On the Impact of Machine Learning on Copyright

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Seoul Copyright Forum
Seoul, South Korea
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Computers and The Creative Process
The Case of Generative Art

1960s 1st Generation (AI = Randomness)

1970s 2nd Generation (AI += Repeating Tasks)

1980s 3rd Generation (AI += Databases)

1990s 4th Generation Design by Numbers

2000s 5th Generation Processing

2010s Machine Learning
AI And Creativity

“Claims that AI is creating art on its own and that machines are somehow entitled to copyright for this art are simply naive or overblown”.


We are not any close to Artificial General Intelligence.
A Japanese AI program has co-authored a short-form novel that passed the first round of screening for a national literary prize - Hoshi Shinichi Literary Award, contest.

**The Day A Computer Writes A Novel**

“...I writhed with joy, which I experienced for the first time, and kept writing with excitement. The day a computer wrote a novel. The computer, placing priority on the pursuit of its own joy, stopped working for humans.”
A portrait entitled The Next Rembrandt, a new artwork generated by a computer that had analyzed thousands of works by the 17th-century Dutch artist Rembrandt Harmenszoon van Rijn.
Frédéric François Chopin (UK: /ˈʃɔpən/, US: /ʃouˈpæn/, French: [ʃɔpɛ̃], Polish: [ˈʂɔpɛn]; 1 March 1810 – 17 October 1849) was a Polish composer and virtuoso pianist of the Romantic era who wrote primarily for solo piano. He has maintained worldwide renown as a leading musician of his era, one whose "poetic genius was based on a professional technique that was without equal in his generation."

https://www.radioclassique.fr/magazine/articles/leif-ove-andsnes-joue-chopin/
https://en.wikipedia.org/wiki/Fr%C3%A9d%C3%A9ric_Chopin
Implication for Copyright Law


Implication for Copyright Law

- Creative works qualify for copyright protection: originality is a must
- In most jurisdictions only works created by a human can be protected by copyright
Implication for Copyright Law

- Ownership not questioned
- Program: a tool to support the creative process

1960 - 2010

1960 - ...

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Implication for Copyright Law

- Ownership not questioned
- Program: a tool to support the creative process

1960 - 2010

- Computer program is no longer a tool
- Some part of creative process is done by machine

2010 - …

- Creative works qualify for copyright protection: originality is a must
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Commercial Impact
Commercial Impact

What about Machine Learning systems which are not protected by law and can be used without payment?


Mario Klingemann

MEMORIES OF PASSERSBY I

Estimate £30,000 – 40,000 GBP  LOT SOLD. 40,000 GBP
Commercial Impact

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MEMORIES OF PASSERSBY I

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Main benefits of Machine Learning systems are on:
• **Task to achieve**: designed to handle time-consuming work
• Underlying **cost** for achieving the **task**

Not so much on the output computed / created(?)


Legal Options
Legal Option on Copyright and Authorship

The author in copyright law is necessarily a human being (creator)

Option 1: **Attribute** authorship of works to the creator of the program
Legal Option on **Copyright and Authorship**

The author in copyright law is necessarily a human being (creator)

Option 2: **Deny** copyright protection for works that have been generated by a computer

**Why:** The machine would need to be able to achieve legal status similar to humans
Legal Option on **Computer-generated Works**

Machine Support e.g., Machine Learning Model

Recognized as tools

Authorship

[Flags of various countries]
Legal Option on **Computer-generated Works. Open Doors to Ambiguity**

Whoever makes the arrangement: programmer, user of the program, person who sells / produces, investor, trainer, software / system team

**Group Authorship**

**Machine Support** e.g., Machine Learning Model

Recognized as (sophisticated) tools

[Image of flags from various countries]
An Illustrative Case

GANbreeder Case in USA

GANbreeder Case – BigGAN

BigGAN

A conditional GAN where class indices are inserted into an embedding layer in order to train the generator network to condition on the class index

GANbreeder Case – GANBreeder

**BigGAN**

A conditional GAN where class indices are inserted into an embedding layer in order to train the generator network to condition on the class index.

**GANBreeder**

Compose an image with genes

- Select new gene
- Add random gene

Create Images

- agaric
- pug


https://ganbreeder.app/category/random
GANbreeder Case – AmalGAN

BigGAN

A conditional GAN where class indices are inserted into an embedding layer in order to train the generator network to condition on the class index.

GANBreeder

Compose an image with genes

- Select new gene
- Add random gene

agaric ✗ pug ✗

Create Images

1. an AI combines different words together to generate an image of what it thinks those words look like.
2. the AI then produces variants of those images by “breeding” it with other images, creating “child” images.
3. another AI shows the artist several “child” images, measuring his brainwaves and body-signals to select which image he likes best.
4. step 2 and 3 are repeated until the AI determines it has reached an optimal image.
5. another AI increases the resolution of the image by filling in blanks with what it thinks should exist there.
6. the result is sent to be painted on canvas by anonymous painters in a Chinese painting village.
7. a final AI looks at the image, tries to figure out what is in it, and makes a title.

https://colab.research.google.com/github/tensorflow/hub/blob/master/examples/colab/biggan GENERATION WITH TF_HUB.ipynb

https://ganbreeder.app/category/random

http://areben.com/project/amalgan/

@artboffin
Alexander Reben

AmalGAN
GANbreeder Case – Creation (?)

@djbaskin
Danielle Baskin

The gene sequence Danielle Baskin used to create the disputed image.
GANbreeder Case – Another Creation (?)

@djbashkin
Danielle Baskin

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Soap Dispenser | Sock | Space Shuttle | Water Jug | Comic Book |
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The gene sequence Danielle Baskin used to create the disputed image.

GAN Breeder + =

@artboffin
Alexander Reben

Minor Modifications + =

?
GANbreeder Case – The Devil is in the Details

Encouraging iteration

GAN Breeder + 

(Unclear) Implied (non-implicit) license

@djBaskin
Danielle Baskin

@artboffin
Alexander Reben

Minor Modifications

@artboffin
Alexander Reben

A non-exclusive license to use the work in an implied way

= 

Granting a non-exclusive license to use the work in an implied way

Derivative of existing works? Yes

Infringement: No

Why: The use is licensed

Damage? Unclear as imaged have not been registered. What about anonymous creation?

Fair Use?

How transformative the use is?
The Future
AI Creations is not yet settled but…

• **Distinguishing** between **human**- and **machine-generated** content will become **more and more complex**

• Even though authorship is central for copyright, **copyright laws have been moving away from originality standards** that reward skill, labour and effort

• **IP laws have changed** and will change to balance the commercialization and utilization of new creations that benefit the public interest and facilitate the true objectives of intellectual property law
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- Our society is moving fast

  October 25th, 2017: the robot was granted Saudi Arabian citizenship, becoming the first robot ever to have a nationality

[https://www.lexology.com/library/detail.aspx?g=d5acda9a-7e17-4a0e-b9a1-34bd4a8b4248](https://www.lexology.com/library/detail.aspx?g=d5acda9a-7e17-4a0e-b9a1-34bd4a8b4248)