, the future we envision is currently only seen in scattered glimpses, not yet fully arrived. Consequently, it's impossible to see it with our own eyes. Even more challenging is the task of conveying this vision to exhibition visitors who are unfamiliar with the concept, making them feel and understand it. How might we share the various images of change in society and life that we envision as part of the Creative Society?

In order to share these images, we utilized Image Generation AI to depict images of future visions for the creative society, which were then exhibited. The year 2023, when ORF was held, was a year in which Generative AI, such as ChatGPT, was widely distributed to the public. Therefore, Image Generation with Generative AI as this year's exhibit was a good fit with the social context. The specific image generation process is shown below.

3.2 Generation Process

ChatGPT Plus DALL-E 3, Bing Image Creator and Adobe Firefly were used to generate the images. Each tool has its own strengths. For example, ChatGPT Plus DALL-E 3 can generate images in an interactive way. Also, Adobe Firefly can easily generate realistic images.

First, we created prompts using the image of the Creative Society described above in words. Specifically, in "Education in the Creative Society," "Work in the Creative Society," and "Life in the Creative Society," what kind of people are there and what happens there and put specific scenes into words without using the term Creative Society. In order to give visitors a more realistic experience of the creative society through the exhibition, the words "A photorealistic image..." were added to the prompts in some images.

Then, we entered a prompt into the system and an image was generated. The generated image was viewed and judged as good or bad from the perspective of how well it matches the future vision that was envisioned.

If the output image was unrealistic or did not convey the desired image, a prompt was modified and re-entered into the system. The image was revised by changing some of the words in the prompt or, in the case of ChatGPT Plus DALL-E 3 by giving instructions to change specific parts such as "Please make it more of a close-up image."

Due to the trial-and-error process described above, in some cases about 10 images are generated before a complete image. For example, in Figure 2, when trying to generate an image

of a man cooking while remotely connecting to his mother via a tablet, the process sometimes generated unrealistic images, such as the tablet screen being opposite the front and back, or the mother, who was supposed to be talking, appearing next to the man, requiring 9 attempts before the final image was generated. Finally, 19 images generated by this process were displayed (Figure 3).

Figure 2: Progression of the image generation process,
in which the final generated image will be presented in Subsubsection 3.4.4.

3.3 Reactions of Visitors

We received various reactions from participants who came to our booth and looked at the images of future visions in the creative society that we had created (Figure 4). The most common responses were, "Wow, these really look like the future," "Aren't they real photos?" "Are you sure you didn't take these pictures?" and "Even though you are describing a creative society, it was hard for me to get an image of it because it doesn't exist yet, but now that there

are pictures, it is easier for me to get an image of it." Also, some responded, "It seems possible, but it doesn't seem to exist yet," and some of the elderly people said, "It's the future, but it's nostalgic" when they saw the images of people making the foods they eat and other things with Japanese houses in the background.

Figure 3: Photographic Exhibition: Envisioning a 'Creative Society' through Generated Imagery.

Figure 4: Visitors Intently Viewing the Photos of Generated Images.

In addition, when introducing the exhibit, we also showed the actual process of generating each of the images, along with the prompts we wrote to generate the images on exhibit. At that time, some people reacted, "The prompts are much more detailed than I expected," "The creator must be able to recognize the image of the creative society at a high resolution in order to create it properly."

3.4 Generated Images

From here, we will specifically introduce the generated images that were exhibited. We will also show what descriptive prompts were employed to generate each of the images utilizing generative AI systems, which are ChatGPT Plus DALL-E 3, Bing Image Creator and Adobe Firefly.

3.4.1 Symbolic Scene of the town in a Creative Society

Figure 5 shows the image that depicts a creative society where there is a town full of people who create their own things by hand and also own shops. People sell and buy handcrafted things and also fix their own things. The large tree in the middle creates a nice place where people of the town can gather and help each other out to repair things or hang out. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A photo-realistic image of a bustling rural town thriving with self-employed individuals. The town square is alive with activity; a South Asian man is setting up a tech repair stand under the shade of an oak tree, a Caucasian woman showcases her pottery on tables outside her studio, and a Middle-Eastern chef is serving street food to locals. Children are playing near a fountain, while a Black photographer captures the essence of the town's spirit. The architecture is a mix of traditional country homes and converted modern workspaces, and the streets are filled with a mix of pedestrians and cyclists, reflecting the town's energetic and self-sustaining economy.

Figure 5: Symbolic Scene of the town in a Creative Society
(generated by ChatGPT Plus DALL-E 3).

3.4.2 A Creative Educational Scene in Relation to Nature

Figure 6 shows the image that depicts a creative society in that kids are building cabins as a part of school activities in the forest, showing that the activities are not merely limited to the classroom. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A scene in a forest where two children are nurturing trees in the background, and in the foreground, one adult with three children are building their own cabin. The forest setting creates a sense of depth between the two groups.

Figure 6: A Creative Educational Scene in Relation to Nature
(generated by ChatGPT Plus DALL-E 3).

3.4.3 A Scene of Workers Having a Meeting on the Beach

Figure 7 shows the image depicts a creative society in that office work is not limited to office buildings and rooms but freely conducted out in the nice weather with a view. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A beach scene on a beautiful southern island, featuring three diverse designers and engineers of varying races, genders, and ages. They are engaged in a collaborative work session around a table, while in the background, two individuals are working separately on laptops. The beach setting includes the clear blue ocean and palm trees, creating a relaxed yet productive atmosphere.

Figure 7: A Scene of Workers Having a Meeting on the Beach
(generated by ChatGPT Plus DALL-E 3).

3.4.4 A Scene of Enjoying Cooking with Family in a Distant Location

Figure 8 shows the image that depicts a creative society in that instead of ordering food, one is making their own food at home and while also talking to his mother through a tablet. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A photorealistic image of a young man in a kitchen overflowing with a diverse array of ingredients, cooking a unique dish in a pot. In the background, a tablet is placed

beside him, showing a video call with his middle-aged mother, who is giving him guidance and sharing a moment of connection as he prepares his creative meal.

Figure 8: A Scene of Enjoying Cooking with Family in a Distant Location
(generated by ChatGPT Plus DALL-E 3).

3.4.5 A Scene of Someone Crafting Their Own Eyeglasses

Figure 9 shows the image that depicts a creative society in that the man is crafting his own glasses for his own fit instead of buying one. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A modern Japanese craftsman in the comfort of his home workshop, intricately examining a pair of eyeglasses he has crafted with advanced technology. He is seated at a modest workbench within a cozy room that has the warmth of a home, with soft curtains, family photos on the walls, and indoor plants adding a personal touch. The 3D printer sits on a nearby table, just finished printing the eyeglasses. He holds the glasses delicately, using a magnifying glass to inspect the fine details. Around him are the comforts of home, like a comfortable chair, a cup of tea, and a bookshelf filled with books and personal mementos. The lighting is warm and inviting, and the craftsman wears a contented smile, reflecting the pride of creating something beautiful within the familiar surroundings of his home.

Figure 9: A Scene of Someone Crafting Their Own Eyeglasses
(generated by ChatGPT Plus DALL-E 3).

3.4.6 A Scene of a Nomad Worker Working in a Co-Working Space in a Mountain Cabin

Figure 10 shows the image that depicts the creative society in that it represents a new way of working out in nature with other remote workers doing their own work. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

A sunny day view of a mountain cabin converted into a coworking space, with Japanese nomad workers engaging in various tasks. The cabin is surrounded by lush greenery and clear blue skies, reflecting a perfect blend of rustic charm and modern work culture. No hikers are visible, just the serene and bustling atmosphere of focused individuals working remotely in the heart of nature.

Figure 10: A Scene of a Nomad Worker Working in a Co-Working Space in a Mountain Cabin (generated by ChatGPT Plus DALL-E 3).

3.4.7 A Scene of Someone Crafting Their Own Pencil Case

Figure 11 shows the image that depicts a creative society where a child is making their own pencil case in contrast to buying one. The prompt provided to Bing Image Creator for generating this image is as follows:

A boy making a pencil case at home, using a sewing machine to create a design he likes.

Figure 11: A Scene of Someone Crafting Their Own Pencil Case (generated by Bing Image Creator).

3.4.8 A Scene of Children at KidsPLoP Engaging in a Writer's Workshop

Figure 12 shows the image that depicts a creative society in that kids are engaging in discussions about papers they have written themselves without adults. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A group of five children sitting in chairs arranged in a circle, deeply engaged in a discussion. Each child is holding papers. They are diverse in appearance: a Caucasian boy, a Hispanic girl, a Black boy, a Middle-Eastern girl, and a South Asian boy. The background features a wall with the word 'KidsPLoP' written on it. The scene is set in a retreat center, with large windows showing a rich natural setting outside, filled with trees and greenery. The image should be a vertical rectangle, capturing the essence of a vibrant and inclusive children's workshop.

Figure 12: A Scene of Children at KidsPLoP Engaging in a Writer's Workshop (generated by ChatGPT Plus DALL-E 3).

3.4.9 A Scene of People of Various Ages and Races Creating a Pattern Language

Figure 13 shows the image that depicts a creative society in a way that there are different people of different ages coming together to create a pattern language. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> In a brightly lit room, six individuals of different ages (including kids and elderly) and descents, including Caucasian, Hispanic, Black, Middle-Eastern, and South Asian, are gathered around a large table. They are focused on a large sheet of white butcher paper on the table, covered with colorful sticky notes with visible writing. The wall in the room prominently displays 'Pattern Language', enhancing the collaborative and intellectual environment. Image files should be output as vertical rectangles.

Figure 13: A Scene of People of Various Ages and Races Creating a Pattern Language
(generated by ChatGPT Plus DALL-E 3).

3.4.10 A Scene of Someone Designing Their Own Game

Figure 14 shows the image that depicts a creative society aspect where instead of purchasing a game to play, it is being created by hand. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

A child deeply engrossed in creating a smartphone game using the visual programming language Scratch. The setting is a cozy room with a computer displaying Scratch's colorful, block-based interface. The child, an Asian boy around 10 years old, is focused intensely on the screen, with various notes and sketches of game designs scattered around him. There's a window in the background showing a sunny day outside, suggesting a contrast between the indoor tech activity and the bright, outdoor world. The image captures the child's concentration and creativity in game development.

Figure 14: A Scene of Someone Designing Their Own Game
(generated by ChatGPT Plus DALL-E 3).

3.4.11 A Scene of Grandparents and Grandchildren Using a 3D Printer for Crafting

Figure 15 shows the image that depicts a creative society aspect where elderly people and children can collaborate across generations through creative activities using a tool like a 3D printer. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> In a traditional Japanese room (tatami mat flooring and shoji screens), a grandfather, a grandmother, and their grandchild are using a 3D printer to create something together. The family is engaged and happy, with the grandchild showing excitement about the 3D printing process. The room has elements of traditional Japanese decor, providing a warm and familial atmosphere. The focus is on the interaction between the family members and their creative use of modern technology in a traditional setting. Image files should be output as vertical rectangles.

Figure 15: A Scene of Grandparents and Grandchildren Using a 3D Printer for Crafting (generated by ChatGPT Plus DALL-E 3).

3.4.12 A Scene of a Customer Creating a Desired Product in a Store with Staff Support

Figure 16 shows the image that depicts the new type of store format where customers create the bags they desire, with staff providing support, illustrating an aspect of a creative society. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A vertical image depicting a joyful and creative shopping experience. A Japanese elderly woman is customizing a bag to her taste using a machine in the shop. Beside her, a male shop assistant is conversing with the customer while demonstrating the use of a futuristic compact 3D printer, which is in the process of creating the bag bit by bit. The shop is filled with the excitement of innovation, as customers engage with interactive technology to personalize their products.

Figure 16: A Scene of a Customer Creating a Desired Product in a Store with Staff Support
(generated by ChatGPT Plus DALL-E 3).

3.4.13 A Scene of a Family Enjoying a BBQ with Freshly Harvested Garden Ingredients
Figure 17 shows the image that depicts a creative society of growing their own food and enjoying cooking it on the spot. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

A photo-realistic image of a small Japanese family of five people enjoying a barbecue outdoors during sunset. There are two elderly individuals, a middle-aged adult, and two children, all of Japanese descent, gathered around a wooden table with fresh vegetables and a grill. In the background is a European-style countryside home, with a lush vegetable garden and the warm glow of the sunset creating a serene atmosphere. The mountains in the distance add to the tranquility of the rural setting.

Figure 17: A Scene of a Family Enjoying a BBQ with Freshly Harvested Garden Ingredients
(generated by ChatGPT Plus DALL-E 3).

3.4.14 A Scene of a Grandmother Masterfully Using a 3D Printer at Home

Figure 18 shows the image that depicts an aspect of the creative society where a 3D printer is present in the home, and elderly individuals are adept at using it. The prompt provided to Adobe Firefly for generating this image is as follows:

Grandmother using a 3D printer in a Japanese-style room.

Figure 18: A Scene of a Grandmother Masterfully Using a 3D Printer at Home
(generated by Adobe Firefly).

3.4.15 A Scene of a Teacher and Students Collaboratively Engaging in Creative Learning

Figure 19 shows the image that depicts a creative society of a teacher and students working together to create a single piece, engaging in new learning through creative activities. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

Inside a brightly lit elementary school classroom, a group of diverse students are deeply engaged in an arts and crafts project. A teacher, of Asian descent, is sitting participating actively participating with the children, all sharing a large, cluttered table filled with a variety of creative materials. The room buzzes with energy as the kids, ranging in descents including Black, Hispanic, Caucasian, and South Asian, work together to create an impressively innovative craft that they wouldn't normally be able to make alone. The table is laden with colorful papers, glue, scissors, markers, and other craft supplies, evidence of the exciting project underway.

Figure 19: A Scene of a Teacher and Students Collaboratively Engaging in Creative Learning
(generated by ChatGPT Plus DALL-E 3).

3.4.16 A Scene of Children and Adults Harvesting Vegetables in Their Home Garden

Figure 20 shows the image that depicts a creative society of people growing their own food, with children also participating in the activity. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A Japanese family of four is participating in a farm-to-table activity outside their traditional Japanese home. The father and children are in the foreground, harvesting vegetables from a small home garden. The mother is cooking in an outdoor kitchen setup to the side of the house, visible in the background. The house is a classic Japanese style, with a tiled roof and sliding doors. The family is interacting happily, with the children showing their harvested vegetables to the parents. The scene is set during the day with clear skies, and the lush countryside extends into the background.

Figure 20: A Scene of Children and Adults Harvesting Vegetables in Their Home Garden
(generated by ChatGPT Plus DALL-E 3).

3.4.17 A Scene of People of Diverse Races Holding a Meeting to Solve Their Town's Issues

Figure 21 shows the image that depicts a creative society of people from diverse ethnic backgrounds collaborating to solve their community's challenges on their own. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A small town hall meeting with a warm and inviting atmosphere. The interior features posters of the town and a blackboard brimming with ideas. Gathered around a large wooden table are diverse local residents: a Hispanic man, an Asian woman, a Black elderly man, and a Middle-Eastern young woman, all actively engaged in discussion. The table is laden with notes, maps, and diagrams. The scene radiates unity and determination, as the group brainstorm solutions for their community's betterment.

Figure 21: A Scene of People of Diverse Races Holding a Meeting to Solve Their Town's Issues
(generated by ChatGPT Plus DALL-E 3).

3.4.18 A Scene of a Child Building a Desk for Their Use with Their Grandfather

Figure 22 shows the image that depicts a creative society where a child, with the help of their grandfather, is crafting their own desk instead of buying one. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> The grandchildren are in the process of building a new chair with Grandpa, enjoying arts and crafts together with his imagination and curiosity sparked by the stories he tells his grandchildren about his trip around the world in Grandpa's secret basement with his souvenirs. Please output a horizontal high quality image of the grandchild in the process of building a new chair with grandpa, so that the entire room can be seen.

Figure 22: A Scene of a Child Building a Desk for Their Use with Their Grandfather
(generated by ChatGPT Plus DALL-E 3).

3.4.19 A Scene of Creative Office Facilitating Easy Prototyping of Ideas

Figure 23 shows the image that depicts a creative society of a new office environment where it's easy to create prototypes of ideas conceived in one's mind. The prompt provided to ChatGPT Plus DALL-E 3 for generating this image is as follows:

> A close-up A4 horizontal high-quality image capturing a natural and candid moment in a creative wooden office. A Japanese person and an African woman are intently working together on a prototype at a desk cluttered with tools and components. The computer screen in front of them displays intricate blueprints of their new product,

while 3D printers and small-scale manufacturing machines hum in the background. The office wall behind them is a collage of sticky notes full of brainstormed ideas. The surrounding space is a creative chaos with prototypes and art, reflecting a fusion of innovation and practical design.

Figure 23: A Scene of Creative Office Facilitating Easy Prototyping of Ideas
(generated by ChatGPT Plus DALL-E 3).

4. Conclusion

In this paper, we proposed leveraging generative AI's capabilities to generate visual representations of future visions. Using this method, visions of the future that have been expressed in words or by drawing pictures can be easily visualized.

Generative AI sometimes interprets the words of a prompt we have written to indicate a different meaning. These characteristics can sometimes expand our own ideas. On the other hand, there were also occasions when it interpreted the prompts in unexpected ways and generated descriptive images that could not have been possible in reality, which required numerous revisions.

Even with these limitations, it has become clear that there are tips for generating good images, such as how to use AI when drawing the future into text and how to use AI to bring it to the ideal image. We would like to further explore this point and clarify patterns.

Furthermore, while this paper focused specifically on Future Vision Image Generation, we are committed to continuously exploring creative applications of generative AI and putting them into practice. We look forward to engaging in discussions and collaborations with others who share this interest.

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