COLLABORATIVE INTELLIGENCE: THE FUTURE ROLE OF

ARTIFICIAL INTELLIGENCE IN BUSINESS CREATIVITY

by

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By comparing advertisements for a "Greek Night" event created through human effort, AI alone, and human-AI collaboration, this thesis explores the integration of artificial intelligence (AI) into the collective creativity process during ideation and workplace innovation within a business setting.

The findings reveal that AI, when used as a collaborative tool, significantly accelerates the creative process by generating diverse visual elements and providing immediate feedback. AI programs like Dall-E and ChatGPT can augment human creativity, offering new perspectives and approaches that enhance the ideation phase. However, AI-generated content often requires human intervention to ensure accuracy and clarity, highlighting the importance of high-quality prompts and thorough fact-checking.

Despite challenges such as textual inaccuracies and the need for specific guidance, AI demonstrates considerable potential in supporting creative teams. AI's role is best viewed as augmentative, enhancing rather than replacing human creativity. This research underscores the value of human-AI collaboration in driving workplace innovation and achieving more effective and creative outputs. By providing insights into AI's capabilities and limitations, this thesis offers practical implications for AI's future role in collective creativity.

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Introduction

Artificial intelligence (AI), with thousands of unique platforms and characterized by its rapidly expanding capabilities, stands as a pivotal force in the modern technological landscape. AI's ability to equip organizations with the insights needed to effectively chart their innovation courses underscores its critical role in contemporary business practices (Paschen et al., 2020; Haan, 2023). A tool that excels in problem-solving, reasoning, and learning, AI is at the forefront of a shift towards an algorithm-based future.

Recent findings have signaled the complex implications of AI, sparking discussions on its application, opportunities, and challenges. AI enables businesses to acquire insights and make educated decisions about where to direct their innovation initiatives (Kakatkar et al., 2020). Its proficiency in evaluating crowdsourced ideas for creativity and originality further underscores its value (Just, 2024), alongside its capacity to refine design thinking methodologies, providing crucial perspectives and assistance to companies engaged in the innovation journey (Micheli et al., 2019). This potential stems from AI's three intrinsic intelligent behaviors: problem-solving, reasoning, and machine learning. By applying logical frameworks under uncertain conditions and navigating complex problem spaces, AI demonstrates an adeptness in identifying patterns and deriving rules through both deductive and inductive reasoning. Moreover, its ability to adapt and evolve without being confined to explicit, pre-set instructions significantly increase its efficiency. This self-improvement mechanism allows AI to progressively excel, reflecting an advanced form of learning (Paschen et al., 2020).

Advanced technology like artificial intelligence, virtual reality, and augmented reality provide businesses with a great opportunity. Businesses can overlay machine-generated information in geographical representations. This information helps human operators make more

informed decisions, as well as understand the manufacturing process better (Liu et al. 2022).

Traditionally used for analytical tasks, generative AI's emergence into the creative domain

demonstrates its capacity to generate various forms of content, including text, images, videos,

and audio (Füller et al., 2022). Although the need for creativity can vary among different jobs, all

positions, regardless of industry, have the potential for creative contribution. This creativity is

critical for a company's continued growth, market position, and ability to innovate (Cirella,

2021).

Often understood as the ability to generate novel and effective solutions, creativity

combines originality and effectiveness (Cirella, 2016; Runco et al., 2012). An essential element

of this concept is that creativity's usefulness is often viewed as subjective. Prior work documents

that creativity involves producing ideas that are not just new but also relevant to the specific

challenge or opportunities faced (Amabile, 1997).

Regardless of how creativity is defined, it is widely accepted as a unique category that

expands beyond abstract ideas (Sternberg & Grigorenko, 2001). This recognition of creativity, as

a collection of attributes with shared characteristics, has allowed for the identification and

tangible measurement of its components (Anderson, 2014).

While there's no single definition that captures all aspects of creativity, it is generally

seen to encapsulate four key components: the individual or team, the creative process, the

environment, and the final product or outcome (Cirella, 2021). When considering all

components, creativity is assessed in terms of its final products, offering a way to quantify it

beyond just a mental activity (Amabile, 1997). Therefore, I will be defining creativity, "as a

generation of novel ideas" (Hughes et al., 2018), and analyzing its outcomes as a measure of its

depth.

Creativity manifests across individual, team, and organizational levels, driven by the dynamic relationship between people and their environment (Anderson, 2014). This interaction is the foundation for creativity, especially within a collaborative setting where dialogue and debate are the catalysts for idea generation (Agogué et al., 2013). These collaborative efforts, described as "collective creativity," consist of a process involving a series of deliberate activities in a shared space that leads to the generation of new ideas, products, or services (Cirella & Shani, 2012), and is particularly relevant to creative organizations.

Collective creativity arises from the collaborative efforts of individuals pooling their knowledge on a particular subject (Hargadon & Bechky, 2006). This perspective is reinforced by research that highlights the link between individual and collective creativity as a fusion of ideas and efforts, a synergy that occurs within team dynamics (Watson, 2007; Harvey, 2014). At its core, collective creativity is a pursuit for extensive understanding through exploration, involving the combining of knowledge to address shared challenges with integrated diverse insights (Cirella & Shani, 2012; Chaharbaghi & Cripps, 2007).

This understanding extends to the creative environment, suggesting that creative teams function as unified entities. Their performance and choices are shaped by their collective attributes, individual member characteristics, and the broader social setting in which they exist (Cirella et al., 2014). For the purposes of my thesis, I am conceptualizing this environment as a "business setting," and defining it as a cooperative space where colleagues engage collaboratively to create tangible or demonstrable outputs that mirror the combined creative efforts and achievements within an organizational framework.

Fostering a collaborative environment in business is crucial for generating synergy and sparking innovation, both of which are vital for organizational success. This synergy between

creativity and innovation, derived from collective creativity, aims to discover and implement novel and enhanced methods of operation, offering substantial benefits to businesses (Anderson, 2014; Parjanen, 2012). Recent research indicates that this type of productive collaboration can also thrive within an AI-based innovation ecosystem. This is because human employees and AI tools in the workplace augment each other's strengths. Within this partnership, human workers leverage the accuracy, numerical calculation, and pattern identification abilities of AI technologies. They train AI to undertake routine tasks with high precision, allowing human resources to focus on decision-making and in-depth analytical tasks (Zirar et al., 2023).

Organizations, driven by the creation of new ideas for solutions, products, and services, universally depend on innovation; it is vital for gaining a competitive edge and outperforming rivals (Hughes et al., 2018). In the initial phase of innovation, a crucial step of idea generation occurs. Also known as ideation, which is how I will be referring to it throughout my thesis, this phase is characterized by its creative and unstructured nature and plays a pivotal role in an organization's achievement (Christiansen & Gasparin, 2016). It is instrumental in determining both the quality and quantity of ideas selected for further development (Moon & Han, 2016). The decisions during this stage are made amidst substantial uncertainty and often too perplexing to communicate (Koen et al., 2001).

Furthermore, ideation and every phase of collective creativity aiding in maintaining an organization's competitive advantage include a component known as workplace innovation. Workplace innovation is described as the methodologies employed in the effort to actualize new concepts. This process entails identifying problems, initiating, adapting, advocating, and executing innovative ideas (Hughes et al., 2018). It represents an additional facet of collective creativity that I will be investigating in this thesis.

Pursuing the endeavor to innovate collectively for a competitive advantage, via ideation and workplace innovation, while beneficial, is a time-intensive process that requires significant effort. Moreover, it may result in a homogeneity of ideas and overlook potential shortcomings (Ritala, 2021). As the examination of human ideation evolves and its limitations become apparent, organizations are seeking innovative ways to transform the innovation process. While the task of generating ideas has traditionally fallen to marketers, engineers, and designers (Cirella, 2021), there is an increasing interest in harnessing generative artificial intelligence (AI) to create new ideas for products and services (Deranty & Corbin, 2022).

The advent of generative AI, featuring leading technologies such as OpenAI's Generative Pre-trained Transformer (GPT) series and Google's Pathways Language Model (PaLM), with their popular interfaces, ChatGPT and Bard, is at the forefront of a revolutionary shift in the process of generating ideas. AI reaches its full potential not only through optimizing current procedures and enhancing automation, information, and transformation effects but also in its capacity to identify, forecast, and engage with humans. In light of these findings, organizations can amplify the business value of their innovative projects by leveraging AI's attributes. Therefore, AI is seen not merely as a solitary technology by individuals utilizing it, but rather as a participant within a team that will be incorporated into existing workflows to establish a hybrid innovation team (Wamba-Taguimdje, 2020).

However, there is opposing evidence indicating that the deployment of AI in workplaces could lead to technological unemployment or, if it becomes widespread, might lead to increased wealth inequality or the expansion of freelance economy jobs, like crowdwork and appwork, further worsening unstable employment situations (Acemoglu & Restrepo, 2020). Within this context, there is limited understanding among human employees regarding how AI systems

affect their roles, stemming from a lack of trust, insufficient AI skills, and limited

comprehension of the technology. This fosters feelings of uncertainty and negative attitudes

among workers, adversely affecting their performance and psychological well-being at work

(Charlwood & Guenole, 2022). Evidently, a fear of being replaced by machines is a common

concern. Against this potential backdrop, my thesis aims to illustrate AI not merely as a

replacement but as a collaborative tool that can enhance creative outputs.

Research Question

As the pace of AI advancements accelerates, the general public is engaging with open AI platforms for entertainment and exploration, showcasing the capabilities of AI and signaling its inevitable integration into our lives. Motivated by the desire to delve deeper into how AI can be harnessed to not only complement but enhance our creative capabilities, this thesis seeks to answer the broad research question: how will artificial intelligence be integrated into the collective creativity process that occurs during ideation and workplace innovation within a business setting? By detailing my direct collaboration with AI in developing a creative advertisement, I intend to provide a transparent view of AI's practical applications when working with a human, particularly in the realm of producing creative outputs.

Methodology

In order to answer the research question, the research aimed to evaluate the creative potential of artificial intelligence by comparing three distinct advertisements for a "Greek Night" event, conceived during my internship with the University of Oregon's baseball team. This internship entailed forming a team of students, establishing marketing goals, generating a variety of promotional strategies, and ultimately producing a detailed marketing proposal. To enhance the project's creativity and practicality, we initiated workplace innovation practices by distributing surveys to gather feedback from the student community, which allowed us to refine our marketing strategies with their input before submitting the final plan to the University's marketing team for implementation. The comparison consists of an original advertisement created by the University's marketing team, an advertisement generated solely by AI, and another crafted through human-AI collaboration.

Within the marketing plan, we created a concept called "Greek Night;" it was an initiative aimed at increasing attendance at baseball games by orchestrating a competition among Greek houses, complemented by incentives like a pizza party with the baseball team for the winning house, a student tailgate, and free burritos for early attendees. The University of Oregon's marketing team, utilizing my marketing plan, turned the "Greek Night" concept into a visual advertisement, which was posted onto the official University of Oregon's baseball Instagram. This visual advertisement created by the University of Oregon is the first advertisement used in this thesis' comparative study.

AI Selection and Advertisement Creation

Choosing AI Tools

For the AI-generated advertisements, OpenAI's Dall-E, a model capable of generating images from textual descriptions, was chosen due to its capabilities and alignment with my thesis' needs.

AI-Only Advertisement

To create an advertisement solely through AI, it was important to provide Dall-E with a prompt that incorporated all the essential elements from the "Greek Night" concept from the marketing plan. The aim was to ensure that the AI could independently generate a visual that was both visually appealing and informative, similar to what a professional marketing team might produce. The prompt I created read:

> "The University of Oregon's Baseball Team needs you to create a visual, print advertisement that promotes "Greek Night." Greek Night is targeted towards the University of Oregon's sororities and fraternities and is an initiative to increase attendance at Oregon's baseball games.
>
> Greek night is an attendance based competition between the Greek houses that are affiliated with the college. The Greek house (sorority or fraternity) with the highest attendance will receive a prize. During "Greek Night," the University will also be hosting a student tailgate prior to the first pitch, throwing a pizza party during the game, and giving out free burritos during the game.
>
> "Greek Night" will be held at PK Park on April 6th at 7:00PM PST and the student tailgate will also be at PK Park from 6:00 PM - 7:00PM.
>
> Create a visual advertisement (flier) for Greek Night that will be promoted on the University of Oregon Baseball Team's social media platforms. You have complete discretion to create and edit the advertisement, as long as you ensure that the needed components are visually present on the advertisement."

Once I generated this prompt, I input it into Dall-E and it created an output, however, I did not look at the advertisement it created to ensure I remained unbiased when creating the next advertisement.

Collaborative AI-Advertisement

When creating this advertisement, I treated Dall-E as a collaborative partner in the

creative process, adjusting the prompt to simulate a team dynamic. The objective was to guide

the AI, providing creative direction while also leaving room for AI's creative input, attempting to

mimic the dynamics of a human team working on a creative project.

To initiate this collaborative process, I revisited the initial prompt I had created for the

AI-only advertisement. However, I adjusted some of the language to reflect a partnership, using

inclusive pronouns like "we" and phrases such as "help me," which are typical in collaborative

settings. These adjustments were intended to simulate a collaborative effort where both human

and AI are working together towards a common goal. The revised prompt read:

> "The University of Oregon's Baseball Team needs me to create a visual, print advertisement that promotes "Greek Night," and I need your help. Greek Night is targeted towards the University of Oregon's sororities and fraternities and is an initiative to increase attendance at Oregon's baseball games.
>
> Greek night is an attendance based competition between the Greek houses that are affiliated with the college. The Greek house (sorority or fraternity) with the highest attendance will receive a prize. During "Greek Night," the University will also be hosting a student tailgate prior to the first pitch, throwing a pizza party during the game, and giving out free burritos during the game.
>
> "Greek Night" will be held at PK Park on April 6th at 7:00PM PST and the student tailgate will also be at PK Park from 6:00 PM - 7:00PM.
>
> Help me create a visual advertisement (flier) for Greek Night that will be promoted on the University of Oregon Baseball Team's social media platforms. We have complete discretion to create and edit the advertisement, as long as we ensure that the needed components are visually present on the advertisement."

After Dall-E received the prompt, the AI generated two initial visual outputs. Upon reviewing

these versions, I created a prompt with ChatGPT, which will be discussed in the, "Creating the

Prompt with ChatGPT" section, aimed at refining the advertisement's message and visual appeal.

The prompt read:

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> "Adjust the visual to clarify the message more. Do this by highlighting "Greek Night" and that it is a competition (its call to action) while reducing some of the other visual clutter. Make sure the visual is legible, spelt correctly, and make sure the other details about the pizza party, tailgate, and burritos are present. The visuals you created do not clearly convey what Greek Night is."

Responding to this prompt, Dall-E produced a revised output that better aligned with the objectives of "Greek Night." However, further adjustments were still made in an attempt to perfect the advertisement's alignment with the intended promotional goals. I issued additional prompts, each time focusing on specific elements, such as the portrayal of the baseball field, the tone of the advertisement, and the precise inclusion of the event logistics targeted at Greek life students. Each round of adjusted prompts and modification produced two unique outputs.

Creating the Prompt with ChatGPT

In the development of the advertisement with Dall-E, I integrated another AI tool, ChatGPT-4, to assist in crafting the first feedback prompt for Dall-E. Upon reviewing the initial advertisements produced by Dall-E, I identified many areas for possible improvement, specifically concerning clarity. To address these issues, I asked ChatGPT-4 for assistance. I uploaded the AI-generated advertisements from Dall-E as files into the ChatGPT-4 interface and provided a detailed description of the event and my concerns about the current advertisement. The initial prompt I sent ChatGPT-4 read:

> "I am attaching two advertisements here and I need your input on how to make them better. These advertisements were created for something called "Greek Night," which is an event the University of Oregon's baseball team is hosting. Greek Night is targeted towards the University of Oregon's sororities and fraternities and is an initiative to increase attendance at Oregon's baseball games.
>
> Greek night is an attendance based competition between the greek houses that are affiliated with the college. The Greek house (sorority or fraternity) with the highest attendance will receive a prize. During "Greek Night," the University will also be hosting a student tailgate prior to the first pitch, throwing a pizza party during the game, and giving out free burritos during the game.

After looking at these ads, how do you recommend I adjust them to make them better promote "Greek Night." In my opinion, the message is unclear, and the advertisement is cluttered."

ChatGPT-4 analyzed the prompt and responded with suggestions aimed at improving the advertisements' clarity and visual appeal. The AI recommended focusing on the competitive aspect of the event, simplifying the visual elements to avoid clutter, and enhancing the legibility of the text to increase accuracy.

Using these insights, I crafted a revised prompt for Dall-E, specifically instructing the AI to adjust the visual elements and emphasize key aspects of "Greek Night."

Selection of Advertisements for Analysis

The process for selecting the advertisements for comparative analysis involved examining the outputs generated by Dall-E. In the AI-only scenario, Dall-E generated two distinct advertisements in response to the initial prompt I provided. For the advertisements developed through the collaborative process with Dall-E, a total of 12 outputs were generated. The rationale for choosing each advertisement to represent each scenario is centered on their potential to offer effective comparability criteria; each advertisement chosen displays a broad array of visual and textual elements as well as identifiable errors.

Results

AI-Only Advertisement Output

Figure 1: AI-Only Advertisement Output

The AI-only advertisement for "Greek Night," generated by Dall-E based on a textual prompt.

This advertisement, generated solely by Dall-E, clearly features "Greek Night" at PK Park, and is depicted in the University of Oregon's colors, green and yellow. The central visual is the baseball stadium, filled with uniformly colored spectators, under a moon, which aligns with the event's evening start time. Key visual elements include the accurately depicted University "O," a baseball with incorrect stitching, a hotdog, and a computer or iPad. The banner in the image contains mostly misspelled words, with "FREE" being the only exception. Additionally, what seems to be a misspelled attempt at a tagline is positioned at the bottom of the advertisement. A

masked-like image is visible in the top right corner, and leaf-like elements are included throughout the advertisement.
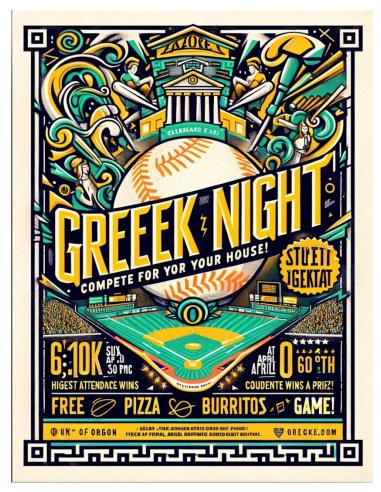
Collaborative AI-Advertisement Output

Figure 2: Collaborative Advertisement Output (Human + Dall-E)

The collaborative advertisement for "Greek Night," created through a partnership between myself and Dall-E

The collaborative advertisement created with Dall-E for "Greek Night" at PK Park has a cluttered layout with a large baseball at the center which has too many stitches to accurately represent a baseball, and an illustration of a classical Greek building above it. The title "GREEEK NIGHT," with an extra "E," is prominently displayed across the baseball in a bold

font, with the subtitle "COMPETE FOR YOUR HOUSE!" emphasizing the competitive nature of the event. The event details are also mentioned but include some textual errors, such as "6:10K" and "SUX AP.0" instead of "6:00PM" on April 6th. Information about the event's incentives, including "Highest Attendance Wins," "FREE," "PIZZA," "BURRITOS," and "GAME!" are displayed at the bottom, although some of the text is misspelled and jumbled together. The bottom of the advertisement also contains additional text that seems to be a placeholder and an attempt at a URL link. The color scheme also aligns with the University of Oregon's branding by using greens and yellows.

University of Oregon's Advertisement Output

Figure 3: Human-Generated Advertisement

The advertisement created without AI by the University of Oregon's advertising team.

The University of Oregon's official advertisement for "Greek Night" is overall clean and organized, with distinct sections separating different pieces of information. The consistent use of the University of Oregon's green and yellow colors ties the advertisement to the University's branding. The design prominently features large, bold text, ensuring the main information is the focal point. At the top, "OREGON BASEBALL" is displayed in large, white, block letters, establishing the context of the event. Directly below, "GREEK NIGHT" is highlighted in an even larger, bold yellow font, making it the most prominent element of the advertisement. The matchup details are present, with the date, time, and location, clearly specified. Additional event

information is also featured which is correctly spelled and factually correct. The only visual

graphic present is a burrito.

Comparative Analysis

Aspect	Human-Generated Advertisement	AI-Only Advertisement (Dall-E)	Collaborative Advertisement (Human + Dall-E)
Design and Layout	Clear, easy to understand, text-centered	Vibrant, illustrative, complex visuals, clearly for University of Oregon	Graphic cartoon dynamic, mix of visuals and structured text
Textual Content	Accurate, clear, no spelling errors, descending font size	Multiple spelling errors, jumbled text	Tag line, URL attempt, spelling errors, somewhat structured, includes incentives, extra commas, semicolons, and periods
Imagery and Iconography	Minimal imagery, small burrito image, university colors	Detailed visuals of filled stadium, same-colored cartoon people, moon, flying birds, hotdog, trees, computer, inaccurate baseball, masked-image	Large central inaccurately stitched baseball, Greek columns and cartoon people, stars, colorful swirling patterns at top, random line drawings between incentives
Color Scheme	High-contrast yellow and green text on black and white background	Green and yellow, with rich colors and detailed background	Green and yellow with black outlines and tan border
Visual Appeal	Functional, wordy	Dynamic, potentially confusing	Visually engaging, but some elements may be distracting
Clarity of Information	Clear and effective layout of information, a lot of small text for social media post	Somewhat obscured by visuals, errors in text, concept of event is unclear	Potentially overwhelming, improved clarity but still less clear than human-generated
Creativity	Less visually creative, more functional	Creative in visual elements and design	High creativity in thematic blending and layout structure

Table 1: Comparative Analysis of Human-Generated and AI-Generated Advertisements

This table provides a comparative analysis of the human-generated advertisement, the AI-only advertisement created by Dall-E, and the collaborative advertisement developed through human and AI partnership. It highlights the distinct differences and similarities across various aspects.

Comparison of Human-Generated and AI-Generated Advertisements

Design and Layout

The University of Oregon's human generated advertisement for "Greek Night" uses a clear, text-centered design, ensuring simplicity and readability. The layout is straightforward, with large bold text that organizes the information into distinct sections, making it easy for the viewers to understand the event details. The advertisement's information clearly stands out without any visual distractions.

In contrast, the AI-generated advertisements by Dall-E present a more visually complex design. The AI-only advertisement features colorful and illustrative visuals, including a detailed depiction of the baseball stadium, uniformly colored spectators, and thematic elements like the moon and birds. This design, however, could obscure the clarity of information. The collaborative advertisement attempts to balance this by combining graphic cartoon elements with structured text, yet it still contains elements that might distract from the main message. While it is obvious the human-generated design captures clarity, the AI-generated designs offer visual richness.

Textual Content and Accuracy

The human-generated advertisement excels in textual clarity and accuracy. It presents all key details, like the event name, date, time, location, and incentives, in a clear and readable

format. The high-contrast text against the solid background has no spelling or grammatical errors.

Conversely, the AI-generated advertisements contain many textual inaccuracies. The AI-only advertisement includes several misspelled words and jumbled text, which could confuse the audience. Although the collaborative advertisement shows improvement with the amount of text, it still contains errors as well as additional punctuation mistakes.

Imagery and Iconography

The human-generated advertisement uses minimal imagery, focusing primarily on clear and bold text to convey the event details. The only visual element is a small image of a burrito and the University's colors, which offer some visual interest without distracting from the main message.

In contrast, the AI-generated advertisements are filled with imagery and iconography. Although the elements create a vibrant scene, they clutter the advertisement and can detract from the primary message; the elements are competing with the text for the viewer's attention.

Color Scheme

The color scheme of the human-generated advertisement is consistent with the University of Oregon's branding, using high-contrast yellow and green text on a black and white background.

The AI-generated advertisements also utilize the University's colors but in a more vibrant and complex way. The AI-only advertisement uses rich colors and a detailed background, while the collaborative advertisement uses a similar vibrant color palette but includes black outlines and a tan border.

Overall Impact: Visual Appeal, Clarity of Information, and Creativity

While the human-generated advertisement is less visually creative, it is the most effective in terms of clarity and accuracy. This is because of its more functional design and structured layout, ensuring the viewers receive all necessary information with minimal confusion. The AI advertisements, excelling in intricate designs and visual elements, struggle to convey information as clearly as the human-generated advertisement due to their complex design and textual errors. While the collaborative advertisement attempts to find a better balance between text and visual elements, it still contains textual inaccuracies and visual clutter that may detract from its overall effectiveness.

Discussion

In evaluating the three advertisements created for "Greek Night," it becomes clear that each method, human-only, AI-only, and human-AI collaboration, have unique strengths and weaknesses. The human-generated advertisement stands out for its clarity, accuracy, and effectiveness in conveying essential details. However, these strengths are more pronounced when directly compared to the AI-generated advertisements. It is important to note that the human-generated advertisement was posted on the University of Oregon's official social media pages to promote the event. Given that advertisements or visual promotions on social media are typically intended to grab viewers' attention through visual appeal, the human-generated advertisement's detailed information may actually detract from its effectiveness in this context. The detailed information could have been more effectively placed in the post's caption, with the visual focusing on grabbing the viewers' attention.

When comparing the three advertisements side by side and analyzing their visual and textual elements, the human-generated advertisement is clearly the most suitable for immediate use. The AI-generated outputs, totaling 14, were tainted by inaccurate visuals, misspelled words, confusing elements, complex layouts, and an overall lack of effectiveness in conveying the purpose of "Greek Night." This comparison underscores that AI, in its current state, is incapable of independently creating a fully polished advertisement suitable for a target audience without human review or adjustments.

The AI advertisements were created with the goal of producing a final output eligible for posting on the University of Oregon's official social media platforms. However, when examining individual elements rather than the whole output, the AI-generated advertisements show significant potential, particularly in terms of visual appeal. The AI-only advertisement focused

more on visual impact than on conveying detailed information, adhering to the prompt's emphasis on social media suitability. It effectively incorporated elements unique to the University of Oregon, such as the colors, the University's "O" logo, and the trees seen from PK Park's home plate. This suggests that AI can make connections to visually represent concepts with limited information, somewhat capturing the essence of the subject it is depicting. The inclusion of a hotdog, a common item sold at sports events, further demonstrates AI's ability to understand and incorporate norms without explicit instructions.

Despite these strengths, the AI-generated outputs have notable flaws. For instance, the AI-only advertisement's depiction of spectators all in the same color raises concerns about the AI's programming. An advertisement aiming to depict a diverse crowd should not display the individuals with such uniformity. The decision to include people in the stands was a creative choice by the AI, which also chose the uniform coloring, indicating limitations in its programming regarding diversity and representation.

The collaborative advertisement highlights additional advanced AI capabilities. While both AI-generated outputs included baseball imagery, the collaborative version displayed a different artistic style, combining elements of illustrative graphic design. It somewhat successfully integrated the three important themes of the prompt, being the University of Oregon, baseball, and "Greek Night," presenting an additional structure for organizing information and distinct visual elements compared to the AI-only advertisement. This demonstrates AI's capacity to produce diverse outputs with varying styles, elements, and features.

Analyzing the specific elements of each AI-generated output rather than evaluating the advertisements as complete pieces reveals AI's creative potential. None of the 14 AI outputs

were immediately suitable for social media posting without human alterations, yet this does not diminish the significant impact AI had on the creativity of the advertisements. This analysis shows that a choice between using only human or only AI for creating advertisements is not realistic nor is it yet achievable. However, collaborating with AI, even though the output is not perfect, reveals that AI is a tool to augment human creativity rather than replace it entirely.

AI as a Tool

While the AI-generated advertisements I created demonstrate significant creative potential, they fall short in terms of accuracy and clarity compared to the human-generated advertisement. However, the collaborative process revealed that AI actually offers more value as a tool to enhance human creativity and accelerate the brainstorming process. By being able to quickly generate images from textual inputs, AI allows for continuous adjustments and iterations, significantly speeding up the creative process by offering immediate outputs. For instance, in the collaborative process with Dall-E, AI's ability to rapidly produce multiple versions of an advertisement enabled me to quickly evaluate the quality of the content, and ask for the necessary adjustments. This iterative cycle facilitated the exploration of various design concepts without the time-intensive effort typically required, making the brainstorming process more efficient and dynamic.

When working with ChatGPT to craft the prompt for Dall-E, it demonstrated its ability to analyze images and provide critiques that might have not been immediately apparent. This ability to generate an exhaustive list of potential improvements simulates the diverse perspectives it is able to offer, highlighting its capacity to provide valuable feedback and suggestions. Identifying areas for improvement in order to enhance the overall design also indicates that AI functions

effectively when augmenting human creativity; it was better suited as a catalyst for idea generation and refinement than for creating a polished output.

Despite these advantages, AI also presents several challenges. Every advertisement generated by AI contained errors, whether textual mistakes or visual inaccuracies. Efforts to correct these errors often resulted in new mistakes, creating a cycle of adjustments and revisions. This was evident during the collaboration with Dall-E, which produced 12 different outputs. After a certain number of iterations, Dall-E began to reuse styles, texts, and images, resulting in new advertisements composed of previously used elements rearranged in different ways. Unique outputs only emerged when specific stylistic changes were requested, indicating that AI tends to become repetitive unless guided by detailed and specific prompts. This highlights the necessity of human intervention to guide AI in producing unique and engaging content.

Furthermore, when tasked with correcting spelling errors, subsequent AI outputs frequently introduced new mistakes, suggesting that AI cannot effectively self-evaluate the accuracy of its content. Although ChatGPT provided valuable analysis and suggestions, the resulting advertisements still contained errors. Additionally, while AI demonstrated an understanding of certain brands and concepts, such as associating the University of Oregon with green and yellow colors, some images produced were factually inaccurate. This means that although AI's understanding could allow for a broader exploration of creative directions, enabling the individuals creating the advertisement to experiment with different visual approaches, all the material produced must be fact-checked for accuracy. The time required for this verification process could potentially offset the time-saving advantages AI offers.

Algorithm Insights

How AI Works (Algorithms)

Artificial Intelligence, particularly models like Dall-E and ChatGPT, rely on complex algorithms designed to simulate human-like understanding and creativity. These models are built using deep learning techniques, which involve neural networks with multiple layers. The neural networks are trained on vast datasets containing a wide range of images and text, enabling the AI to recognize patterns and generate content based on the input it is receiving. Dall-E, for example, is a network which consists of two main components, a generator and a discriminator. The generator creates images from textual prompts, while the discriminator compares the generated image outputs to real images to improve the quality of the outputs over time. On the other hand, ChatGPT is based on a Transformer architecture, which has advanced capabilities in processing sequences of data and generating coherent text by predicting the next word in a word sequence based on the information provided by previous words (OpenAI, n.d.).

Knowing the inner workings of the algorithms highlights that effective use of AI tools hinges on the ability to write precise and informative prompts. During the experiment, it became evident that specific instructions led to more accurate and diverse outputs, while vague prompts often resulted in repetitive or incorrect responses. As the quality of the output is directly influenced by the clarity and detail of the input provided to the AI, professionals working with AI will need to develop the ability to write detailed and context-rich prompts to harness the full potential of AI as a tool. This is why, as AI becomes integrated into creative and business processes, one implication is the role of prompt engineering will become a specialized job. This will involve understanding the AI's capabilities and limitations, anticipating potential misinterpretations, and iteratively refining prompts to achieve the desired outcomes.

Impact of Bias and Information Loss

The outputs generated by AI are highly dependent on the prompts provided. However, even with well-crafted prompts, the AI's programming and training data can influence the final output, introducing biases or recurring patterns that may not align with the original creative intent. The datasets, including texts and images, are inherently influenced by biases present in the data they contain. For example, if the training data includes more images of certain demographics or styles, the AI is more likely to generate outputs that reflect these biases. This can lead to a lack of diversity and representation in the generated content. This was evident in the AI-generated advertisement, which depicted uniformly colored spectators, highlighting a potential bias in representing diversity.

Moreover, the prompt itself can introduce bias. If the prompt emphasizes specific elements or tones, the AI will generate outputs that align with these instructions, potentially overlooking other important aspects. For example, a prompt focusing heavily on visual appeal might lead to an advertisement that is visually striking but lacks clarity and detailed information. On the other hand, a prompt emphasizing textual content might result in an advertisement with well-organized information but lacking in visual creativity.

AI models can also exhibit biases based on user interactions and the feedback loop created by these interactions. For instance, popular images or commonly used phrases in the training data can create a feedback loop where the AI preferentially generates similar content, reinforcing existing trends and biases. Essentially, the AI might default to common tropes or visual clichés, rather than creating unique and context-specific visuals. This can result in outputs that are less innovative and more homogenous, as the AI relies on familiar patterns rather than exploring new creative directions. If creatives rely too heavily on AI, there is a risk that the

distinctiveness of individual contributions could diminish, resulting in a lack of uniqueness and originality in creative content.

During the collaborative process, a notable problem was the tendency of AI to forget information over successive iterations. Despite the detailed prompts, the AI sometimes omitted essential details from the outputs or seemed to forget the correction it was instructed to make. This potential for information loss could have significant implications if AI is heavily relied upon. The habit of overlooking details might become ingrained, leading to a generalization of creative content. Advertisements, which should be uniquely tailored to the target audience, could lose their specificity and effectiveness, resulting in more standardized and less impactful communications.

Broader Implications

The implications for customers and audiences are significant as AI-generated content becomes increasingly prevalent. One of the primary considerations is how this content is perceived and engaged with by diverse audiences. AI has the potential to produce a wide range of creative outputs quickly, but it is essential these outputs resonate authentically with the target audience. Authenticity in AI-generated content means that the outputs should align with the values, cultural nuances, and expectations of the audience. Ensuring this involves several layers of consideration. First, the individual using AI must continuously evaluate the relevance and appeal of the AI-generated content to their audiences. This requires a deep understanding of the target demographics' preferences, behaviors, and cultural context. AI tools must be trained on diverse and representative datasets to avoid biases that can alienate or misrepresent certain groups. Regular updates to AI's training data can help maintain its relevance and inclusivity.

Implications for new opportunities in personalization and interactivity are present in the integration of AI into marketing, advertising, and other creative domains. AI, being able to analyze vast amounts of data, can tailor content to individual preferences, creating more personalized and engaging experiences. For example, AI can customize advertisements based on customer behavior and feedback, increasing their effectiveness and relevance. However, this level of personalization also raises concerns about privacy, which must be managed to maintain customer trust.

AI's ability to generate content rapidly also means that marketing campaigns and creative projects can be developed and deployed much faster than traditional methods allow. This can be particularly advantageous in fast-paced industries where being first to market with a new idea or campaign can provide a significant competitive advantage. However, this speed must be balanced with thorough quality control to ensure that the rush to produce does not compromise the content's quality or accuracy.

The widespread use of AI in content creation also raises ethical considerations. There is a risk that over-reliance on AI could lead to a homogenization of creative outputs, where the unique voice and perspective of individual creators are overshadowed by algorithmically generated content. To mitigate this risk, it is crucial to maintain a balance between AI-generated and human-created content, ensuring that the unique value of human creativity is preserved.

Finally, the integration of AI into creative processes necessitates continuous monitoring and adaptation. As AI technology evolves, businesses must stay informed about the latest developments and be prepared to adapt their usage and strategies accordingly. This includes investing in ongoing training for employees, updating AI systems with the latest advancements, and being vigilant about the ethical implications of AI use.

Extensions for the Project

One promising extension for this project is to develop a specialized GPT model trained exclusively on data from the University of Oregon. By feeding this model with extensive information about the university, its culture, and its students' demographics, the GPT could generate more accurate and contextually relevant advertisements. For instance, a University of Oregon-specific GPT could create tailored content that resonates more deeply with students, incorporating unique campus references and insider knowledge that a general model like Dall-E might overlook.

This specialized GPT could be evaluated by comparing its outputs to those of general models, focusing on the accuracy and detail of the content. By assessing whether a purpose-built GPT can produce more effective and engaging advertisements, this research could demonstrate the value of refining AI models for specific purposes.

Another potential extension is to run the same creative prompt through more advanced AI platforms as they become available. AI technology progresses rapidly, and comparing outputs from newer models with those from earlier versions can provide insights into how quickly AI's creative abilities are evolving. This could involve using the same prompts across different generations of AI models and evaluating the changes in quality, originality, and complexity of the outputs.

A broader extension involves conducting a three-way comparison between human-generated, solely AI-generated, and human-AI collaborative outputs across various creative domains. This could include areas such as art, music, design, videography, etc. By involving experts from each field to evaluate the creative contributions of AI as well as its overall creative ability, the study would bring subjectivity to the otherwise objective nature of creativity. Experts

would assess aspects such as originality, technical quality, emotional impact, and overall

creativity. This comprehensive and large-scale evaluation across different domains would

provide a better understanding of AI's creative capabilities and limitations in various contexts.

By focusing on these specific extensions, future researchers can build on the foundation

of this project to deepen our understanding of AI's role in creativity.

Conclusion

By comparing advertisements for a "Greek Night" event, this thesis found that AI serves best as a collaborative tool rather than an independent creator. AI programs like Dall-E and ChatGPT can quickly generate diverse and innovative elements, significantly accelerating the brainstorming process. They can act as a catalyst for idea generation and refinement, having the ability to enhance the creative capabilities of human teams. Leveraging AI to provide immediate visual outputs allows human team members to potentially use AI as a foundation for ideation, thus enabling them to spend more time analyzing and refining their ideas.

During the collaborative process, ChatGPT's ability to provide immediate visual feedback underscores its potential to augment ideation and workplace innovation by offering new perspectives and approaches to assigned tasks. By simulating a critic and offering diverse viewpoints, AI demonstrated its capacity to offer improvements and critiques, showcasing its ability to enhance the ideation phase through valuable insights. Its ability to offer different perspectives on refining the advertisement further highlights its ability to enhance workplace innovation. AI can also serve as an additional tool for creative team members to seek assistance, whether for generating concepts, providing interpretations, or offering feedback. This ability to assist at various stages of the creative process can significantly accelerate the process, making AI an innovative tool that teams can utilize when support is needed.

However, incorporating AI as a tool in the middle of a creative project can be time-intensive. AI needs to be educated on the task at hand, requiring carefully crafted prompts that inform it of the task's objectives, necessary information, and creative elements to include. This critical thinking and prompt-writing process can detract from the time available for creating the final output.

Moreover, the effectiveness of AI-generated outputs is highly dependent on the quality of the prompts. If the experiment were rerun with differently worded prompts, the outputs would vary. This underscores the importance of prompt writing, although the best or worst ways to craft prompts remain unclear. Leaving creative freedom up to AI often resulted in similar outputs, whereas specific instructions led to more diverse results. However, each AI-generated output contained errors, whether textual inaccuracies or inappropriate visuals. This indicates that while AI's creativity is vast, human input is necessary to tailor it effectively to the target audience effectively. AI is capable of producing all the elements needed to attract a target audience and providing useful critiques for refinement, but it cannot produce a completely polished output without human adjustments. Therefore, humans will always need to instruct AI on how to be creative, or at the very least, guide the AI through the creative process while offering feedback and making adjustments along the way.

The need for human intervention is also highlighted by AI's inability to effectively self-evaluate the accuracy of its content, meaning that all AI-generated material must be fact-checked by humans. This verification process, while potentially diminishing the time-saving benefits that AI offers, is essential, proving that AI cannot successfully act independently in producing a perfected creative output.

The findings from this study demonstrate that AI has the potential to be an effective tool in the collective creativity process during ideation and workplace innovation. It can significantly enhance the creative process by providing rapid generation of visual content, offering valuable critiques, and enabling continuous interactions. However, AI's role should be viewed as augmentative, enhancing human creativity rather than replacing it.

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