

Computer generated car design

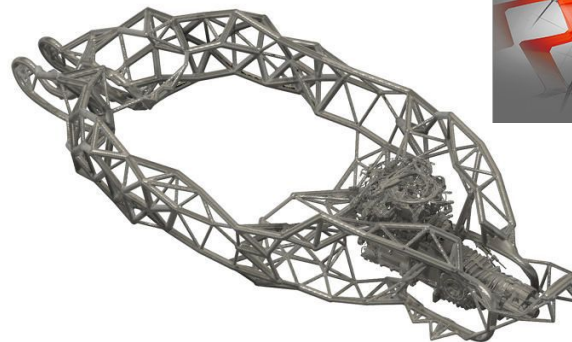
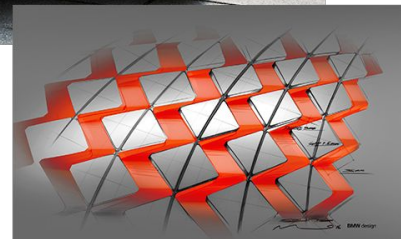
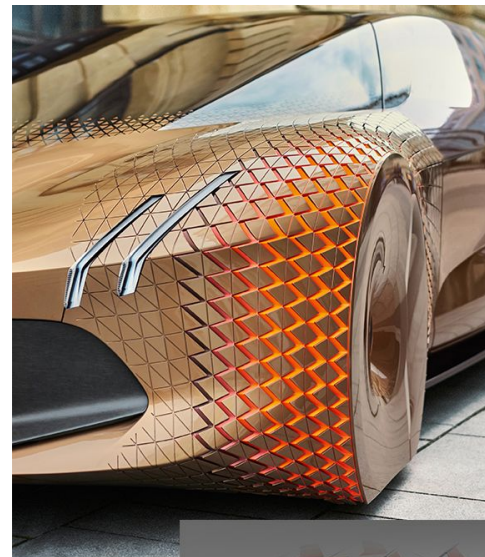
Steps to a creative system by Lennert Bontinck

lennert.bontinck@vub.be | creative-car-design-vub.lennertbontinck.com | @blackguette



Why choose this domain

- I'm a nerd and car geek
- Get an idea of merged brand design
- Access to multiple juries
- Fascinating past work
- Interest by big brands
- It's just cool



Interesting work

Real life applications

- Hackrod (Pette, 2015)
- Czinger (Girish, 2020)



Image generation

- StyleGAN (Karras et al, 2018)
- Predicting cybertruck design (Trevedi, 2019)
- Automating Car Design Studio with GAN (Radhakrishnan et al, 2020)



GAN control

- Understanding hidden units in deep NN (Bau et al, 2020)
- GANSpace (Härkönen et al, 2020)



Pette, B. (2016). *The world's first ai-generated car*. Retrieved February 17, 2021, from <https://blogs.nvidia.com/blog/2016/07/26/hack-rod-car-ai/>

Girish. (2020). *A revolutionary hypercar built for the 21st century*. Retrieved February 17, 2021, from <https://www.czinger.com/about-21-c>

Karras, T., Laine, S., & Aila, T. (2018). A style-based generator architecture for GAN. CoRR, *abs/1812.04948*. <http://arxiv.org/abs/1812.04948>

Trivedi, C. (2019). *Fun with stylegan: Let's predict the tesla cybertruck design!* Retrieved February 17, 2021, from <https://bit.ly/2QNL9wL>

Radhakrishnan, S., Bharadwaj, V., Manjunath, V., & Srinath, R. (2018). Creative intelligence-automating car design studio with generative adversarial networks (gan). In A. Holzinger, P. Kieseberg, A. M. Tjoa, & E. Weippl (Eds.), *Machine learning and knowledge extraction* (pp. 160–175). Springer International Publishing.

Bau, D., Zhu, J.-Y., Strobelt, H., Lapedriza, A., Zhou, B., & Torralba, A. (2020). Understanding the role of individual units in a deep neural network. *Proceedings of the National Academy of Sciences*, 117(48), 30071–30078. <https://doi.org/10.1073/pnas.1907375117>

Harkonen, E., Hertzmann, A., Lehtinen, J., & Paris, S. (2020). Ganspace: Discovering inter-pretable gan controls.

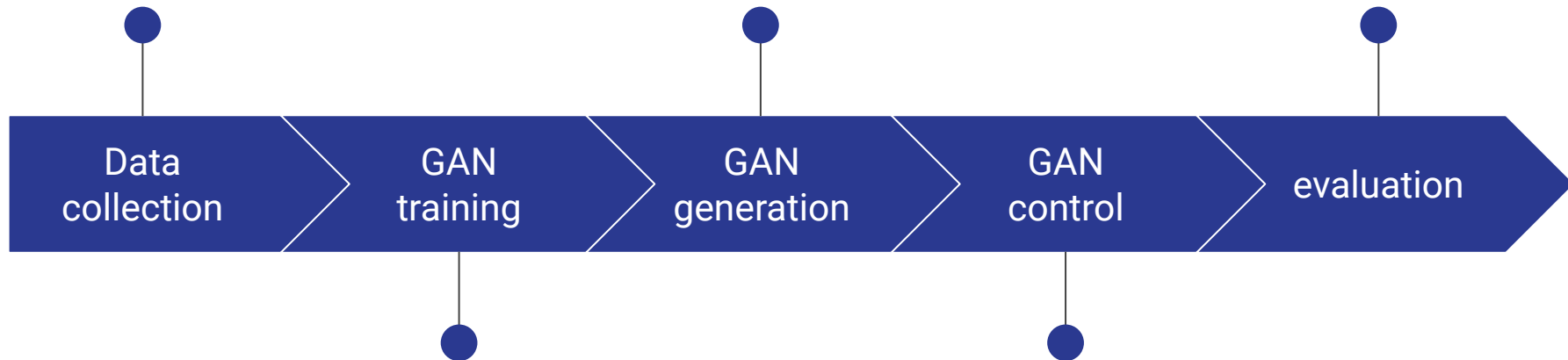


Flow of the system

Using a crawler to collected the needed images (bypassable)

Trained GAN capable of generating visually pleasing images

Objective and subjective evaluation of the GAN

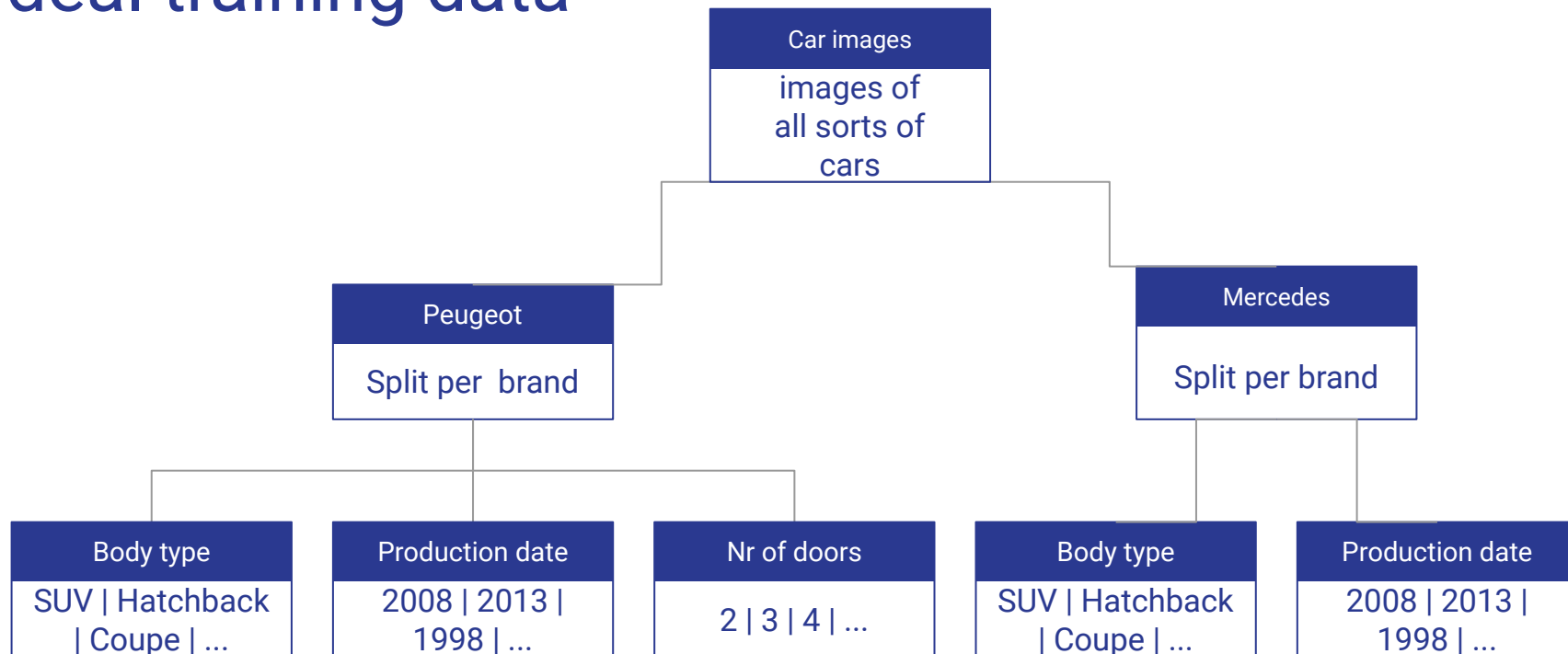


Training StyleGAN or variant with the images (bypassable)

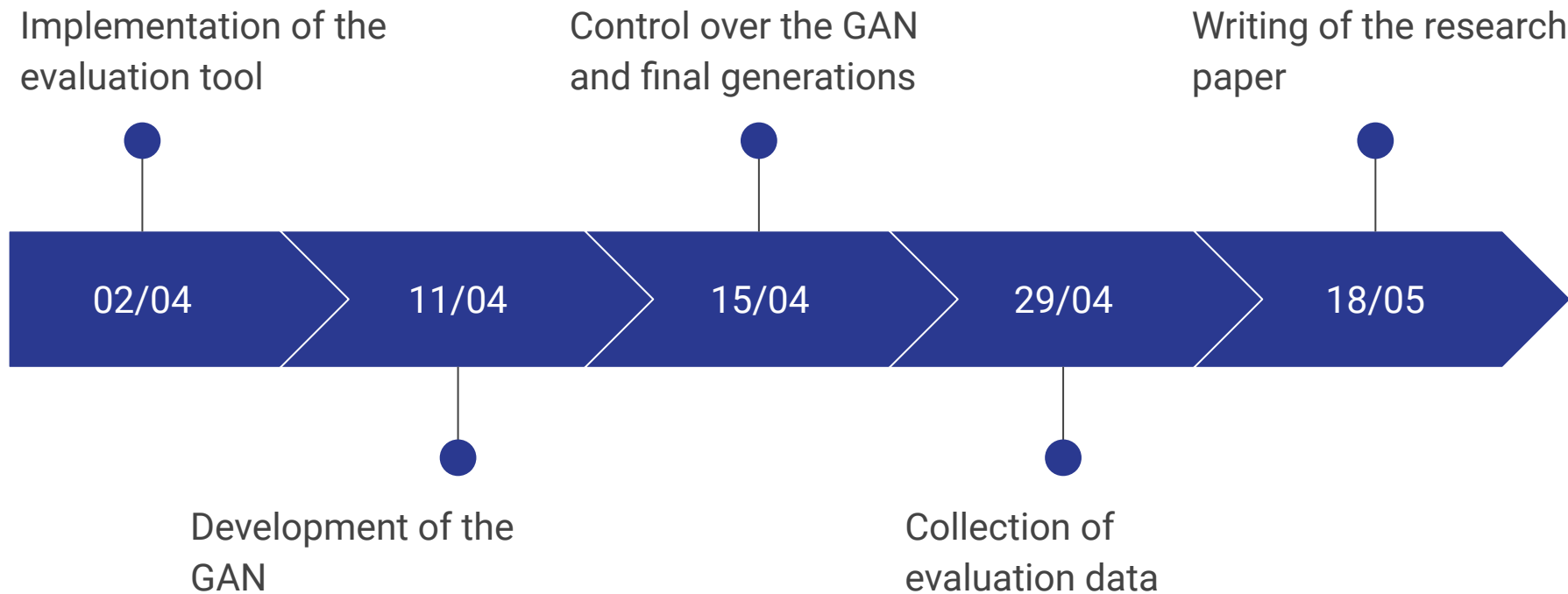
Using GANSpace to gain control over the GAN procedure



Ideal training data



Proposed roadmap



Evaluation

- Using seen criteria
- Access to expertised juries
- Reusing previously written evaluation tool

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Informatie over u

Geslacht

Gelieve een geslacht te kiezen

Leeftijd

Leeftijd

Expertise

☐ Ja ☐ Nee

Indien u een gegronde kennis heeft van afbeeldingscompressie algoritmes, het verschil kent tussen lossy en lossless algoritmes en artefacten zoals blokartifcaten kan herkennen, kiest u hier voor de optie ja.

Kleurenblind

☐ Ja ☐ Nee

Niet zeker of u kleurenblind bent? Doe hier een korte test.

slechtziend

☐ Ja ☐ Nee

Indien uw bril en/of lenzen u niet (of niet genoeg) helpen om goed te zien kiest u "ja".
Als u normaal een bril draagt en deze nu niet op heeft kiest u ook voor ja.

Bovenstaande gegevens zijn correct, start de beoordeling van de afbeeldingen.



Questions?

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