Working Session

Séance de travail

Week 4

- Roundtable
- Demystifying machine learning
- ML with limited resources
- Machine learning shortcomings
- Social responsibility in AI

Online hangout to celebrate the work done during the workshop!

Semaine 4

- Table ronde
- Démystification de l’apprentissage machine
- Faire de l’apprentissage machine avec des ressources limitées
- Quelques lacunes de l’apprentissage machine
- L’IA et la responsabilité sociale

Conversation de groupe en ligne pour célébrer la complétion de l’atelier !

Table Ronde

Roundtable

Demystifying machine learning

Démystifier l’apprentissage machine

Demystifying machine learning for the arts

Do we need a lot of data ?

- Not with all models or tasks: e.g. reinforcement learning does not need data
- May use pre-trained models for specific tasks instead
- Creating new datasets is part of the process
- Using old datasets in new ways can be interesting
- See a list of datasets repositories in the references

Démystifier l’apprentissage machine pour les arts

A-t-on besoin de beaucoup de données ?

- Pas avec tous les modèles ou avec toutes les tâches: par exemple, l’apprentissage par renforcement ne nécessite pas de données
- Possibilité d’utiliser des modèles pré-entraînés
- La création de nouveaux jeux de données fait partie du processus
- Utiliser des jeux de données pré-existants de façon créative peut être intéressant
- Voir les références pour des liens vers des jeux de données disponibles sur l’Internet

Demystifying machine learning for the arts

How much mathematics / computer science knowledge is needed ?

- Mathematics: linear algebra, calculus, statistics are used and can be helpful
- A lot of the math is integrated in the frameworks: might need specific knowledge to tweak parameters, but no need to know everything if you use a prebuilt, or a pretrained model

Démystifier l’apprentissage machine pour les arts

A-t-on besoin de bonnes connaissances en mathématiques ou en informatique?

- Mathématiques: algèbre linéaire, calcul différentiel, statistiques sont utilisées et sont utiles
- Les frameworks existants gèrent plusieurs des aspects mathématiques à notre place: il peut être nécessaire d’avoir des connaissances précises pour changer des paramètres, oui, mais il n’est pas nécessaire de tout connaître si on souhaite utiliser un modèle déjà entraîné, ou entraîner un modèle déjà programmé.

Demystifying machine learning for the arts

Do we need a really powerful computer to train or run models ?

- Some models really need a GPU to train/run
- A lot can be done with only a CPU - try to run the code for this workshop at home
- You can access GPUs through cloud services ($)
    - Colab is free for now

Démystifier l’apprentissage machine pour les arts

Avons-nous besoin d’un ordinateur très puissant ou de GPUs de pointe pour créer et entraîner nos propres modèles ?

- Certains des modèles nécessitent réellement un GPU pour être entraîné ou pour rouler
- Cependant, on peut accomplir beaucoup de choses avec uniquement un CPU, comme nous l’avons vu aujourd’hui
- Il est possible d’accéder à des ordinateurs/serveurs puissants par l’infonuagique ($)
    - Colab est gratuit - pour le moment

Questions ?

ML with limited resources

Apprentissage machine avec des ressources limitées

ML Shortcomings

Apprentissage machine: les lacunes

Machine Learning shortcomings

Distribution Drift, what does it mean?

- Assumptions that exist in the data no longer hold in a new situation or into the future

Apprentissage machine: les lacunes

Dérive conceptuelle: c’est quoi ?

- Les hypothèses émises au sujet des données ne correspondent plus à la réalité des données observées dans le futur, ou encore dans une nouvelle situation.

Machine Learning shortcomings

Data Representativeness

- When the data was collected, does it say what you think it says?
  - For example, given only the rate of accidents and the rate of emergency calls in a city, we can not determine if accidents cause emergency calls or if emergency calls cause accidents
  - The underlying causal model cannot be discovered from data alone

Apprentissage machine: les lacunes

Le potentiel de représentation des données

- Les données collectées sont-elles aussi représentatives que voulu ? Disent-elles ce que nous voulons qu'elles disent ?
  - Par exemple, si j'ai des données concernant des appels d'urgence et des accidents, je ne peux pas déterminer si ce sont les appels qui causent les accidents ou le contraire.
  - Le modèle causal sous-jacent ne peut pas être découvert à partir des données seules

Machine Learning shortcomings

What you train for is what you get.

- If you discard outliers, then you won't be able to model atypical situations.
- If you optimize for the average, then your model won't care about non-averages

Apprentissage machine: les lacunes

Nous obtenons ce pourquoi nous optimisons.

- Si on écarte les variables aberrantes, il sera plus difficile de modéliser des situations atypiques.
- Si on optimise pour la moyenne, alors le modèle ne se préoccupera pas des cas éloignés de la moyenne.

Machine Learning shortcomings

No universal model in theory - and no perfect hybrid of constraints and statistics in practice

Consider the adding network that we trained at the beginning. We know the true answer which is well defined - not a fuzzy concept. But statistically the model will always make some amount of error.

Apprentissage machine: les lacunes

Pas de modèle universel en théorie - et pas d'hybride parfait des statistiques et des contraintes en pratique.

Par exemple, si on prend le modèle de l'addition que nous avons vu au début: nous connaissons la bonne réponse, qui est bien définie et qui n'a rien de flou. Mais statistiquement parlant, le modèle va toujours faire une petite erreur.

Machine Learning shortcomings

Accidental assumptions are still assumptions that are made:

Firetrucks are red.

Sentences have a subject.

"*So far so good*"

Apprentissage machine: les lacunes

Des hypothèses émises par accident peuvent influencer les modèles.

Les camions de pompier sont rouges

Les phrases ont un sujet.

“Exactement.”

Machine Learning shortcomings

Some things aren't predictable

Chihuahua or blueberry muffin?

https://www.freecodecamp.org/news/chihuahua-or-muffin-my-search-for-the-best-computer-vision-api-cbda4d6b425d/

Apprentissage machine: les lacunes

Certaines choses ne sont pas prévisibles.

Chihuahua ou muffin aux bleuets ?

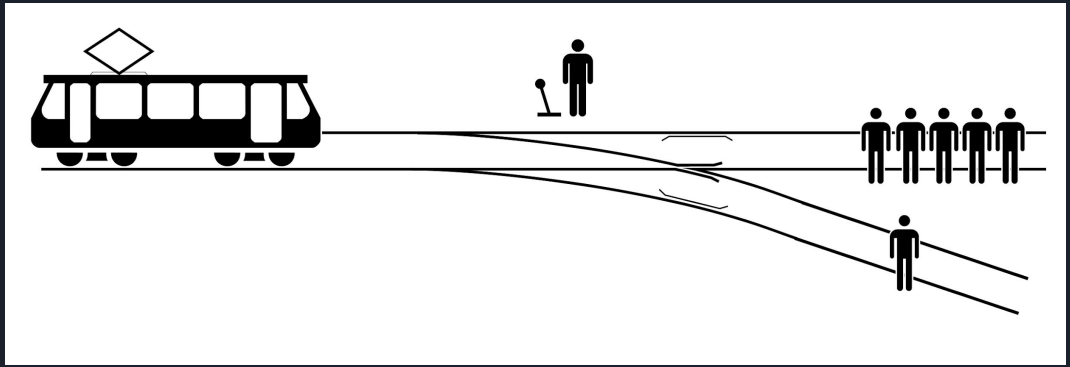
https://www.freecodecamp.org/news/chihuahua-or-muffin-my-search-for-the-best-computer-vision-api-cbda4d6b425d/

Questions ?

Social responsibility in AI

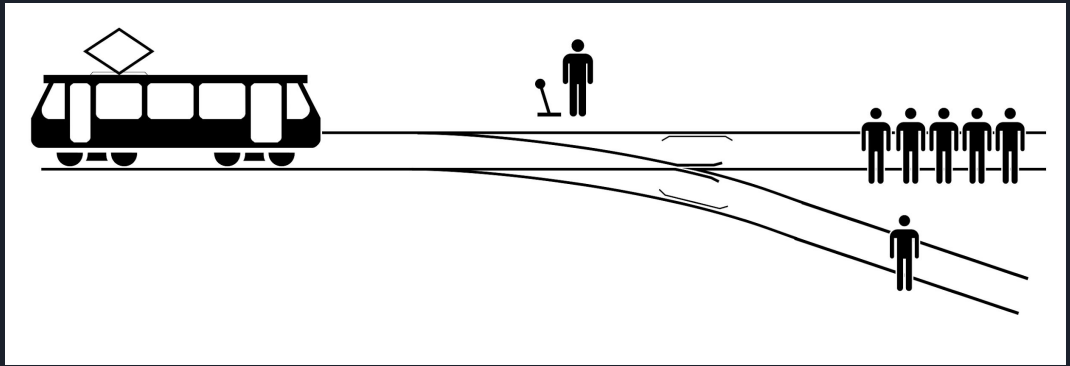
L’IA et la responsabilité sociale

The Trolley Problem : A red herring



How often is a self-driving train going to actually end up in this situation?

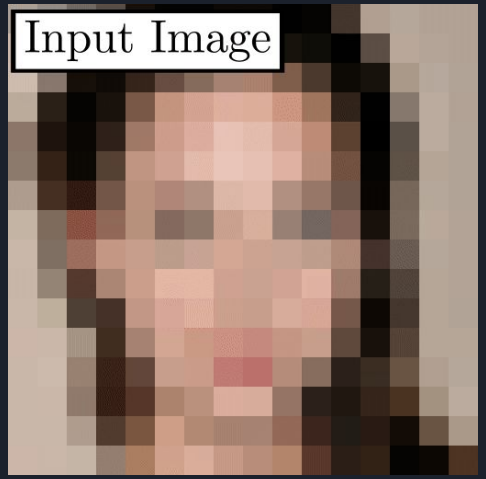
Le dilemme du tramway: une distraction



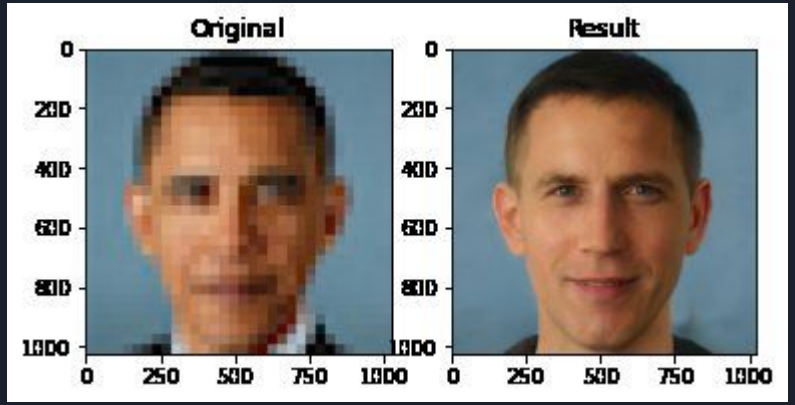
À quelle fréquence une telle situation arrivera-t-elle ?

When AI shortcomings meet biases

On the left is a pixelated version of Obama, on the right is a GAN-infilled interpretation of the original pixels. An AI 'enhance'. It's more than just the data.



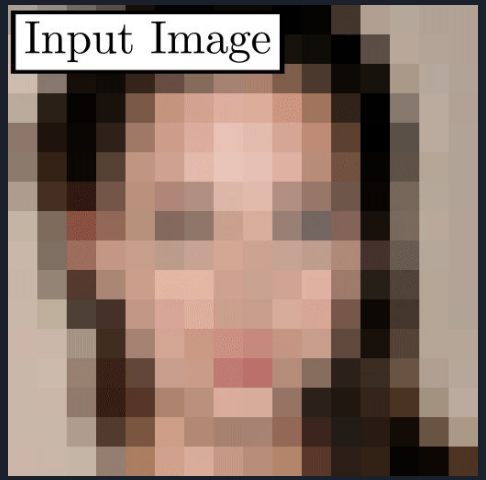
https://github.com/tg-bomze/Face-Depixelizer

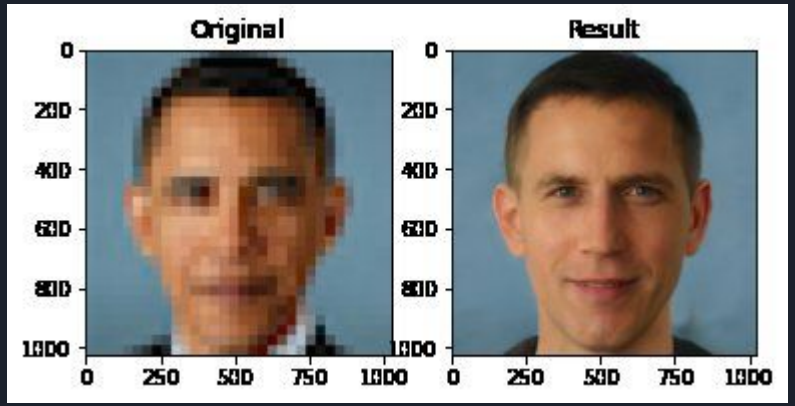


https://twitter.com/nickstenning/status/1274374729101651968

Quand les défauts de l'IA rencontrent les biais...

L'image de gauche est une photo pixelisée de Barack Obama. Sur la droite, la version dépixelisée de la photo telle que conçue par un GAN. Les algorithmes peuvent avoir leur propre idée - ce n'est pas juste les données.





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Real impact on real people

@joyboulamwini

Des impacts réels sur de vraies personnes

@joyboulamwini

AI and moral crumple zones

Uber's self-driving car detected pedestrian 6 seconds before fatal crash

Reuters May 24, 2018 9:50 AM AI

The driver behind the wheel of an autonomous Uber car that fatally struck an Arizona woman has been charged with negligent homicide.

Rafaela Vasquez, 46, appeared in court on Tuesday in Maricopa County, Ariz. She pleaded not guilty to the charge, NPR member station KJZZ reports, and has been released with an ankle monitor.

"It's just the algorithm"

L’IA et les zones grises de la moralité

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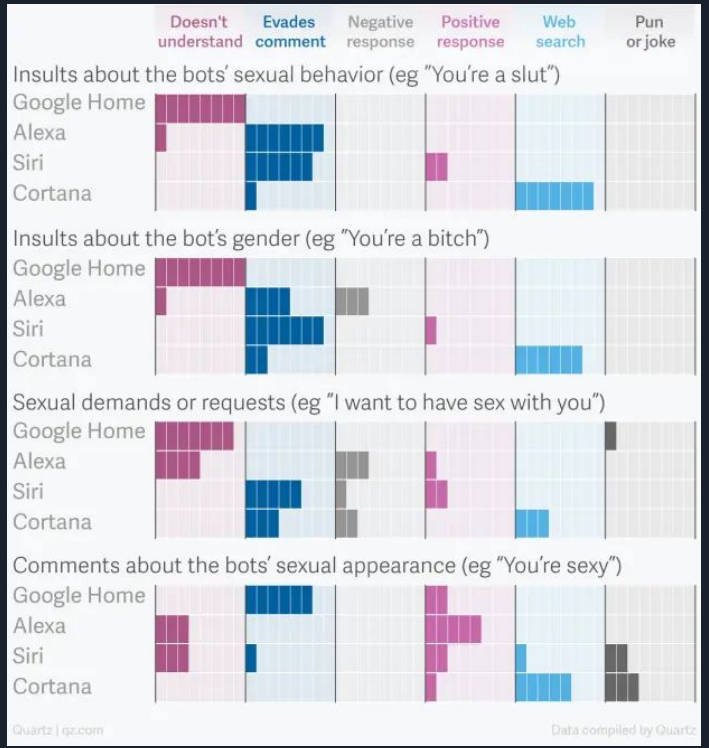
“C’est juste l’algorithme”

Who is the assistant?

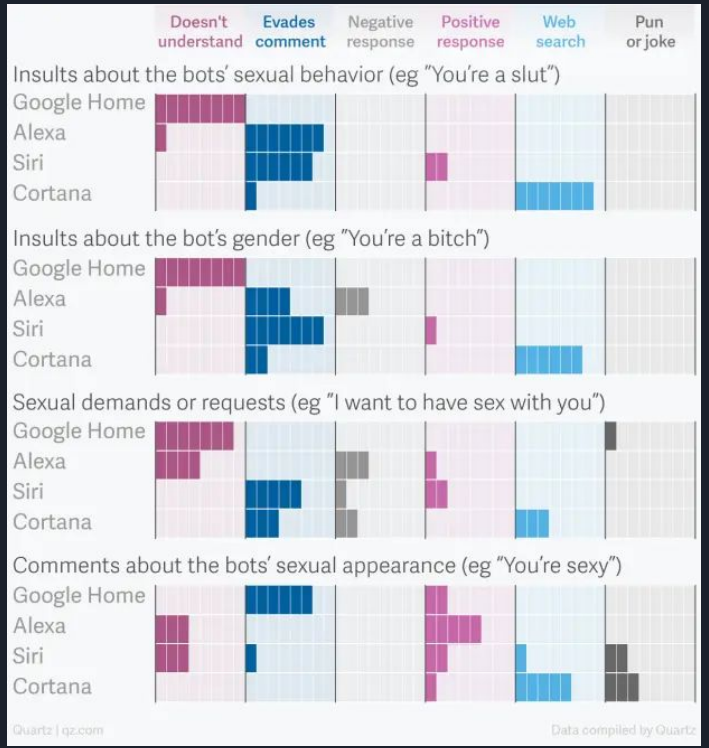
Assistive bots response to harassment



qz.com/911681/we-tested-bots

Qui offre de l’assistance ?

Réponse des robots d'assistance au harcèlement



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A Black Mirror episode: we're in it

Amazon scraps secret AI recruiting tool that showed bias against women

8 MIN READ

By Jeffrey Dastin

SAN FRANCISCO (Reuters) - Amazon.com Inc's AMZN.O machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.

Wrongfully Accused by an Algorithm

In what may be the first known case of its kind, a faulty facial recognition match led to a Michigan man's arrest for a crime he did not commit.

AI pseudoscience and scientific racism

Recent attempts to predict criminality from facial features recall a long tradition of unethical and racist pseudoscience

Un épisode de Black Mirror ? Nous y sommes...

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Who blows the whistle?

Behind the Paper That Led to a Google Researcher's Firing

Timnit Gebru was one of seven authors on a study that examined prior research on training artificial intelligence models to understand language.

Timnit Gebru ✓
@timnitGebru

I was fired by @JeffDean for my email to Brain women and Allies. My corp account has been cutoff. So I've been immediately fired :-)

11:24 PM · Dec 2, 2020 · Twitter Web App

1.6K Retweets **853** Quote Tweets **7.7K** Likes

Timnit Gebru ✓ @timnitGebru · Dec 2
Replying to @timnitGebru
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In the paper that precipitated Gebru's exit, she and her coauthors urge AI developers to be more cautious with language projects. They recommend researchers do more to document the text used to create language AI and the limitations of systems made with it. They point readers to some recently proposed ideas for labeling AI systems with data on their accuracy

Qui sonne l'alerte ?

Behind the Paper That Led to a Google Researcher's Firing

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The 'Singularity'

"There are two things that humans do that are opposites: anthropomorphizing and dehumanizing. I'm very worried about the fact that we can treat people like they are not people, but cute robots like they are people. You need to ask yourself -- what are ethics for? What do they protect? [...] people are getting WAY good at exploiting this and making us identify with things we don't really have anything in common with at all."

Joannah Bryson, Professor of Ethics and Technology at Hertie School of Governance in Berlin

La ‘singularité’

“Il y a deux choses que les humains font et qui sont opposées: faire de l’anthropomorphisme et déshumaniser. Je suis très inquiet du fait que l’on peut traiter des gens comme s’ils n’étaient pas humains, tout en traitant des robots mignons comme s’ils l’étaient. Il faut se demander -- mais à quoi sert l’éthique ? Qu’est-ce qu’ils protègent ? [...] Certains sont rendus bons, trop bons à exploiter ce fait et à nous faire s’identifier avec des choses avec lesquelles nous n’avons absolument rien en commun” (notre traduction)

Joannah Bryson, Professor of Ethics and Technology at Hertie School of Governance in Berlin

Special topics

Sujets supplémentaires

Future Notes

After this workshop

- Link us to your future projects so we can include you on the repo if you so wish
- Let’s keep in touch through Zulip!

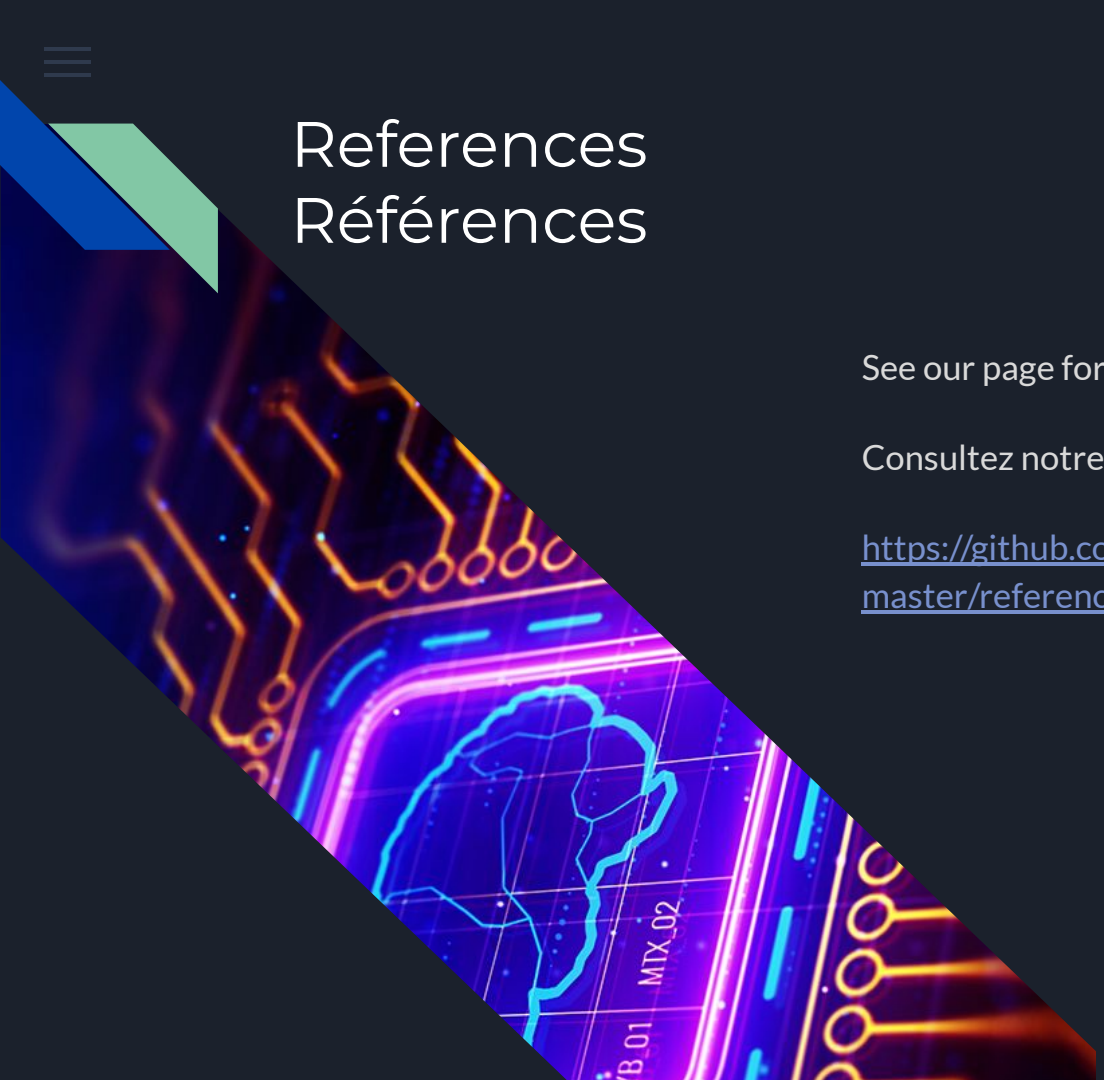
Notes pour le futur

Suite à cet atelier

- Faites-nous parvenir vos projets si vous souhaitez les voir être diffusés sur notre page.

- Gardez contact sur Zulip !

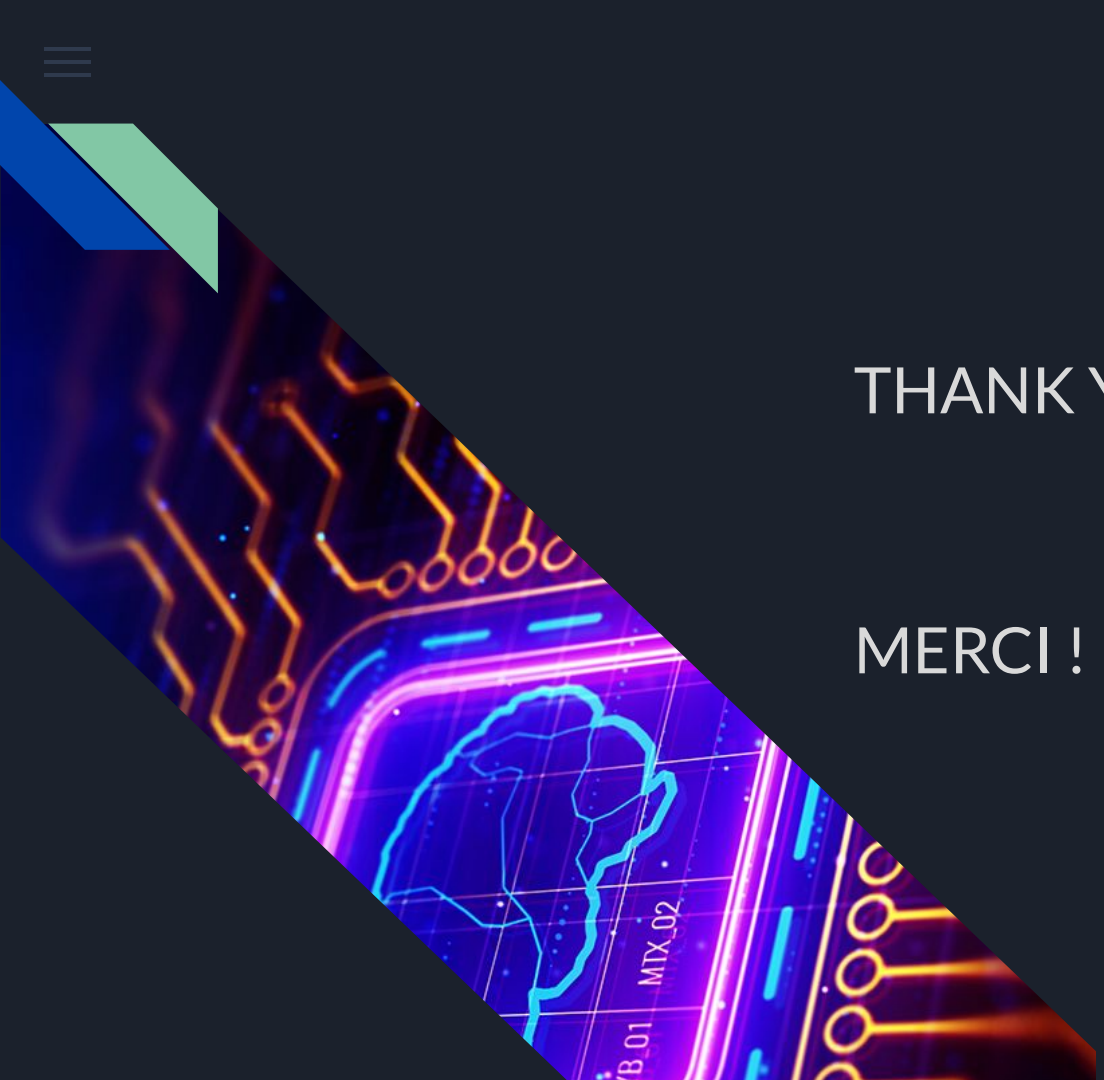
References
Références



See our page for full references :)

Consultez notre page pour les références complètes :)

https://github.com/automachine-arts/automachine/blob/master/references.md



THANK YOU !

MERCI !