

GRAPHICAL COMMUNICATION

# Bachelorrapport

**Using AI to optimize the graphic design workflow**

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# Introduction

We encounter new technologies all the time. We see AI being used for cars, robots, even art projects – so how come it's not utilized in the graphics industry to optimize their creative workflow? Using AI would be able to aid Art directors and design agencies as a whole.

New AI research is made every single day, and despite using intimidating, open-source programs are easy to use.

Designers are generally not afraid of AI, 57% answered positively to the thought of working together with AI, so why is it exactly that AI isn't getting used in the creative industry?

The words used in AI can be intimidating: GANs<sup>FN1</sup> and CNNs<sup>FN2</sup>, but what do they actually mean, and could this create a possible way of speaking to designers who aren't technology interested?

AI can do many jobs that we currently outsource to other countries, and could save money for the agencies by doing so. We even know that AKQA successfully developed a sport with a logo using AI in 2019. 8/9 art directors are open to the possibility of working with AI, but only 2/9 uses it, they all agree to the lack of knowledge.

## Problem definition

How can I inform design agencies about AI, make them test it in their workflow and awaken their interest in artificial intelligence?

## Subquestions

- Which designers should I target, agencies or freelancers?
- If agencies, which position?
- Are the art directors aware of AI?
- Are they afraid/which concerns does the art directors have?
- Is AI useable for people that aren't technology interested?
- Which AI technology is available and easy to use?
- How do art directors learn about new technologies?

# Theory/Method

AI seems scary to designers. It is code and numbers, hardly something to be used in a creative field. The designers usually love their traditional tools and don't have the time or money to optimize their workflow. They rely on Adobe updates.

I'm going to focus on creating a solution that can make Art directors see new possibilities without being overly complicated. This might also make them want to learn more about how AI works and develop their own projects.

Simplicity is a big part of this, so I want to keep my approach simple and interesting.

How do I create interest? How do I show Art directors that there's more than just premade programs? How do I get agencies in on the technological development? How can art directors use AI? Should creatives be afraid of being replaced by AI?

Due to the outbreak of COVID-19, going places and getting quick interviews by scheduling has turned into phone/skype interviews. It's been hard to access materials due to libraries closing and the niche nature of the subject. It has proven impossible to get materials from the agencies, since they're all working from home.

I interviewed professors, agencies (including freelancers) to find the exact approach for my final design. The professors helped me gain more knowledge, find pros and cons, and understand the current opinion on the subject. I started out with the target "agencies"

that switched to designers, 40-60, these seemed to be having strong opinions on their tools. The focus group has therefore switched to art directors aged 25-35, as they are new in the field and open to technological

FN1 - see "What are GANs" - page 4

FN2 - see "What are CNNs" - page 4

possibilities.

Through interviews and questionnaires, I found out why AI isn't utilized more in the field and where the problem is rooted.

For desk research, I'll use Google, google scholar and John Maedas, who has a PhD in design science and is the forefather to the programming language "processing". I make sure to check the legitimacy of my sources. Since the subject took off more recently, there aren't any books on it, and much of the research is done by people in the field. That means a lot of my sources are articles, that I have checked against multiple other articles I stumbled across to find out if they were legitimate. I found a lot of pros/cons for AI in the desk research.

I used the double diamond model<sup>42</sup> to find out, whether the problem is relevant and in the end, triangulated my research to double-check the validity.

## Analysis

### Desk research

#### What is AI?

Artificial intelligence is an algorithm-based software that learns from experience. There are multiple kinds of algorithms. The ones discussed in this paper are the generative and newly researched GANs and CNNs, two different algorithms. This is called a bottom-up approach that learns without prior learning, by asking itself: "does this look right?".

Top-down would mean it knew everything already.

#### What are GANs<sup>4+14</sup>?

Generative Adversarial Networks are algorithms that generate images on the basis of already-existing data. From a dataset of pictures such as logos, it can generate new ones. They're difficult to train and usually take several days for good results. For idea generation, you can train them in less than a day. A lot of already-trained networks exist, such as logan<sup>11</sup>. These networks can be trained to generate anything imaginable, i.e. wireframes for websites or magazines.

#### Models and the inner workings

A GAN model is a big collection of images of what you need compressed to one file of data. To generate logo ideas, you feed the GAN with as many logos as possible. These are named datasets. You then convert these to a file that holds all of the data of these logos, and this is what the GAN can train on. After training, the data can be used by anyone.

#### What are CNNs<sup>5</sup>?

Convolutional Neural Networks. These networks fulfil very basic human tasks, such as looking. They're networks that classify things such as speech, detecting objects, describing images etc. They are the heart of Computer Vision. These are the direct connections to the real world and make the machine able to see and understand it. An example could be your phones facial recognition.

I'll be focusing on using GANs and CNNs for my thesis, since these are getting researched and constantly gets better.

#### OFX<sup>24</sup> and ML4A<sup>22</sup>

OpenFrameworks (OFX) and Machine Learning for Artists (ML4A) are two great resources for beginners. The programs works on OSX, are great to show what machine learning can do with few limitations and will be a possibility to use for my campaign or program.

OpenFrameworks is necessary to compile the code and make it work. This is the core for the assets from ML4A.

#### How to use AI

AI can at first glance seem very complicated. There's no "run this program" button for most of them. Many require in-depth knowledge of computers. Luckily, most of the programs have a guide. The dependencies, requirements for the programs to run, for all the programs were Tensorflow<sup>29</sup> and Python 3, a programming language. Both of these have easy to follow tutorials. After setting the dependencies up, whether you were

training or using pre-trained models for your GAN, you'd use most time downloading the assets.

### Specifications

OSX and Windows have two widely different code structures.<sup>6</sup>

Tensorflow supports Mac, Windows and Ubuntu. It's an open-source core library for machine learning - basically what keeps the networks running, and is therefore required to run GANs. Tensorflow is getting more and more compatible with internet browsers, so the requirements for the library are not high. To make these solutions viable, there will be focus on low specifications and possibility of use with mainly Mac, since OSX is the default OS for designers. That we will stay away from training models as much as possible in the final product to avoid the need for powerful hardware. This way the final product will run on older pcs or iMacs.

### Collaboration - mixing Classical design, Design thinking and Computational Design<sup>9</sup>

There are 3 types of design.

The classical, which is completely handcrafted, perfected, and takes a lot of time. This would be something like a renaissance painting.

Design thinking, the second type, is where the design gets provocative, innovative and focuses more on the humane aspect of design and how to communicate - where the machine fails the hardest.

Lastly there's computational design. This type uses the design thinking and classical design to create individual and personal components for everyone.

You simply feed the machine with a lot of classical design and in return, it produces more. Then you take these, perfect them yourself and put them in context with your design thinking. This means that you always have the final say in the design.

### Cooperation

AI in its current state lacks personality. It's a good idea to only use AI as a kind of idea-generation or pre-production mockup-maker to quickly see the possibilities.

If we use design thinking to touch up the generated logos, they can be sent out early to the customer as mockups.

Instead of working as rivals, using the AI as a partner would be more efficient, combining the human creativity and understanding of other humans with the speed of the AI.

### Economy

Businesses need profit: there's a steep price of \$300 per month (pay for what you use)<sup>28</sup> if you want to use GAN training over cloud hosting services. The machine would have to do work worth three days of a full time lowest wage worker in Denmark to break even. Luckily, training it just for idea generation takes 1-2 days on consumer hardware to get recognizable results.

It's recommended to use conditional GANs (DCGANs) to combat the problem. These have conditions for the idea generation, which specifies the result more, but you need a creative coder to set these conditions. The idea generation process theoretically costs around \$30 but costs a lot of unused time for the agency. Many pretrained datasets exist. For most problems, you'd just have to download them.<sup>20</sup>

### Utilization

Danish agencies outsource tedious work to countries<sup>18</sup> with lower average wage. Much of this work can be done by algorithms, such as retouching a photo<sup>25</sup> or doing custom fonts from one letter<sup>8</sup>. This would cause the outsourcing cost to disappear.

### Voice recognition

We can also optimize by including non-graphical AI, such as voice recognition. As an example:

What if you could say "I want a big red dot of 10x10 cm" and it'd spawn. "How about a little smaller?" and it'd decrease the size slightly.

That'd make it easier to work while getting your coffee. You could create an idea without even looking at the screen. It also gives people with physical disabilities the ability to work with graphic design. In the future this could be combined with the CNNs and make it possible to say for the computer to e.g make a pattern of stars on voice-command, which would be based on a set of data. It's not that far-fetched, look at Nvidias gaugan<sup>23</sup>.

**Partial conclusion**

- OSX is compatible with a lot of GANs, the generating networks, and CNNs, the looking networks.
- AI is good for tedious work
- If you want to train in the cloud, the cost is around \$300 per month
- AI excels at using pre-existing styles in new ways and creating a lot quickly.

**Lack of possibilities vs. lack of information**

There's a lot of current possibilities, though relatively unknown, there's:

- Stylegan2, overall generator for whatever you train it on<sup>15</sup>
- LayoutGAN, a network for generating layouts<sup>13</sup>
- loGAN, a network generating logos based on color
- Brandmark, an online logomaker that utilizes icons from the noun project<sup>18</sup>
- Artbreeder, an overall generator for concept art<sup>17</sup>
- RunwayML, a userfriendly version of stylegan<sup>27</sup>, and much more

Through my research, I've concluded that while none of these can create a final product currently, they can assist. It's more important to teach people what these premade GANs and CNNs are, and how to use them.

**AI, replacement and fear**

Designers and art directors generally answer well to AI. It's an opportunity to get rid of tedious tasks. a study by Adobe from 2018 shows that 54% of creatives are not afraid of losing their job, and 57% answered very positively to using AI as an assistant.<sup>2</sup> Andreas Pfeiffer, president of Pfeiffer consulting, answered the concern with:

*"It was derived that creativity is a process and a life journey in which technologies like AI can enhance human creativity, but cannot replace a human's creative spark."*

When it comes to designers believing they'll be replaced in the future though, things looks differently. John Maedas research in 2018 shows that 88% of designers believe that they'll be replaced by machines in 5+ years. 35% of them believed it would be more than 10 years.<sup>10</sup>

**Weaknesses of AI (limitations)<sup>3</sup>**

While AI is faster and more efficient than humans, it can't think of new ideas and is biased to what it's fed. Having just been born, they are weak in regards to biases, original content and understanding nuances. Therefore we can say that AI is better for tedious and abstract work, and needs a lot of help from designers to become understandable.

**Personal test of GANs and training times with consumer hardware**

To test out GANs, I had to test both premade datasets and try to make one myself. I compiled a dataset consisting of 698 images, partly duplicated. To reach the phase where colors were added to the logos, it took me 12 hours. To reach a phase, where I could make out some logos, it took 1 day and was leaning highly towards apple due to the amount of duplicates in the dataset. I also tested a pre-existing dataset, with which I let the AI train for 3 days.

The results:

LLD<sup>40</sup>

Personal dataset<sup>41</sup>

It's better to use premade training sets and use the abstracts as a base, such as Sketch2Code<sup>30</sup>, Dain<sup>16</sup> or stylegan, which already have a lot of premade data that can be used.

**Which problems can we solve/optimize?**

- Wireframe/mockup to product
- Magazine layout generation
- Design to code
- Idea generation
- Voice recognition for illustrator/photoshop
- 24 to 60FPS
- Superresolution<sup>31</sup>
- EBSynth - video style transfer, change the style of any video<sup>21</sup>
- Video generation<sup>26</sup>

### Easy to use GANs

There are multiple solutions that use GANs in a more design-friendly way, such as RunwayML. Currently it can't train, unless you pay for the current beta, therefore it is very limited. It's constantly expanding and trying to make itself the go-to platform for designers using UI.

There's an AI designed only for concept art named Artbreeder, and one for websites named UIZard<sup>32</sup>, both are very user-friendly too.

These are all currently very limited by the style of the designers that're in control of the products.

### Future and natural implementation

Adobe is already implementing AI. The PatchMatch algorithm<sup>12</sup> is used for their fill-in tool.<sup>7</sup>

Adobe sensei, Adobes creative AI solution, is used in almost all of Adobes programs, as their framework. There're a lot of options that makes it easier for the consumer to use the software without understanding it.

They will inevitably add a lot of this research to their work.

## Field research

### Interview with an AI practice lead from a design agency which has done AI work.<sup>38</sup>

I contacted the AI Practice Lead at a agency that's worked with AI for the creation of a design identity. They wish to stay anonymous. Their process involved using already-existing DCGANs, and training it on logos from the field they were designing the logo for. They then proved it themselves.

*“Google Collabotory is where I ran the code and found many existing examples to help me get started.”*

I asked the AI parctice lead if she saw AI being used for conceptualizing, where she confirmed my doubts by saying:

*“AI and ML are now extremely accessible with notebook technology and existing datasets. It's really more of an educational challenge, trying to find ways to help people understand the versatility of machine learning and deep learning. It's like trying to explain the benefits of the internet before anyone had really used it.”*

### Professor interview - Stig Møller Hansen<sup>37</sup>

Stig Møller Hansen is a professor at DMJX. The interview gave me an insight about how the products currently are focused on the end-user and made me realize that their workflow is a better direction.

*”Det med at få en idé og kunne formalisere den, det er det vi skal lære designerne”*

He made me focus more on the personal aspect while utilizing AI, which should be easy to use. He described that we would possibly become “meta-designers”, designers that describe what they need and have the computer make it, which would make the designers more creative due to more possibilities, making designers into curators in the end. Stig also made me realize that economy could pose a problem.

*“Om et bureau lever eller ej, det handler jo dybest set om at de skal have skrevet nogle fakturaer”*

Overall this interview set the direction of using already available solutions with little-to-no research needed.

*“Der skruer vi ned for det der hedder at være den udførende del, og så skruer vi op for den del der handler op at være skabende på teknologiens premisser, fordi vi kan forstå den”*

### Freelancer questionnaires<sup>36</sup>

I contacted the 23 freelancers on Fiverr, only 3 answered. 2/3 answered that they did use automation, but it was mainly illustrator actions and more macros than AI in itself. 2/3 said that they'd like to know more about AI.

### Design agency interviews<sup>35</sup>

I asked some design agencies about their work process and opinion on AI. Only 1/5 used it, 3/5, were afraid of the result losing personality. 4/5, saw it as a new possible interaction method for the end product and were mainly focused on the customers. 2/5 said economy played a big role. This also made me switch from the “Designers VS AI” approach to the “It's AI with Designers”. The more traditional design companies had

heard of AI, but hardly ever used it due to costs. The designers were overall open to it, the art directors often have the last say, and since designers work closely together with them, I decided the art directors should be the target audience.

### **Art directors and new technology<sup>33</sup>**

After talking to art directors, I realized that they're open to using new technology. 2/9 have used it. 3/9 mentioned it needed to be easy or effective. 8/9 agreed that they needed more information on the subject. only 3/9 were worried about the result losing personality, and saw it more as a tool. This means that I should focus on awareness.

I also found out that a lot of art directors start in an age between 17 and 30. Jeppe Strøm Lundsgaard, digital art director of Little Studio, says:

*“Det skal være så seamless at det er ligesom hvis jeg skal have noget vand, så er der postevand i hanen”*

The ways they get their information is either through pinterest or research talks, Jeppe also spoke of a plugin named Muzli.

Ulrik Jessen<sup>34</sup>, concept artist and earlier Art Director said that he had used these tools and was aware of their existence, but never really thought of them as AI. He only knew about the FPS interpolation since he works with videos and believed that concepts created by AI could be worrying.

### **Art directors and competitions**

After talking to the art directors, I figured that a strategy with standard commercials wouldn't work. By looking at their websites I found that 50% mentioned their awards, a couple of examples are: Hello Monday, IDNA Group, PearlFisher and Duckwise.<sup>39</sup>

Both the Creative Circle Awards, and the Danish design awards are international.

Overall it would mean that Art directors care about the prizes enough to put them on their websites for credibility. There have been multiple freelance winners in the Danish Design awards, so going for the gold would not be impossible.

### **Partial conclusion - field research**

- freelancers have quicker projects, and won't have the time or money to run AI
- Art directors direct the designers and are therefore better to target
- Art directors and design agencies are open for new technologies
- Art directors prefers marketing via imageboards such as Instagram
- Art directors and agencies care a lot about personality, so the AI should be a helping hand
- The campaign should focus on awareness and usability of AI that's stable and easy to use
- Award shows is a good alternative place to show off

## **Discussion**

art directors have been hard to get a hold of, after calling 20 agencies and writing 40 emails, no emails were answered, and only 8 art directors had the time, due to working from home or being busy. Many agencies told me to write an email, but never replied within the 3 weeks of my project, so no questionnaires were filled. I did get a hold of 5 designers by the side, and 10 freelancers. It was enough to get an idea of the market. Not being able to go out and meet up also hit my own workflow and motivation.

The subject is still highly researched, and sources have been scarce. I found 1 book that seemingly had some of the topic, but it was impossible to get home for the one month I had for researching. Instead I looked over the different articles and websites, double-checking who wrote it, to make sure that they were valid. I've also sourced the research paper and included the use case for all of the github projects. To gather info about the art directors, I was forced to do interviews which I would much rather have done by meeting up, as it would possibly have given me some more insight and details, and I could see the awards.

The art directors and designers are willing to adapt, and believe that their strategic communication job won't be touched. This is great news, as it allows me to create a campaign focusing on awareness, as they were not opposed to use the AI. A lot of them didn't know much about the use of AI, and those who did used it for end users. Through the research of looking at their websites, I know awards are highly relevant, and multiple mentioned image-sharing sites such as Instagram or Pinterest when talking about where they got their information from.



Knowing that personality is important to them, it's important to show it as only a tool.

### **Target audience - freelancer vs design agency & who in the agency**

I decided not to target freelancers due to lack of time, and answers. If I were to create a campaign with the purpose of educating, it'd be relevant to have a target that has the willingness and possibility to do research. Young people are also generally more tech-savvy and open to new workflows, especially when they are juniors within the field and want to make a good impression.

The final target audience will therefore be art directors, 25-40 years old.

Secondary: Designers, 20-30.

### **Advertising to art directors**

A lot of the art directors mentioned Adobe as their usage of AI, which have made it a consideration of trying to make a plugin for the programs for further knowledge, since user friendliness is very important. I won't have time for that in my product, but to create awareness of the AIs that're already easy to use is a definite possibility. A product focusing on unused and exciting research would probably further the interest of the Art directors. I could also go to conventions and awards to get their attention. Many studios uses awards as credibility.

Most agencies are international and a lot of danish agencies speak english. Advertising in English is optimal and adds the possibility of foreign designers using the information. I also believe it's important to talk their language and use graphic design terminology if need be in the product.

### **Style for the campaign**

The whole campaign should be used as a showcase to get a hold of the Art directors and show them the new ways. I would like to make an awareness campaign that uses the help of AI, GANs trained on current trends, and CNNs if necessary since it would give an understanding of what the AI could do, and make them see that they "don't just want a horse with wheels"

I'll be doing the design thinking, while the computer will be doing a lot of the work, just like partnering up with someone.

## **Triangulation**

By looking at the Art directors answer, and putting it against Adobe and John Maedas report, we can conclude that Art directors are not afraid of AI and are actually rather open to use it. We can see that they like achieving from the awards on their websites, and from that we know that the art directors shouldn't just be advertised to conventionally and more effort or a product is needed for them to actually dive into AI.

## **Conclusion**

We can conclude that the information regarding AI in agencies workflow is underdeveloped. While some use it for customers, they're unaware of using it for their own workflow and ideas. AI is not actively utilized because designers and art directors lack awareness of the possibilities.

We can also conclude that the personality is important to both designers and Art directors, we therefore have to make a campaign that brings together the designer/art directors and the AI. Art directors have also shown to be technologically interested, so there's no need to worry about lack of interest. Most important is getting a hold of the art directors, who control the general flow and direction of the production. They should be hit while they're new to the field, as to not be too sturdy in their ways of working. Art directors find their inspiration through Imageboards and talks, and awards are widely shown on the agency websites, thus making an informative campaign to win an award using AI would make sense, for further advertisement, in case an award won't be achieved, advertising on popular sites such as pinterest and plugins as Muzli would make sense.

It's clear that the field is international, and therefore would need the campaign to be in English - this also creates further reach.

## **Perspective**

On basis of my conclusion and analysis, I'll make an awareness campaign with the purpose of sparking interest and informing about what AI CAN help with, instead of what it can't help with. I want to make

sure that the campaign shows that you can still get your personality in, and that AI is just a tool. Since the agencies currently seem to not want the car but a horse with wheels instead, I'll become an expert on the area telling them what they need to get. On basis of the research, I can also see that there are less readily available methods to enhance the workflow than originally thought, though the few that can, might be able to help a lot. Therefore I believe the campaign should focus on a few of these methods and how to bring awareness to the art directors of the agencies.

In the end, that means my campaign should be created with the help of AI, and have a showcase of how it you can use these AIs such as GANs for your production pipeline.

**SMP:**  
**human AND machine**

# Creative brief

## **Who's the customer?**

Design agencies

## **What's the product?**

An awareness campaign made with the help of AI

With an easy to use program that shows off AI

## **What's the purpose?**

To show people the power of AI, and that it can still be personal

## **Who's the target audience?**

Art directors

## **What should they know/experience?**

That you can work together with AI, and while AI can't make new ideas, you can. Therefore you can help each other.

It needs to be a kind of "aha"-experience, where they see new possibilities

## **What should they feel and think?**

That AI is amazing and fun to work with, and that they want to know more and research on their own.

## **Which medias will the solution be made on?**

Digital

# Appendix & sources

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## Interviews

### Art directors

- 33 Appendix - Interviews AD - 1-8.mp3 + Ulrik Jessen.mp3
- 34 Appendix - Interviews AD - Ulrik Jessen.mp3

### Design agencies

- 35 Appendix - Interviews designer - 1-5.mp3

### Freelancers

- 36 Appendix - Interview freelancers - 1-3.png

### Other

- 37 Appendix - interview with stig.mov
- 38 Appendix - talk with anonymous AI Practice Lead.jpg

## Personal tests

- 39 Appendix - awards.jpg
- 40 Appendix - personal tests - LargeLogoDataset.png
- 41 Appendix - personal tests - PersonalDataset.png

## Models

- 42 Appendix - Double-diamond.jpg (<https://innovation.sites.ku.dk/model/double-diamond/>)