Imaginary Horizons: AI-driven content generation and strategy development on Instagram through ChatGPT and MidJourney

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Figure 1: *Header of Instagram account (middle) and utopian (left) and dystopian (right) world image generated by MidJourney*

Abstract

As AI technologies evolve and the accessibility to the general public grows, the question arises: What impact will this development have on our working environment? New AI technologies such as ChatGPT and MidJourney could affect creative jobs like content creators on social media platforms such as Instagram. To investigate this, a three-week case study was conducted to see how ChatGPT and MidJourney could be used to create content and develop strategies for Instagram. The study shows that while ChatGPT and MidJourney provide support, they are not self-sufficient solutions. Particularly, in content creation they emerge as valuable aids that enhance idea generation and make content creation more effective. However, their role in strategy development is more limited, serving as initial input rather than comprehensive assistance. Therefore, it is feasible to utilize them in the capacity of a content creator's tasks. Nevertheless, their application should be complemented by human oversight.

1. Introduction

Artificial intelligence (AI) technologies have evolved in recent years and are becoming increasingly important in the job market. This trend is highlighted by an analysis, which estimates that the market size was worth $136.55 billion in 2022, with a growth forecast of 37.3% in the coming years [Res21]. Given the growing presence of AI in the professional sphere, the impact of AI on the labour market is the subject of past and current research literature. As AI evolves, it is predicted to be increasingly able to take over tasks that were previously performed by humans [AAHR22]. In research, this is referred to as labour-saving technologies (LSTs). LSTs can be classified into two categories "Automation and Robots" technologies and AI technologies [Zar23].

The emergence of new AI technologies, such as ChatGPT and MidJourney, also raises the question of how they will affect the labour market. ChatGPT is a speech model trained by OpenAI which interacts in a conversational way [Ope22]. MidJourney is an AI-based Discord integration that allows the creation of images through text commands [Midnd]. This type of new AI technology could have a particularly significant impact on creative professions, which have been less affected by now. This was demonstrated in a photography competition in 2023, where an image won which was created by DALL-E 2, an AI system similar to MidJourney [Par23].

A growing number of so-called AI influencers are also establishing themselves as content creators in the creative sector. According to Thomas and Fowler [TF21], an AI influencer is a "digitally cre-

ated artificial human who is associated with Internet fame and uses software and algorithms to perform tasks like humans". One of the most popular accounts on Instagram is Lilmiquela, with 2.7 million followers [Lil16]. However, AI influencers like Lilmiquela do not use AI technology in the traditional sense, but rather computer-generated avatars, with the rest of the Instagram account built and decided by human intervention. With new AI technologies such as ChatGPT and MidJourney, it is conceivable that AI could take over other areas of a content creator's work.

In our work, we want to explore this possibility further and see how new AI technologies like ChatGPT and MidJourney influence the work of a content creator. Part of a content creator's job is to generate content and develop strategies to increase the reach and engagement of the account. To explore the possibilities and limitations of using ChatGPT and MidJourney in content creation and strategy development for an Instagram account, we conducted a three-week case study. In the case study, we create an Instagram account using ChatGPT and MidJourney based on some pre-defined principles that determine the influence of AI tools and humans. The analysis and discussion of the results will be based on previously selected criteria.

Through this case study, our intention is to offer insights into the possibilities and limitations of utilizing emerging AI technologies, such as ChatGPT and MidJourney, in terms of content generation and strategy development on Instagram. We seek to evaluate the extent to which AI can function as an LST within the domain of responsibilities as a content creator.

2. Related Work

In this section, we present related work on the topic. Since ChatGPT and MidJourney are emerging technologies, there is limited comparable research on the exact research topic. Therefore, we will mainly focus on the change in the labour market through AI, with special attention to the creative industry.

The start of LSTs can be dated back to the industrial revolution. People were increasingly replaced by automation and robots. This led to an improvement in productivity, efficiency and improved people's standard of living [SV21]. Two dominant research positions exist in the field of automation and robots. Some assume that it will lead to unemployment, wage stagnation, and income inequality [BBZ16]. Other studies found that automation can also lead to new job opportunities (high-skilled jobs) [Aut15].

The question of how LSTs change our labour market has been discussed similarly with the increasing presence of AI. On the one hand, it can lead to tasks previously done by humans being done by AI, and on the other hand, the use of AI can create new areas of responsibility. [AAHR22].

However, the impact of AI and automation does not affect all jobs equally. According to the polarisation thesis, middle-skilled jobs are particularly affected [Aut15]. The polarisation thesis indicates a decrease in middle-skilled jobs now and in the future. The decrease is associated with the increasing use of digital technologies. Due to the high proportion of routine tasks in the middle qualification level, these are particularly affected [Wit19]. Jobs with higher skill levels seem to benefit from AI. In high-skilled jobs, AI can create new job opportunities and increase productivity by taking over repetitive tasks and allowing workers to focus on creative and complex tasks [Zar23].

Nevertheless, it is also assumed that AI can influence jobs with higher skill levels due to the rapidly progressing further development [Wit19]. The question is whether this influence will be by substitution or augmentation [Wit19]. Various AI applications show that the technology can also cover analytical, complex, and creative tasks ([HHS17] [DM15] [BM11]).

The influence on creative work seems to be an increasingly more important topic, that comes with the further development of generative AIs like MidJourney and ChatGPT. Davies et al. [DKMGS20] found that although there is still relatively little research on AI in the creative sector, the amount of AI research relevant to the creative sector is increasing. A review by Nantheera Anantrasirichai et al. [AB22] examines the usage of AI in different creative applications and distinguishes between the potential of AI as a creative tool and as a creator. In terms of content creation with AI they found several examples where AI has been used in both ways: The movie "Sunspring" is entirely written by an AI called Benjamin. Due to an unnatural storyline, they used the AI model only as a collaborator for the sequel "It's No Game" [AB22]. Even generating captions based on the content is possible with object recognition [PGH*16]. The review of Nantheera Anantrasirichai et al. [AB22] shows as well that in terms of image generation, there are many possible ways to use AI: It is possible to create new digital imagery based on a selected training dataset: e.g. anime characters [JZL*17]. Some applications use style transfer or image-to-image translation to produce a new image based on the style or characteristics of another image, that is applied to a different image. Another example was using GANs to convert between two image types. The published codebase was used to generate Renaissance portraits from real portrait photos [AB22].

Based on their review Nantheera Anantrasirichai et al. [AB22] predict that AI will largely be adapted as a tool in the creative industry. And indeed a survey of Adobe showed that three-quarters of artists in the US, UK, Germany, and Japan consider working with AI tools. However, they see its use as a creator alone as modest in areas without limitations [PDJ*18].

Even on social media platforms like Instagram, AI is not an unknown topic: On the one hand, it is used to gain social insights about the own brand and audience, to automate processes to increase productivity, to conduct target group-oriented marketing [SAAMM21] and on the other hand, more profiles of so-called AI influencers have appeared in recent years. Some experts believe that the number of AI influencers will increase as the technology develops. [AGHS20]. AI influencers have the advantage of no physical or capability limitations [Jan22] and advertisers can reduce the subsidiary cost and effort compared to real-world work [n.a21]. In contrast, other researchers argue that AI influencers can be more costly compared to human influencers since creating a CGI model may cost more, as it requires demanding technologies [TF21].

The related work shows that LSTs have been a highly discussed topic for multiple years. Since MidJourney and ChatGPT are new technologies, there is little research on how these generative AIs

will impact the work environment. And even less research on how these technologies can be used in social media to generate content and develop a strategy for a social media account.

3. Definition of case study

The purpose of the paper is to examine the possibilities and limitations when using image- and text-generative AIs for content creation on social media. To achieve this, we conducted a three-week case study in which we created a social media account whose content was generated using AI. In addition to content generation, AI was used to advise on the strategy development of the account. By strategy development, we mean all the actions and decisions on the Instagram account that contribute to gain more followers and increase the engagement on the account. This can include different actions such as interacting with other content or accounts, or choosing the time when something should be posted. The decision about the activities is made by ChatGPT.

3.1. Task and tool selection

As mentioned, we chose Instagram as a platform for the case study. The platform was chosen because it is one of the most popular social media apps, with over one billion downloads in the Play Store. ChatGPT and MidJourney were chosen as text- and image-generative AIs. ChatGPT is used for generating captions, comments, MidJourney prompts, and messages, as well as advising on strategy development. MidJourney is used to generate any images on the Instagram account. Both were selected because they were recently published and have high user numbers.

Since there are no scientific papers on the tasks of a content creator, we come up with the following tasks based on the possibilities you can do on a social media platforms like Instagram: posting content, engaging with the own community (e.g. answering comments and messages) and liking and commenting on posts and following other accounts. The content that can be posted on Instagram is photo posts, reels, and stories. To evaluate all content features on Instagram sufficiently, we have determined that ChatGPT and MidJourney should generate content for at least one photo post, one reel, and one story every day.

3.2. Procedure of Execution

The case study is divided into four phases. The first phase is the account creation. ChatGPT will be asked one-off questions necessary to create the account. These include:

1. What topic does the account want to post about?
2. What is the profile name of the account?
3. What is the biography for the account?
4. What is the MidJourney prompt for the profile image?
5. Should we tell our followers that the content is generated by AI?
6. Do you have any suggestions for opening an account and gaining more followers?

The phase also includes the creation of the profile image using MidJourney.

The second phase is the creation and planning of the content. To do this, ChatGPT should be given the following tasks for each day:

> Okay great, we can plan our [day] day of content. Please work on the following tasks:
>
> 1. Create a [utopian/dystopian] world and describe it in the caption of the post. Add everything to the caption that you think is relevant.
> 2. Determine how many images the post should have and what is shown on each image as MidJourney prompt
> 3. Determine which hashtags we should use
> 4. Determine what poll we should ask in our story
> 5. Determine what we show in a reel that is related to the post (as a MidJourney prompt) and what caption the reel should have
> 6. Determine the time when we should post it on [weekday] the [day]

How the tasks are put together is explained in section 4. The prompts are then passed from ChatGPT to MidJourney to generate the images and videos for that day. The third phase is the posting of the reel, stories, and photo posts. These will be uploaded to the platform at the time specified by ChatGPT. The fourth phase is about interacting with other accounts. This includes replying to comments and messages, writing comments, giving likes, and following other accounts. Phases two to four must be completed for each day of the three weeks.

3.3. Criterias of execution and analysis

In order to have a structured and regulated process during the execution of the case study, rules have been set for the interaction and involvement of ChatGPT and MidJourney:

1. The text published on the Instagram account is exclusively written by ChatGPT.
2. No changes should be made to the text that alters or adds content.
3. Single words may be changed or rather placeholders from ChatGPT can be replaced.
4. If ChatGPT offers more than one option, one may be chosen.
5. If an answer from ChatGPT is out of context, you may ask again.
6. The images or videos posted on the account are exclusively created by MidJourney.
7. The prompts for MidJourney are generated exclusively by ChatGPT.
8. The images may not be edited. It is only allowed to rescale them to fit the given format.

The criteria that should be analysed to determine how well ChatGPT and MidJourney are suited to create and develop strategies for an Instagram account are:

1. Originality of the content
2. Complexity of the content
3. Suitability of the content
4. Time expenditure and workload
5. Success of the strategy development in terms of followers, likes and comments

4. Execution of case study

The case study was conducted over three weeks from 08/07/23 to 24/07/23. One reel, one photo post, and two stories were posted

each day, except on 19/07 due to time constraints. A single chat history was used for the communication with ChatGPT so that ChatGPT would retain context for all subsequent interactions. For MidJourney, a private Discord server was created with the MidJourney bot to see only their own prompts and not those of others as on the MidJourney server. For a better understanding, we have included excerpts from the chat transcript, which we refer to in the following sections.

4.1. Phase 1: Setup of the Instagram account

After introducing ChatGPT to the exact plan of the case study, the setup questions were asked. The chat transcript for the introduction and setup questions can be found in appendix A. In summary, the responses were as follows: The profile name, bio, and profile picture can be seen in figure 1. The topic of the Instagram account is "visual storytelling of dystopian and utopian worlds". The account states that AI generates the content. MidJourney generated the profile picture and one of the four options was chosen independently. The profile name had to be changed, as ChatGPT's was already taken. The topic idea was not taken directly from ChatGPT, as ChatGPT suggested more general topics. The final topic is a combination of several suggestions from ChatGPT.

4.2. Phase 2: Generation of content

The content for the Instagram account was always planned seven days in advance so that the case study could be implemented within the given capacities. When creating the content for the first day, we experimented with the task format to make it as efficient and good as possible. In the end, we decided on the format of daily questions described in subsection 3.2, because it was possible to generate the content for one day with only one command. We also decided on the format for the stories, which consisted of suggestions from ChatGPT to post photos of the work and interact with followers via polls. The chat transcript for the creation of the tasks can be found in appendix A. The prompts from ChatGPT were passed to MidJourney and an image was chosen independently. The video generated by MidJourney had to be rescaled for the Instagram format. Overall, it took an average of 15 minutes to create a day's worth of content. All content generated by ChatGPT can be found in appendix A. The photo posts and reels can be found on the Instagram account.

4.3. Phase 3: Posting of content

The content was posted from the time suggested by ChatGPT. In the first two weeks, ChatGPT gave two time ranges, so the time could always be kept in the first two weeks. In the third week, ChatGPT gave an exact time, so the times could not always be kept in the third week. On the day, two stories were posted based on ChatGPT's suggestions in appendix A. The first story was a picture from the photo post and the second story was a poll about the utopian or dystopian world that was posted. In the end, ChatGPT was given the statistics (likes, comments, and new followers) of the previous day and asked for improvement suggestions. As the improvement suggestions were always the same, this step was discontinued after a few days.

4.4. Phase 4: Interaction

Interaction with other accounts was determined by ChatGPT. ChatGPT specified that we should write comments, like other posts, and follow other accounts. The number of interactions was also to be determined by ChatGPT, but this proved difficult as ChatGPT did not want to make a clear decision and pointed out that you should adapt it to your available time. Therefore, we decided that there should be a minimum of 10 comments per day. This was always achieved, except for three days due to technical reasons (ChatGPT was down) and time constraints. Comments were generated by describing the image you wanted to comment on. Another part of the interaction was answering some messages. We answered the messages with ChatGPT as well. An excerpt from the chat transcript for the interactions can be found in appendix A.

4.5. Further notes

We have taken the following suggestions from ChatGPT into account when developing the strategy:

- Define your brand and niche
- Consistent posting schedule
- Engage with audience
- Use relevant hashtags
- Collaborate with others
- Network and engage with the community

A detailed list can be found in appendix A.

During the study, ChatGPT was down for one day, but this only affected posting comments and replying to messages and comments. On the night of the seventh and eighth day, the Instagram account was suspended for about ten hours, which could have affected the engagement of the previous posts.

ChatGPT suggested that we should collaborate with another account to get more followers. So we started a collaboration with another account and created a total of four posts. The concept for the collaboration and the first message to the collaboration partner were written with ChatGPT. For all further messages, we did not use ChatGPT, as this would have made things unnecessarily complicated and would probably not have led to a collaboration. An excerpt of the chat transcript with ChatGPT for the collaboration can be found in appendix A.

5. Results and Discussion

In the following chapter, the results of the case study are presented and discussed. The results will be considered for the analysis criteria from subsection 3.3.

In total, 10 utopian, 10 dystopian, and 1 mixed future scenario were created with ChatGPT. For each future scenario, a photo post with 1-5 pictures, a role, and two stories with a link to the post and a poll were created. In addition, 4 posts were created in collaboration with another account.

Originality of the content: The content of each scenario is very similar. In the utopian worlds, people live together in harmony and

Figure 2: *Stylistically similar images from days 7 and 13*

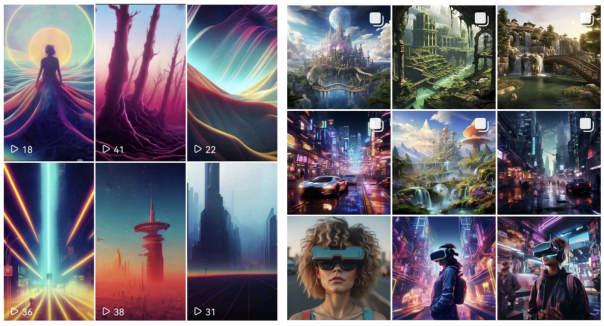

Figure 3: *Comparison of complexity between reels and photo posts*

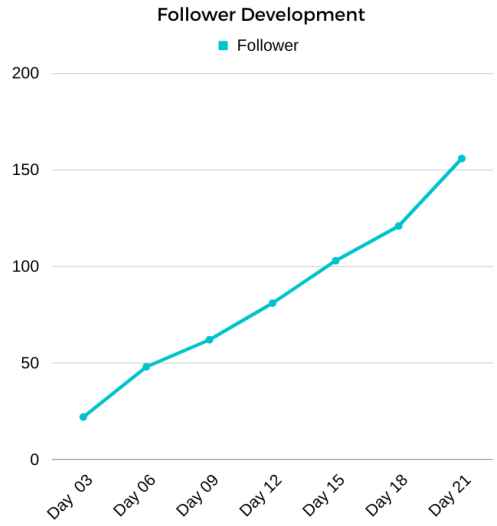

Figure 4: *Follower development over three weeks*

	Likes	Comments	Reel Views
Week 1	30	8	23
Week 2	89	11	54
Week 3	83	7	70
Total	202	26	147

Table 1: *Likes, comments and reel views after 24h during the three weeks*

unity. A flourishing landscape and nature with bright colors is described, where everyone pays attention to sustainability. Technical innovations work hand in hand with humans and nature. On the other hand, dystopian scenarios consist of destroyed buildings, surveillance, almost no civilization, pollution, and darkness. Some future scenarios are more original than those just mentioned, such as day 5, where gravity does not exist and the sky is made of candy. However, overall the scenarios are rather general and shallow. The AI-generated images tend to vary. Some images are similar in style and content, as shown in figure 2. It is not possible to pinpoint the specific reason for this. The reason could be MidJourney or to similar prompts generated by ChatGPT. ChatGPT's comments, on the other hand, were original and mostly very well received. This could be seen in the reactions, such as likes or replies to the comments. A variety of emojis and hashtags were also used.

Complexity of the content: All scenarios are described in detail. ChatGPT uses a lot of descriptive adjectives such as enchanted, whimsical, and desolate. MidJourney's images are complex and rich in detail. Compared to the images, the generated videos are slightly less detailed and complex, as can be seen in figure 3. This may be due to the format used to generate videos on MidJourney. The command "-ar 16:9" is used to get a single video, which results in one large image/video instead of four small images. In most cases, the comments were complex and vividly commented on the image being described.

Suitability of the content: The individual-generated stories were generally very well suited to the theme of dystopian and utopian worlds. It was very easy to tell by the storyline if it was a dystopian or utopian world. The images generated matched the ChatGPT prompts and the story. The reels that were generated tended to be a bit more abstract and only schematically depicted the world. The music for the reels was available in most cases, but some song titles were not. ChatGPT only provided the song titles with unknown artists for the music selection, so it can be assumed that these were only accidentally in the Instagram music library. The story polls were thematically related to the generated world. In most cases, the comments were very applicable to the image described. However, in some cases, ChatGPT added something that was not depicted in the image. The emojis and hashtags also matched the image well.

Time expenditure and workload: It took 10-15 minutes a day to generate the content. During the generation, ChatGPT and MidJourney did almost all the work. We just had to give ChatGPT the command to generate the content and pass the MidJourney prompts. Posting the content took about 10 minutes a day. This work was all done by us. The time spent interacting with other users was about 30 minutes per day. ChatGPT took care of writing the comments and we chose the images to comment on, like, and follow other accounts.

Success of the strategy development in terms of followers, likes, and comments: The progression of the number of followers

	Likes	Comments	Reel Views
Week 1	147	18	200
Week 2	188	12	454
Week 3	155	10	206
Total	490	40	860

Table 2: *The total amount of likes, comments and reel views during the three weeks*

	Average likes	Average comments
Own posts	4.81	0.62
Collaboration posts	13.25	1.75

Table 3: *Comparison of likes and comments between own and collaboration posts*

over the three weeks is shown in figure 4. Followers generally increased linearly, with a slightly steeper slope at the beginning and end. Likes and comments increased in the first two weeks and decreased slightly or stayed about the same in the third week. In terms of the total number, this is probably partly because some followers had already been generated by then and the posts were online for longer overall than in the third week. Story views increased steadily over the three weeks, with the highest number of reels viewed in week two. In weeks one and three the views were about the same. This is because, in week two, two reels generated a particularly high number of views (day 8: 96, day 12: 149). An overview of the exact numbers after 24 hours is shown in table 1 and for the whole three weeks in table 2. In general, the account grew steadily and was able to generate some followers, likes, and comments. However, the account was not overly successful. It is also not possible to determine exactly which strategies led to the acquisition of followers, likes, and comments. However, we can confirm the success of one strategy. By collaborating with another account, our four collaborative posts received more likes and comments overall. An overview of the average numbers can be found in table 3. It was not possible to adjust the strategy dynamically during the case study. The statistics from the previous day were given to ChatGPT, but ChatGPT could not give a detailed analysis of why something went well and why it did not. Only the same general indications were given.

In summary, AI tools can support the generation of content and interactions. In particular, the generation of comments and messages to other users was created efficiently, and original content was reproduced. It was possible to quickly post personal messages/comments to build high-quality interactions with other users. Image generation with MidJourney provided varied and appropriate images. It should be noted that 'suitability' depends on the topic of the Instagram channel. For the generation of fictional utopian and dystopian worlds, the results were original, complex, and suitable, but this is not necessarily the case for other topics. In our case, the video generation produced less original, complex, and appropriate results. In this case, one could also use a specific AI for video generation and test whether it gives better results. As for the originality of the fictional utopian/dystopian stories, we did not get satisfactory results. In this case, a combination of human creativity and AI "creativity" could be used. Human creativity would provide the initial input, i.e. the story and content, and ChatGPT could further embellish and write the story.

Even though ChatGPT and MidJourney could support content generation and interaction well, many decisions still need to be made by humans: image selection, which posts to like, comment on, or which accounts to follow. This is where a more technically complex system could help, connecting the Instagram API to ChatGPT's API and giving ChatGPT insight into Instagram. ChatGPT generally struggled to make decisions and would only decide after several requests, making the whole process more complicated than making a decision itself.

ChatGPT was less suitable for strategy development. The strategy suggestions from ChatGPT were rather general and could not be specifically adapted to the results of the channel. ChatGPT's suggestions can provide a good initial guide, but cannot be used as long-term advice. An AI model trained specifically for Instagram would probably be better suited for this.

Although we tried to minimize human influence, it could not be completely avoided. For example, certain human decisions may have influenced the success of the Instagram account, such as the choice of topics for the account and the choice of images from MidJourney. The time available for the case study was relatively short, so not all of ChatGPT's strategy suggestions could be implemented and the success of the Instagram account could not be analyzed in the long term. To save even more time, the whole case study could have been further automated, such as posting content and comments. How such a system could be set up and how promising it would be could be explored in further work. The use of other AI systems that are explicitly suitable for Instagram or generating video content, could also be further explored.

6. Conclusion

The case study provides a first insight into how AI tools such as ChatGPT and MidJourney can be used in content creation and strategy development, as well as the possibilities and limitations of their use. The results show that the use of ChatGPT and MidJourney can offer advantages in content creation on Instagram. However, at this stage, we would advise against letting AI alone make the decision for content generation, but to take an Augmented Intelligence approach and work with AI. This could compensate for the lack of originality of the content and still maintain the complexity and effectiveness of the generation. In particular, ChatGPT was not found to be very helpful for decision making and should therefore be used more as a brainstorming tool. It should be noted, however, that the results are not necessarily transferable to other thematic content of an Instagram account. The extension to other topics can be part of further research. ChatGPT proved to be less suitable for strategy development and should rather be used as a first guide. The case study only looked at two AI tools, but it should be considered that further AI tools could cover the limitations of these two, making the task areas even more independent of humans. This could be the subject of further research to compensate for the limitations in strategy development, video generation, and decision-making.

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Appendix A: Digital Appendix

Content of digital appendix:

1. Excerpt of the chat transcript
2. Posting schedule

The digital appendix can be found at the following link: https://drive.google.com/drive/folders/1OQ0qYYtBdqzhqArtka8MWULrW7LL0drn?usp=sharing