Providing Trust

in

Data-Driven Innovation

with

AI-Generated Synthetic Data

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- **NSTDA** (National Science and Technology Development Agency)
  - **NECTEC** (National Electronics and Computer Technology Center)
    - **AINRU** (Artificial INtelligence Research Group)
      - **IPU** (Image Processing and Understanding)

Defining data driven innovation

DDI is the innovation and consequent economic and social value that arises from the use of data analysis by private and public sector organisations to make better decisions and create new products and services. DDI can support a very wide range of innovations, including improving firm operational efficiency, developing new products and services, making better investment and strategic decisions, and more effective government interventions.

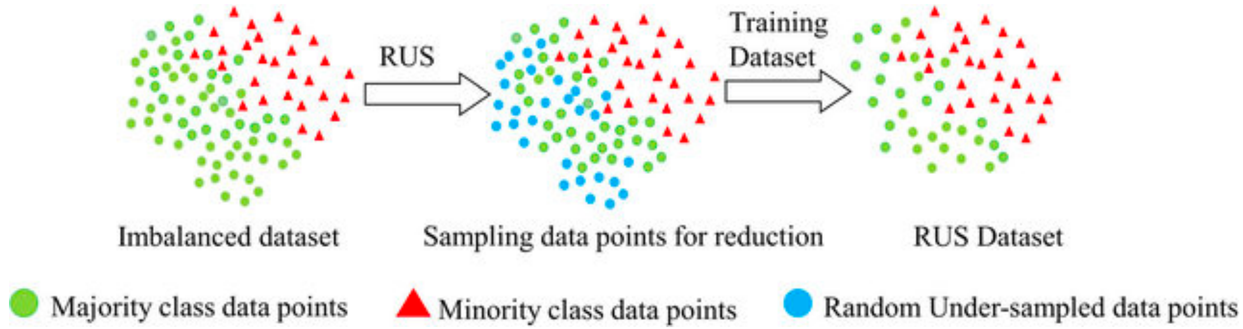
Data Driven Innovation in New Zealand
https://srgexpert.com/wp-content/uploads/2017/11/Data_Innovation_Report_WEB.pdf

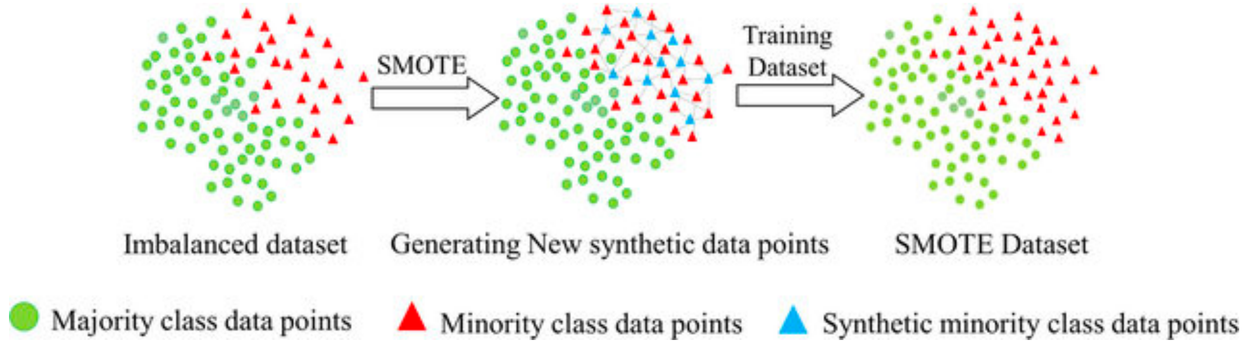
Data related problem

- Who own data?
- Privacy
- Biases
- Unbalanced data
- Data missing & imputation
- Data sovereignty
- ...

"Classical" solutions

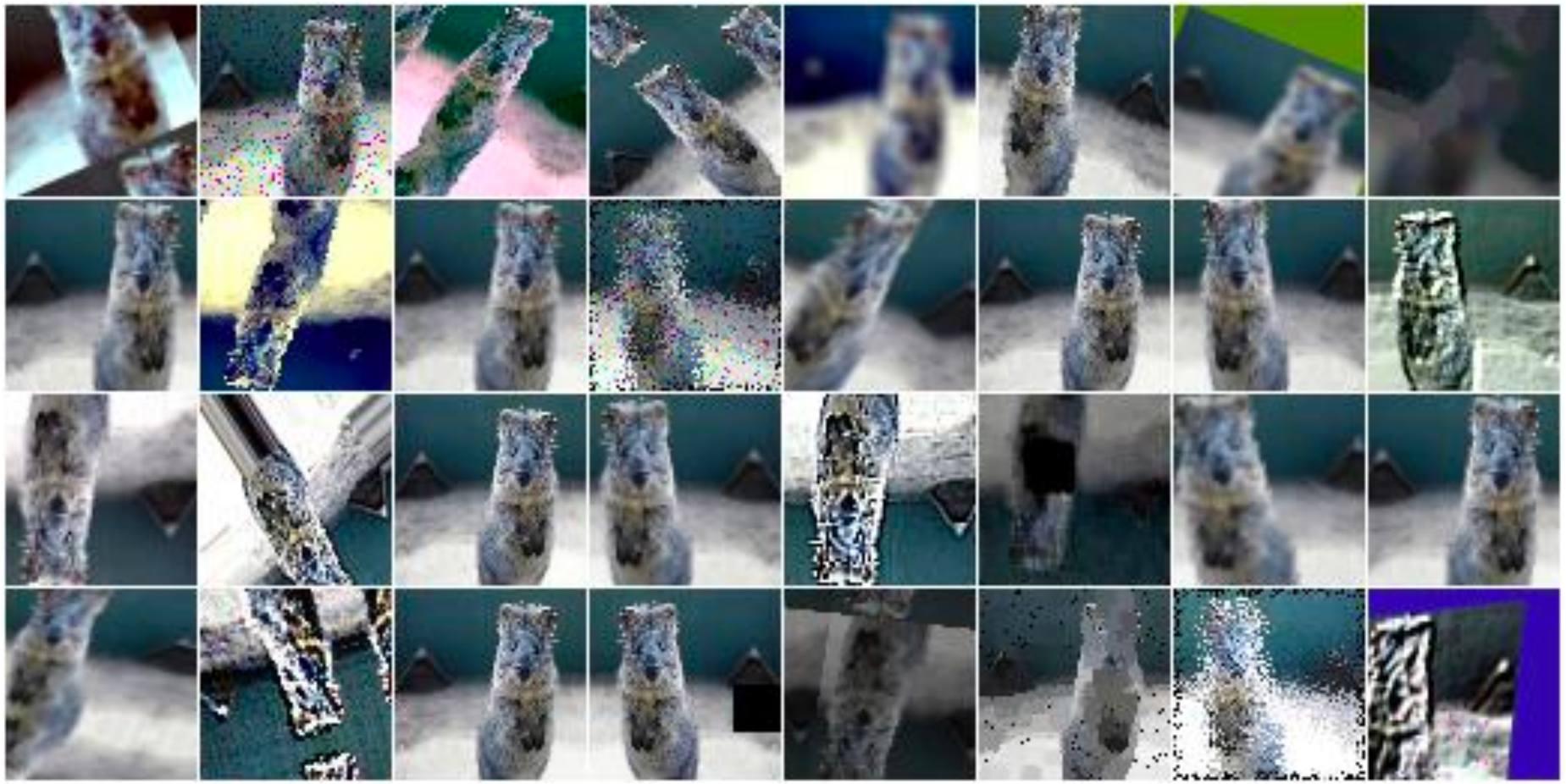
- Resampling
- SMOTE
- Image augmentation
- Use game and simulators



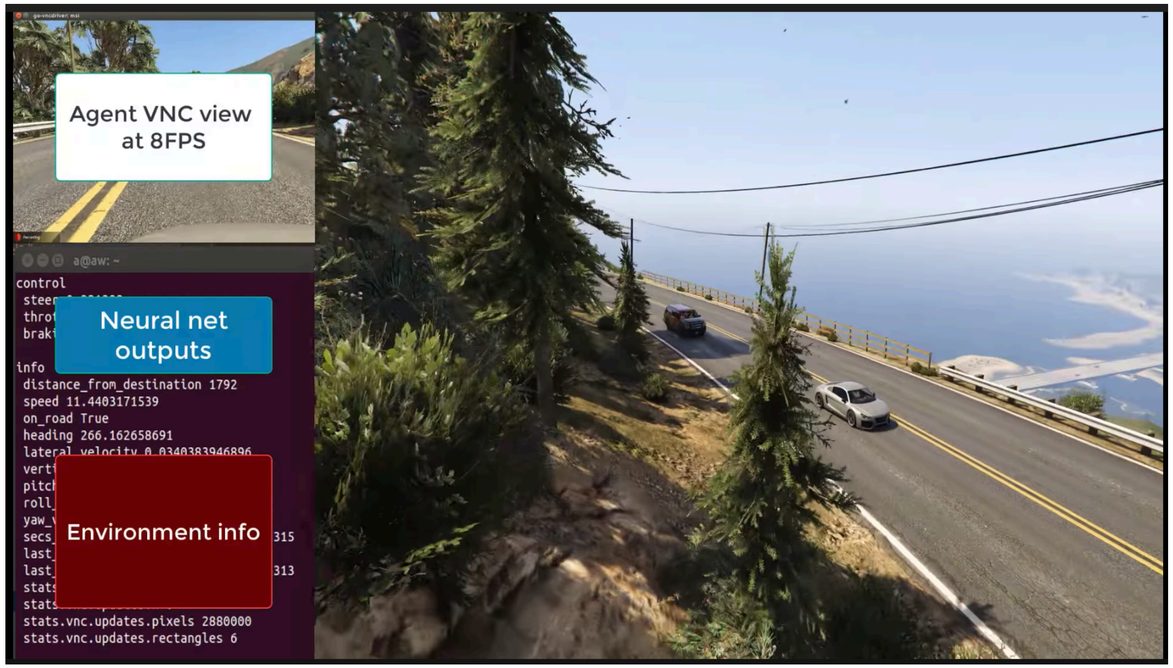


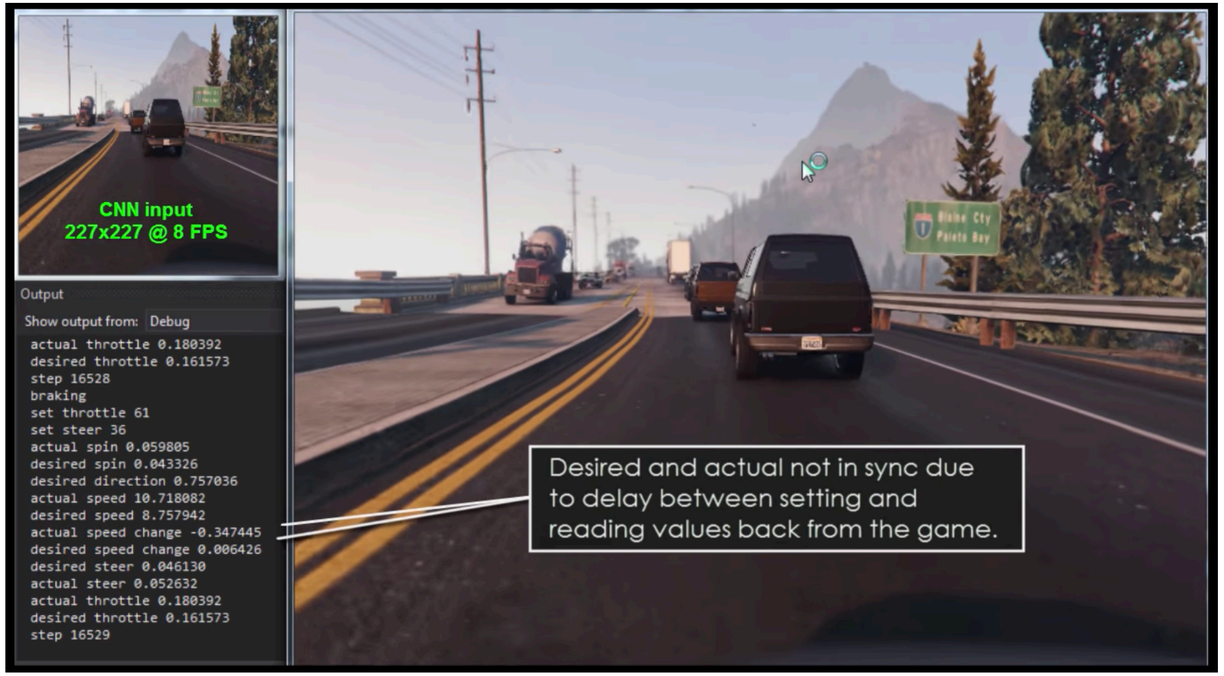
Aldraimli et al.
"Machine learning prediction of susceptibility to visceral fat associated diseases"
https://www.researchgate.net/publication/343326638_Machine_learning_prediction_of_susceptibility_to_visceral_fat_associated_diseases

Image augmentation



https://imgaug.readthedocs.io/en/latest/

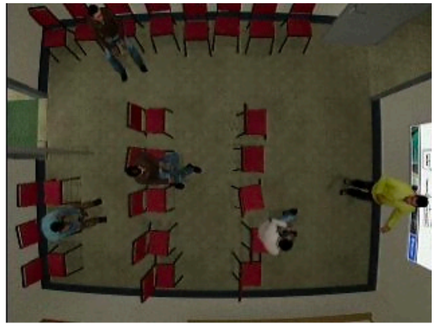




GTA V + Open AI

DeepDrive Traffic
https://www.youtube.com/watch?v=DeE8tntTSPI

(a) Office lobby



(b) Conference room

(a) Street view

(b) UAV view

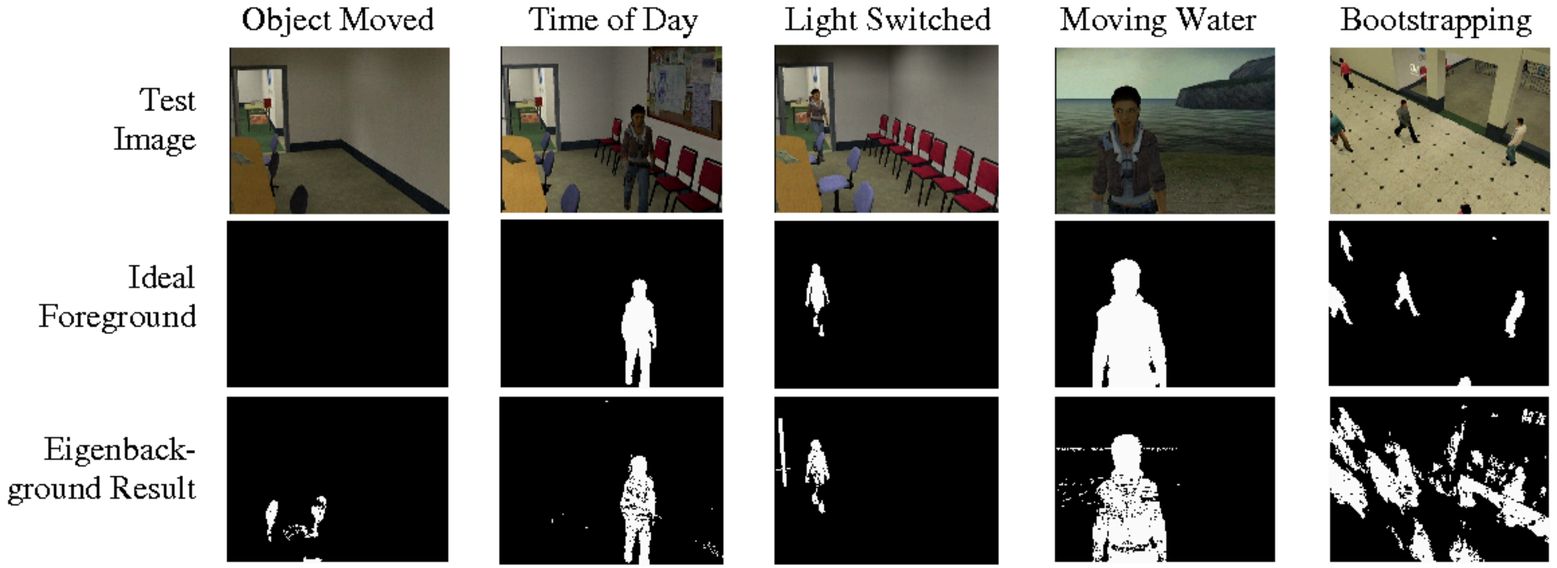
(c) Customer queue

(d) Dropped bag

(c) Rain and fog

(d) Low light

Half-life

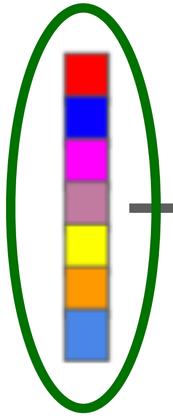


Geoffrey R. Taylor, Andrew J. Chosak, P. C. Brewer
"OVVV: Using Virtual Worlds to Design and Evaluate Surveillance Systems"
CVPR 2007

New solution

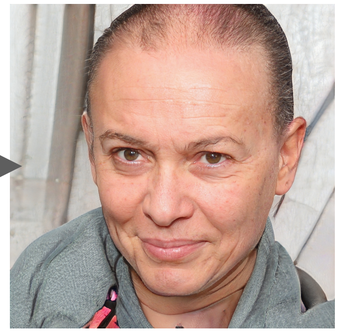
"GAN"

GAN



latent variable

Generator



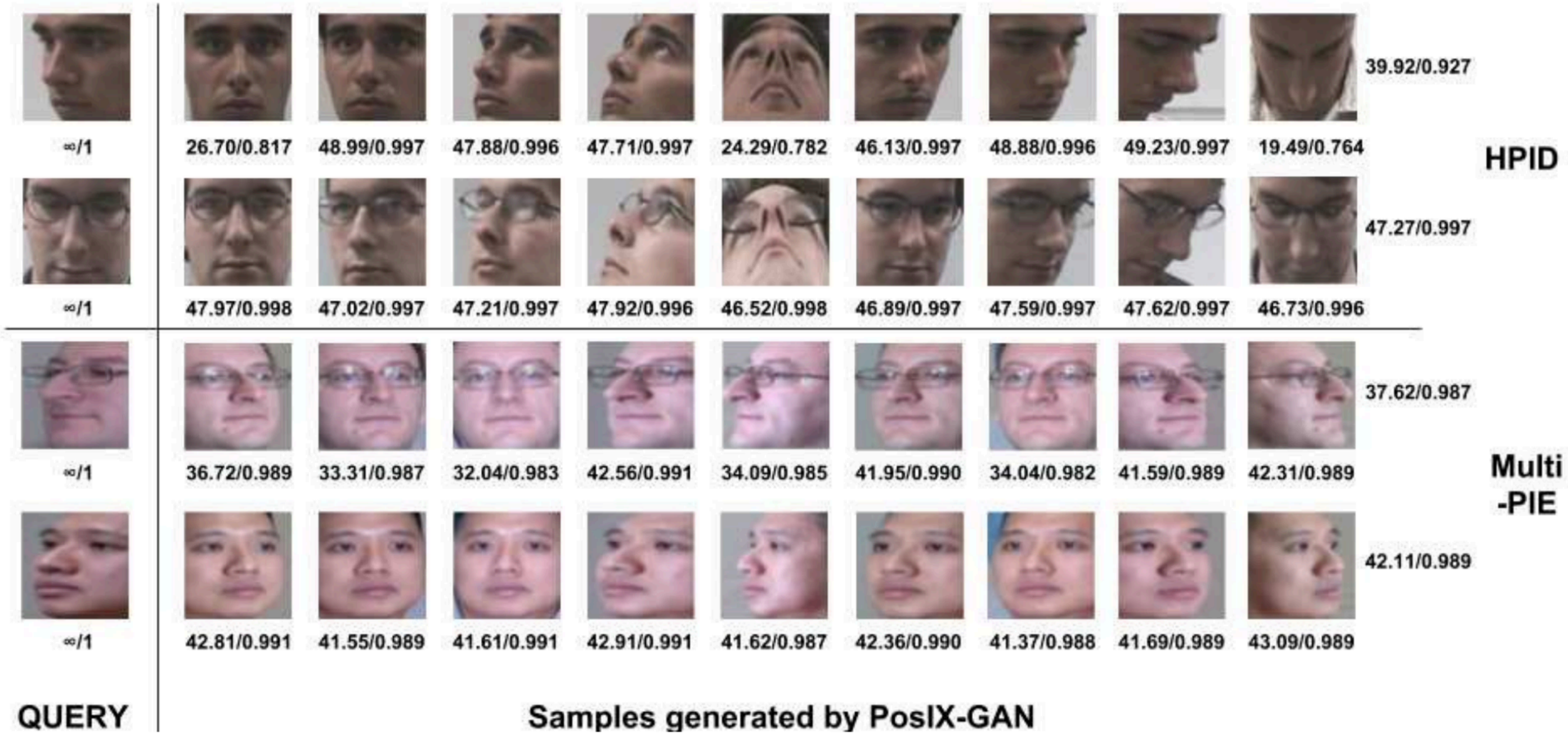
Discriminator

Real / Fake

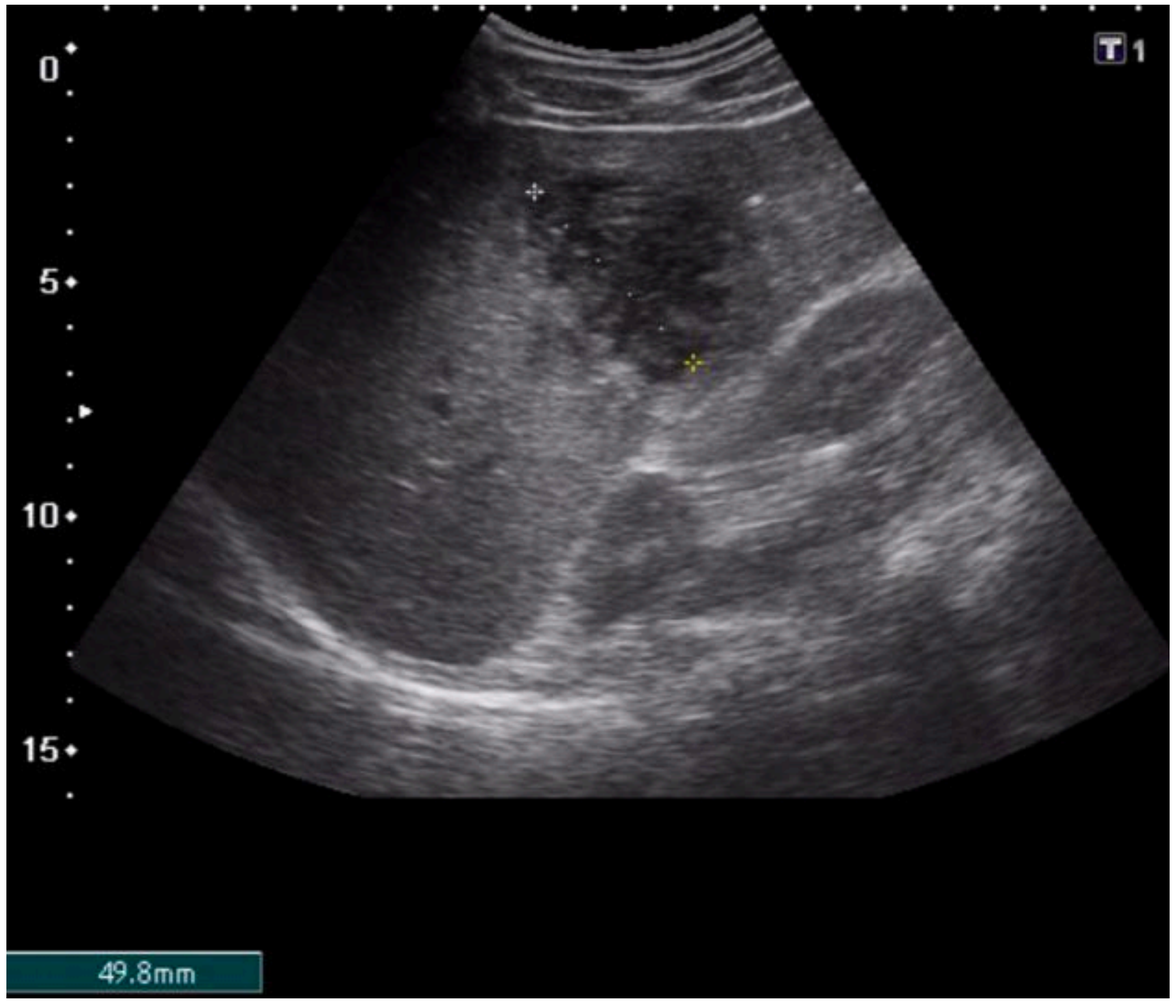
Check on this website

https://thispersondoesnotexist.com/

GAN for head pose synthesis

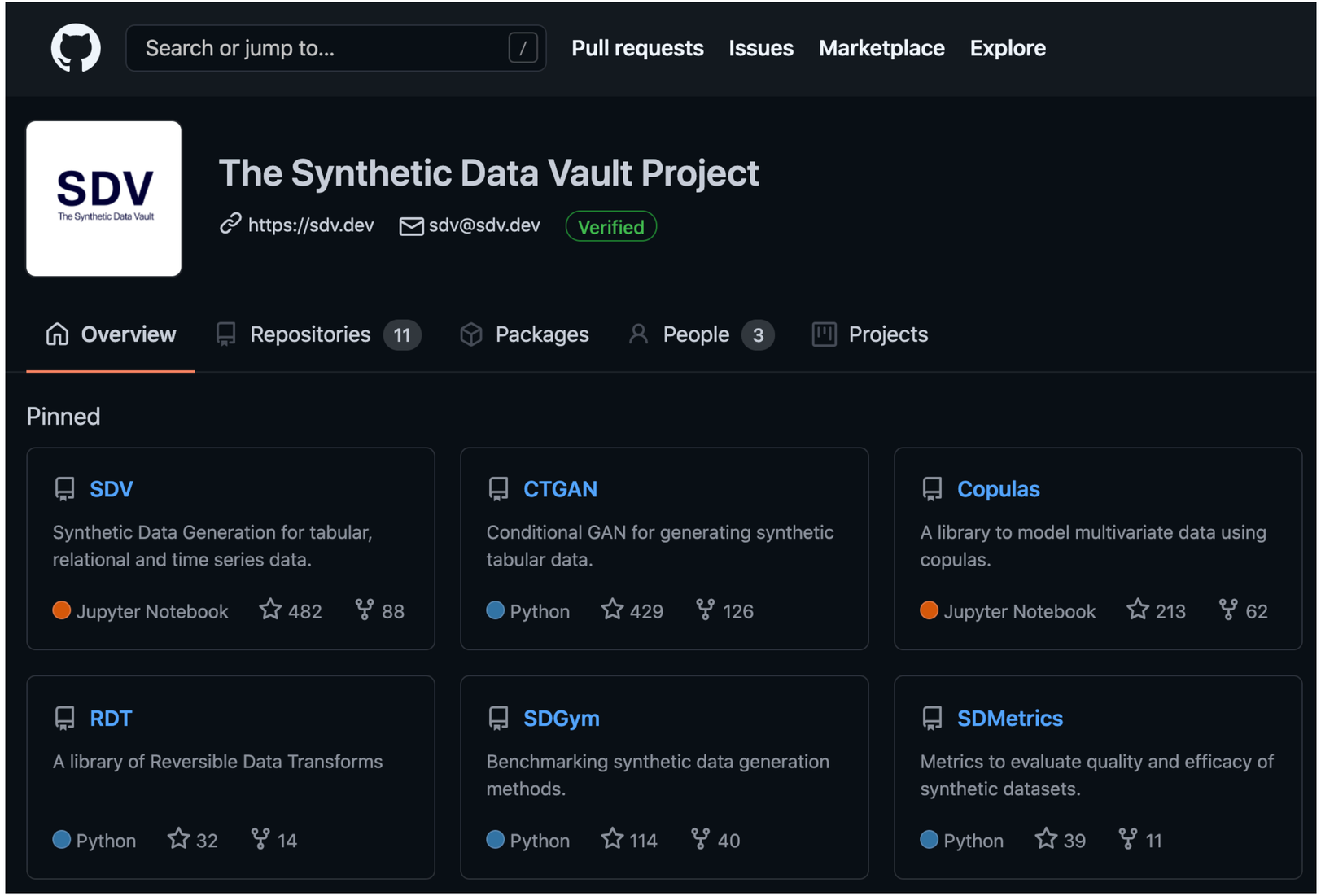


GAN for removing markers



https://radiopaedia.org/cases/pyogenic-liver-abscess-1

GAN for tabular data



Thank you

Q & A