Measuring Impact Of AI Image Generators In Photography: A Pragmatic Study On Professional Photographers

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Abstract
The growth of Artificial Intelligence (AI) has been exponential in the last few years. AI Image generators like Dall-E, Midjourney etc. have increased the popularity among professional photographers. These generators can convert any text prompt into an image. The study aims to investigate the influence of AI Image Generators on photographers and the advancements it has on the overall landscape of the industry. The research undertaken focuses on the pros and cons of AI Image Generators, suggestions for improvement in existing image generators and understanding how these image generators may be the tool of fake news. The study is conducted with a pragmatic approach that includes survey and telephonic interviews of professional photographers. The scope of the study extends to making people aware about the AI Image Generators and the complications surrounding it. The study highlights the views of the photographers about these generators and can be used as a reference to study the various ethical issues pertaining to these AI tools.

Keywords - AI, AI Image Generators, Photography, Photographers, Technology

1. Introduction

The rapid development of deep learning and neural network designs has led to considerable improvements in AI image generators in recent years. They have quickly taken hold in a variety of industries, revolutionizing corporate practices, and opening fresh opportunities. Among them is the photography sector, many companies including Adobe, Capture One, and DxO, have used intelligent algorithms for a long time without necessarily calling them artificial intelligence. Machines have long had an impact on photography. For some time now, "intelligence" has been used by everyone of us in some way.

Photographers have long used artificial intelligence to increase productivity and produce better photos. In the past, photographers have employed AI to improve their cameras' capabilities or even to automate photo editing. The AI Image Generation technology today has gotten better and more usable with time, with tools like Dall-E, photographers can now put a description of the kind of picture they want, and the Artificial Intelligence (AI) will create the same for them. Without a doubt, AI will transform photography and perhaps even the entire planet.

Photographers have been using AI image generators for image enhancement and restoration, artistic style and filter application, creative composition and augmentation, automatic image tagging and categorization, and upscaling algorithms, such as super-resolution techniques. These uses of AI image generators in the photography sector boost creativity, enhance image quality, simplify workflows, and provide artists with new tools and strategies to push the limits of their artistic expression.

While AI picture generators present intriguing possibilities, it is crucial to remember that, in order to preserve the authenticity and integrity of photographers, using AI image generators ethically and with ethical concerns is essential. AI image generators can generate images that closely resemble existing copyrighted works, raising questions about intellectual property rights. As AI systems become more advanced, there may be concerns about the devaluation of professional photography skills and the potential displacement of photographers.

Therefore, to study how AI Image Generators will impact photographers the following research questions are developed:

RQ 1. How have the emerging AI Image Generators impacted the photography industry?
RQ 2. What are the advantages and disadvantages of AI image generators in the field of photography?
RQ 3. How can AI image generators like Dall-E and Midjourney be utilized to propagate false information?
RQ 4. What potential improvements and modifications can be made to the existing technology in order to advance the sector?

1.1. Objectives of the Study:
1. To examine the potential impacts of AI image production on professional photographers.
2. To comprehend the drawbacks and benefits of AI image generators for photographers
3. To study how AI Image Generators like Dall-E, Midjourney can be used to spread fake information.

4. To examine what changes can be brought to the technology for the advancement of this sector.

1.2. Review of Literature

Artificial intelligence (AI) has come a long way since its inception in the 1950s. One area where AI has made significant progress is in the generation of images. Despite the limitations, the ability to generate images using computers is seen as a major milestone, as it opened up the possibility of creating digital art and visual effects for film and television. In the 21st century, AI image generation has continued to evolve and improve at a rapid pace. Previous researches has helped the researcher gather knowledge about AI Image Generators and their use case scenarios.

The research paper '**Generative AI: Here to stay, but for good?**' by Henrik Skaug Sætra discusses the possible influence of AI Generators as well as the risks associated with using AI to create text and other types of material. The researcher claims that there are concerns that generative AI might be harmful to political stability and democracy. Example can be the nearly limitless capacity of generative AI to produce political content for distribution. One issue is false news, which can include text and generated films that show actual people or circumstances in inventive and fictitious ways (deepfakes). Second, as previously mentioned, generative AI has the ability to replace all types of workers, even so-called "knowledge workers." AI will alter professions, which will alter how different groups, employers and employees, and professions relate to one another in terms of power. If we take freelance photographers as an example, what happens when news organizations use images from Dall-E or Midjourney rather of paying for stock photography or hiring photographers? The researcher uses this paper as a reference to study how generative AI takes, appropriates, and develops information created by humans and presents significant issues.

Video titled '**AI Is Coming For Photographers Next.**' the YouTuber, Jonny Keeley describes the process of AI Image generators and shares a few examples with the audience. He further describes that the AI right now creates images that are abstract rather than something that is true to life and hence is not very useful to marketing agencies. But he fears that once AI starts building images that are true to life it can affect photographers, models, makeup artists, illustrators, re-touchers, and everyone involved in creating images that companies use in their marketing. He also talks about a possibility wherein; companies could generate images of models with their products through AI instead of getting them clicked by photographers. He also points out that the AI-generated images are technically original and hence companies do not have to worry about copyright issues. This video highlights the views of photographers on AI-generated image generators and how they are cheaper and companies in future might prefer them instead of hiring a photographer.

An online article by James Vincent for The Verge (September 15, 2022) titled "**Anyone can use this AI art generator – that's the risk**" emphasises on the potential risks of AI being in the hands of everyone. The author discusses that AI image generators had given people of all kinds the ability to make things. However, the findings revealed that many people create "amazingly hateful things." According to the article, Stable Diffusion poses a greater risk than DALL-E since it lacks a mechanism for controlling the content it generates. This makes it possible for it to produce NSFW content, and anyone can do so. The absence of moderation at Stable Diffusion also enables it to produce copyrighted content that promotes plagiarism. This article helped the researcher formulate questions regarding the free use of AI Image generators.

The article '**The Power and Ethical Dilemma of AI Image Generation Models**' describes the working and effects of generative AI. The Diffusion models are a type of generative model that creates data output that looks like the input data they were trained on. It is through this "noising" and "de-noising" diffusion process that one can even use these AI image generators to create images in the style of a particular artist, just by typing in their name. In order to produce something in a particular artist's style, works by that artist must be scraped off the internet, and then fed into these AI training datasets. Copyrighted artworks, artists' personal names and styles are simply ingested without any respect to the legitimate authors. Artists are forced to compete against the code in this setting. This article talks about the ripple effects of Ai Image generators that are beyond copyright violations and the possible threat to human artists' livelihoods. This article gives the researcher an insight about how these AI Image generators have been using the work of photographers to develop new works and how it can be harmful for the photographers.

In an article '**How AI Imagery is Shaking Photojournalism**' the author Amber Terranova talks about the recent AI project 90 Miles by photographer Michael Christopher Brown. A post-photography AI reporting illustration project was made by the photographer to explore historical occurrences and contemporary realities in Cuba that have inspired Cubans to travel the "90 miles" of the ocean that separates Havana from Florida. The photographer explains to the author that the project's goals were to investigate, analyse, and discuss the potential applications of AI for reportage illustration as well as to raise awareness of the implications of such work for image-based storytellers who are concerned with reality and truth. His goal was to engage new audiences by presenting them with something they had never seen before and by raising awareness of a certain topic by utilizing modern technology. This article helps the researcher to broaden the area of research to photojournalists as well along with freelance and hobby photographers.

The researcher feels that no specific study has been done on the influence of AI Image Generators with a focus on photojournalists after evaluating all the publications and research papers. The awareness of the wide range of accessible software and applications along with the awareness about the ethical issues is a further problem. Although AI image

generators can be used to produce fraudulent photos, it can be difficult for regular individuals to tell which images are produced by AI and which are not, hence knowledge of this issue is lacking among the general public. There is a widespread fear that the AI Image Generators would be a threat to the jobs of photographers therefore the researcher would like to study these aspects to present a clear situation of the scenario.

1.3. Research Methodology
The research study is based on pragmatic research approach to determine the trend and impact of AI Image Generators on professional photographers. Surveys and interviews are prepared to gather primary data. Whereas the researcher used webpage articles as well as YouTube videos as the secondary source of data. The quantitative research includes a survey method whereas the qualitative study includes telephonic interviews.

For quantitative study, a purposive sampling technique and cross-sectional survey has been undertaken. Since, the researcher studied the relation between the impact of AI Image generators on the photography industry, the researcher has undertaken a correlation research design. The subject of study is the photographers currently working in the industry including both photojournalists, freelancers and hobby photographers with a sample size of 100. With respect to qualitative study several AI experts along with photojournalists were chosen to be interviewed.

1.3.1. Hypothesis
H0: AI image generators pose threats to professional photographers, and the outcome of their usage depends on various factors such as artistic integrity and creative control.
H0: The increased advancements in AI image generators will lead to a decline in job opportunities for photographers, as these automated systems can efficiently generate high-quality images with minimal human intervention.
H0: AI image generators have the potential to significantly advance the work of photographers by enhancing their creative process, improving efficiency, and expanding artistic possibilities.
H0: The use of AI image generators raises significant ethical concerns, including copyright issues for photographers.

2. Data Collection and Analysis
2.1. Quantitative Data Findings: A survey was conducted to get information from the photographers. It includes those who are working as freelancers or photojournalists and hobby photographers. The survey was sent to around 150 photographers out of which 104 filled the same. 78 being from the age group of 18-25 and 25% being from the age group of 25-60. Amongst these 104 people, 70 are hobby photographers, 29 are freelance photographers and 5 are photojournalists. 84.6% responders have stated that they have heard about AI Image generators whereas 9.6% were unsure and the rest of 5.8% haven't heard about AI Image generators (Figure 1).
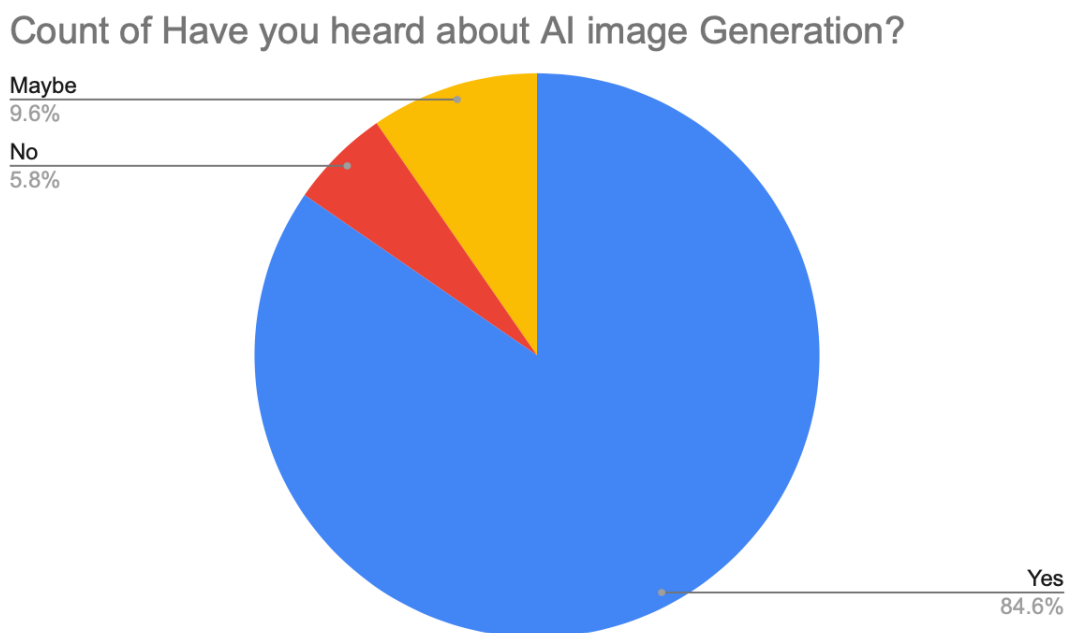

Figure 1

- The responders were asked to select which AI Image generator they have used or heard about from various options like Night Café, Dream by Wombo, Midjourney etc. As per the Forbes list of Best AI Image Generators, DALL-E 2 tops the list and as per the survey, 47 responders have heard or used DALL-E 2. And on an average 49.5% of responders have heard or used Midjourney (Figure 2).

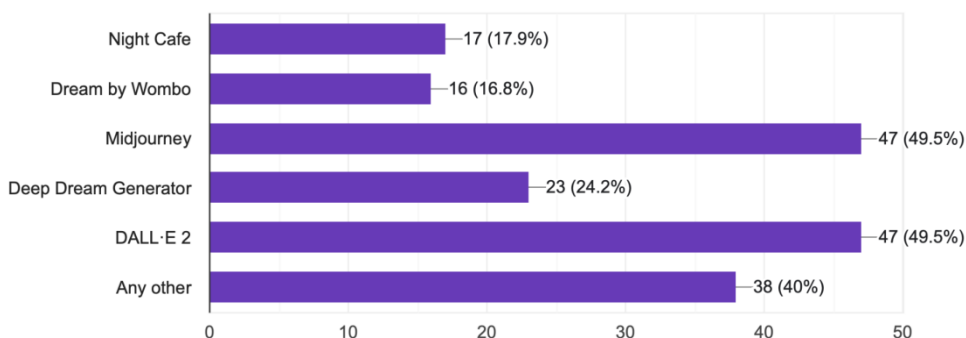Which AI Image Generator you have heard/used ? (Select all that apply)
95 responses

Figure 2

● Majority of responders, around 51% have either used AI Image generators just to experiment or for their own creative clarity and use. Whereas only 8.7% that is 9 photographers have used AI Image generators for commercial use (Figure 3).

Count of If you've used an AI image generator before, please specify your purpose.
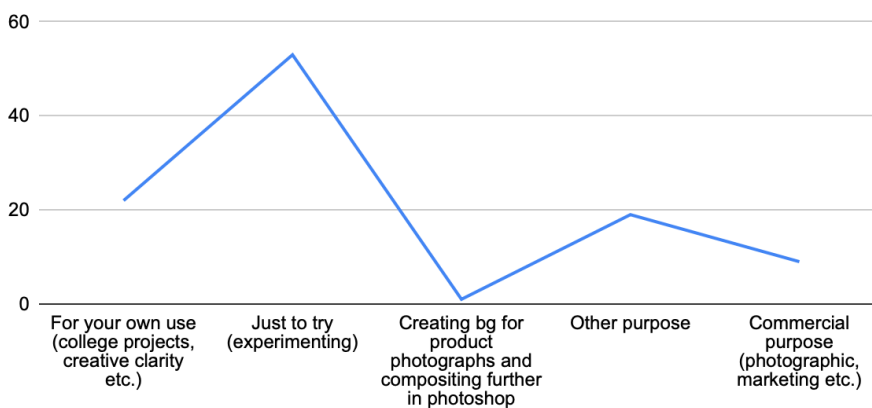
Count of If you've used an AI image generator before, please specify your purpose.

Figure 3

What are the main limitations or challenges you encounter when using free AI image generators? (Select all that apply)
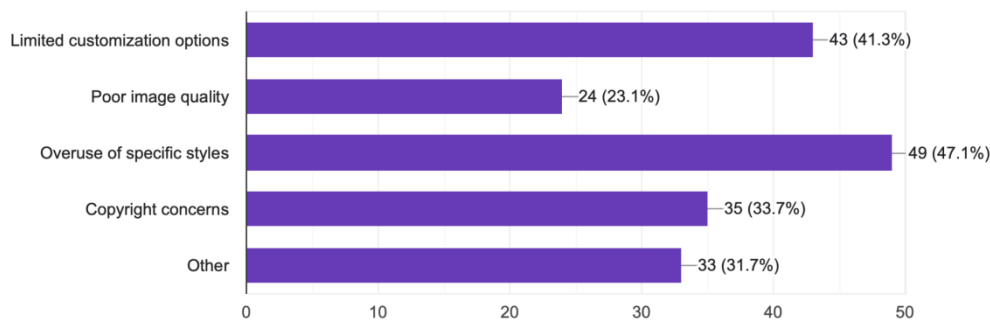104 responses

Figure 4

● 49% of the responders felt that one of the biggest limitations of these AI tools are the overuse of the specific styles available to create images. Every AI Image generator has a few options available for producing different kinds of pictures like monochrome, modern, vintage etc. another prominent issue is the lack of customization available on these platforms. Though all these tools claim that the images produced through AI Image generators are copyright free, 33% responders feels that the issue of copyright is prevalent (Figure 4).

● Almost 63% of the photographers believe that AI Image generators can help photographers to create virtual backgrounds to merge with real images. Some believe that they can work smart with the AI tools as well as take inspiration for creating images (Figure 5).
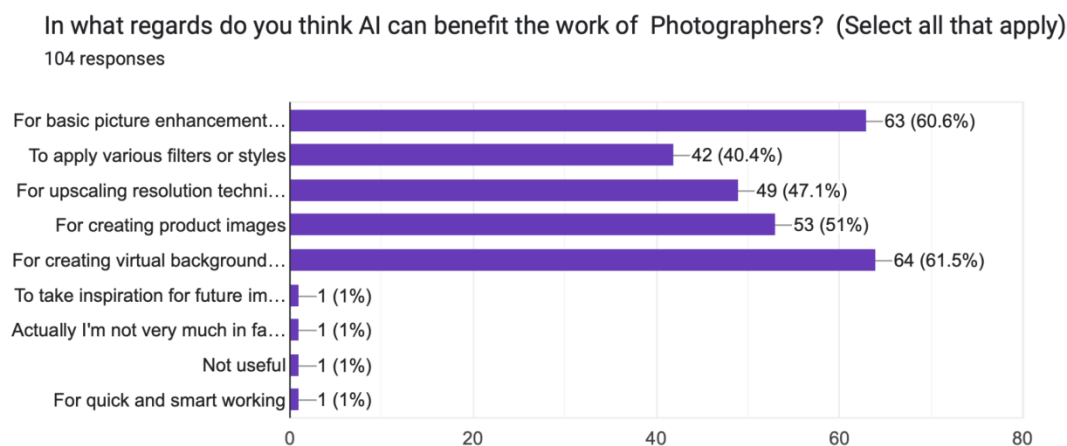

Figure 5

● When asked in what ways AI Image generators can be a threat to photographers, most of them believed that it can overshadow the work of Photographers with instantly creating photographs whereas a considerable number of photographers believe that it is a threat to the stock photography industry (Figure 6).
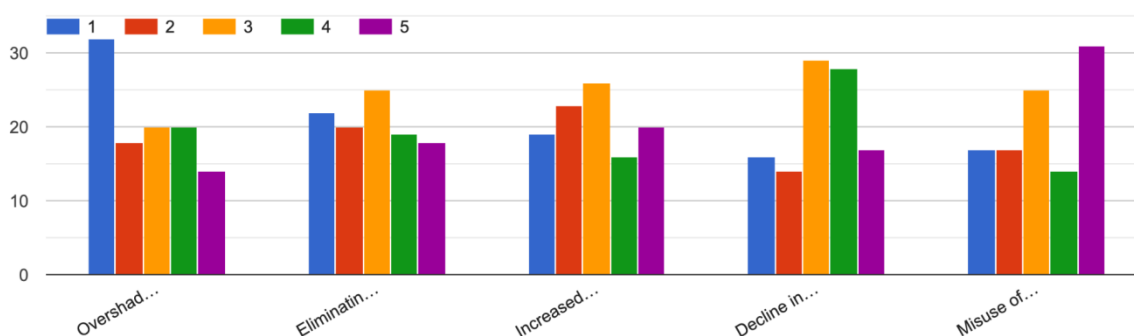

Figure 6

● 77.9% of responders believe that AI Image generators can be used to fabricate images and videos. This throws light to a direct relation between how AI should not be free for everyone to use. A five-point scale was used to measure their responses, ranging from strong agreement to strong disagreement. 34 photographers believe that AI should not be free to use for everyone (Figure 7)

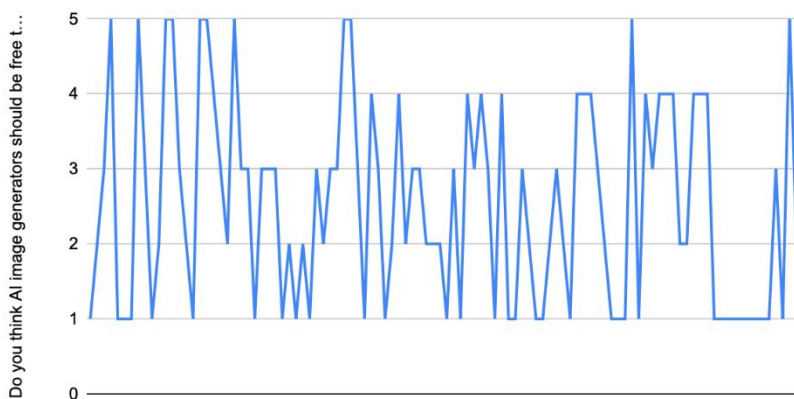Do you think AI image generators should be free to use for everyone?

Figure 7

● The next question aimed specifically at Adobe Photoshop's "Generative Fill" feature. Since this new feature has been the talk of the town for a while now and has speculated that it can force a decline in the necessity or demand for product photographers. 39 responders were not sure about the same, but 38.5% responders agreed to the fact that it is possible (Figure 8).

Count of Specifically referring to product photography, where companies may utilize tools like Adobe Photoshop's "Generative Fill." Do you see a decline in the necessity or demand for product photographers?
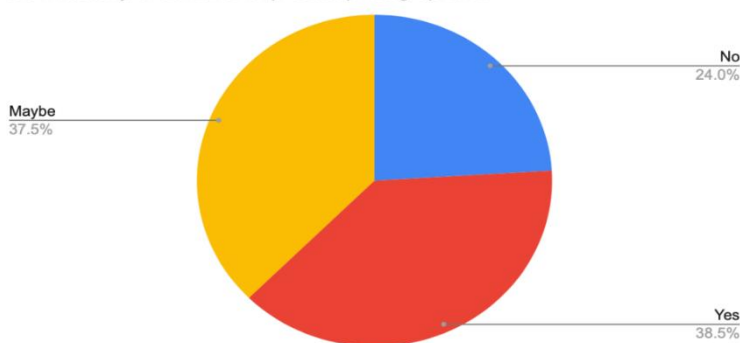

No
24.0%

Maybe
37.5%

Yes
38.5%

Figure 8

● Considering the ethical issues related to AI Image generators, one of the biggest issues is the use of already existing data to train AI tools. This can lead to copyright issues wherein there is a possibility that the image generated is based on an already existing image. A five-point scale was used to measure the responses of the photographers regarding the same, ranging from very unlikely to very likely. Around 37 photographers are likely to be bothered by this whereas only 4% are very unlikely to be bothered by this (Figure 9).

AI Image Generators are trained using data that is already available online (Eg. the photographs available on the internet). How much does this bothers you, on a scale of 1 to 5?
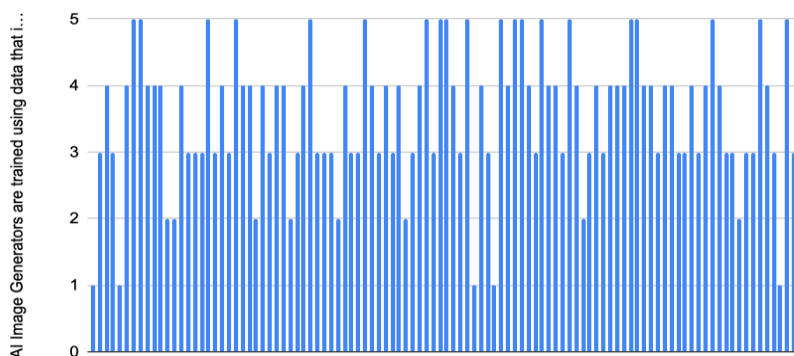

Figure 9

● The next question focused on the improvements and suggestions photographers would like to see in future in AI tools. The responders had a very interesting take on this question. One of the respondents mentioned that 'AI needs to learn more about less popular things' which clearly means that according to the responder these AI tools just pick whatever things are famous and apply those styles. Some of them mentioned that AI should be used in rotoscopy and animation/vfx as well. Some of the responders suggested that there should be a clear indication either by adding a watermark or by showing the date stamp on the image generated.

● 58.7% of the responders believe that the images generated by AI Image generators should be labelled when exhibited or published. And 58.7% responders also agree to the fact that there should be some regulatory frameworks or guidelines in place to govern the use of AI Image generators. When asked what guidelines would the photographers want in place for the same. They focused that AI Image generators should not be available to use for all and should have restrictions so that people do not generate fake images. Responders also suggested that these tools can be paid or licensed. People also pointed out that if AI tools are used for commercial purposes, it should be properly mentioned. To conclude we can say that these AI tools are a benefit to society if used with proper guidelines or else they can be the reason for destruction (Figure 10).

Figure 10

● Most of the responder that is 46.2% see that their relation is evolving and hence when asked in detail how they see this relation evolving. The researcher got responses that clearly states that even though there is a relation it might not be a positive one. Most responders believe that it is too early to define this relation but some of them also talk about how this relation can destroy things (Figure 11).
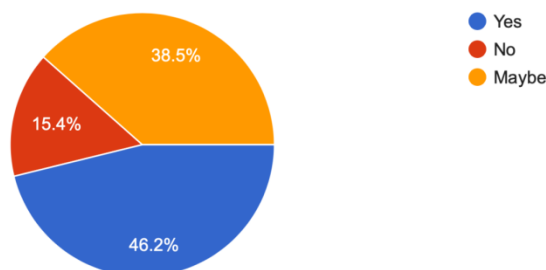

Figure 11

2.2. Qualitative Data Findings

To get an in-depth insight on the topic the researcher will also undergo interview technique.

Photojournalists as well as hobby photographers would be interviewed for the same. AI experts were also be interviewed so that the researcher gets ample of information about how AI Image generators work and what they bring in the future for us. The following is the summarized version of the findings through the telephonic interview.

Questions/ Photographers:	Tarun	Rohit	Varun Tyagi
Used/heard about AI Image Generators	Heard but not used personally.	Used DALL-E once.	Used RetouchMe & portraiture for skin retouching
Photography industry affected by AI Image Generators	Photography is going out, scouting a subject, it's all about emotions. I don't feel that AI is at the moment capable enough of doing.	Can help product photographers but just a tool can't replace people.	Depends on what type of photography you do. For a fitness photographer it can be helpful and for product photographers it can be a threat.
Future between AI & Photographers	Other industries might but photojournalists won't be affected.	To evolve with AI we need to understand the nuances of AI & how it can be helpful for us.	It's in the transition phase right now. We really can't say anything where it will go.
Training of AI on already existing images	I don't think my credibility will be affected with AI or someone even using my picture	Depending on the photograph, if it could generate revenue, it does bother me.	Definitely it can. So, if AI can completely copy my style, then it can be a really dangerous thing.
Ethical issues	Too early to comment. It will take around 20-30 years to say anything	AI everything has gotten very easy. So, it becomes very difficult to know what to see and what not to.	We can notice a constant focus on the ethical implications of AI. There should be a regulatory body or regulations in place.

a. Analysis of Interview with AI Experts

● They pointed out that AI can't replace photographers as AI can be used to edit the pictures, but it can't capture them.
● Additionally, certain types of photography, such as product and stock photography, will undoubtedly be impacted. It can eliminate some jobs or theoretically qualified people from the picture, but not entirely.
● There is no perfect solution to distinguish between AI-generated images and photographer-clicked images. It depends on the picture. Hence, it is better if they are labelled.
● Particularly in terms of Artificial Intelligence, there is a lot of ambiguity as it is still in its evolving form. People are unaware of proper usage procedures. Therefore, there is still a lot of time needed to get a clear picture of whether it is harmful or not.

b. Findings

● It is difficult to say whether AI Image Generators endanger professional photographers. The response is inconsistent since some photographers think AI can speed up their workflow but cannot produce real-time photographs.
● It is true to say that these automated systems can efficiently generate high-quality images with minimal human intervention but to operate these systems effectively photographers are necessary.
● We can agree that AI image generators have the potential to significantly advance the work of photographers by enhancing their creative process, improving efficiency, and expanding artistic possibilities.
● Yes, the use of AI image generators raises significant ethical concerns, including copyright issues for photographers. Hence, there is a need for regulations for these image generators to function, or else people tend to exploit them.
● It can also be concluded that the pictures generated by this AI software should be clearly labeled so that the audience can easily differentiate between an AI generated image and a human clicked image.

3.Limitations & Suggestions
3.1. Limitations
● One of the major limitations of the study was AI Image generation is relatively a new concept and has not been assimilated in the industry enough for everyone to know and use them.
● Another limitation was the area of sample limited to photographers. The willingness of the photographers to fill out the survey was another limitation that the researcher faced.

3.2. Suggestions
● The researcher advises that there should be certain regulatory norms in place in order for these generators to function successfully within the sector.
● Considering the ethical issues surrounding the AI Image generators the researcher suggests that there should be more research to explore these implications.
● The researcher also suggests that more industry specific researchers also should be conducted like research specific to product or stock photography should also be concluded.

4. Conclusion

In conclusion, it can be said that it is too early to comment on the fact if AI image generators pose a potential threat to future photographers or not. There is a lot of speculation around the same. Amidst being a potential threat, it is imperative to recognize and embrace the profound benefits that this technology can offer when wielded judiciously and with vigilant oversight. By embracing these technologies responsibly, industries can leverage their power to drive innovation, streamline processes, and unlock new creative possibilities. Striking a balance between harnessing the capabilities of AI and upholding ethical standards will be essential in shaping a future where technology and art coexist harmoniously. Presently, we are at a juncture where the verdict on whether AI image generators are a boon or bane remains uncertain. It is a notion that demands a patient observation of the technology's evolution, a keen awareness of its impacts, and a collaborative effort to guide its trajectory. Only by allowing this technology to fully unfold and working collaboratively can we discern its true nature and shape a future where the marriage of technology and artistic expression becomes a testament to our collective ingenuity and foresight.

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