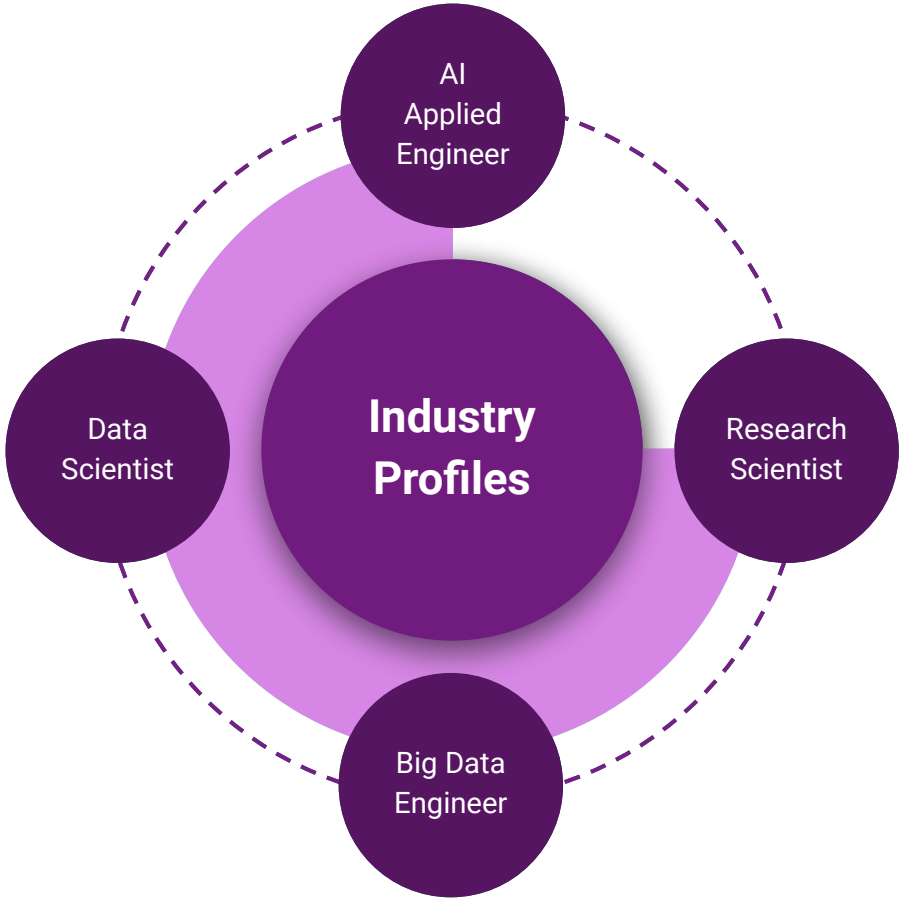
Applied Deep Learning

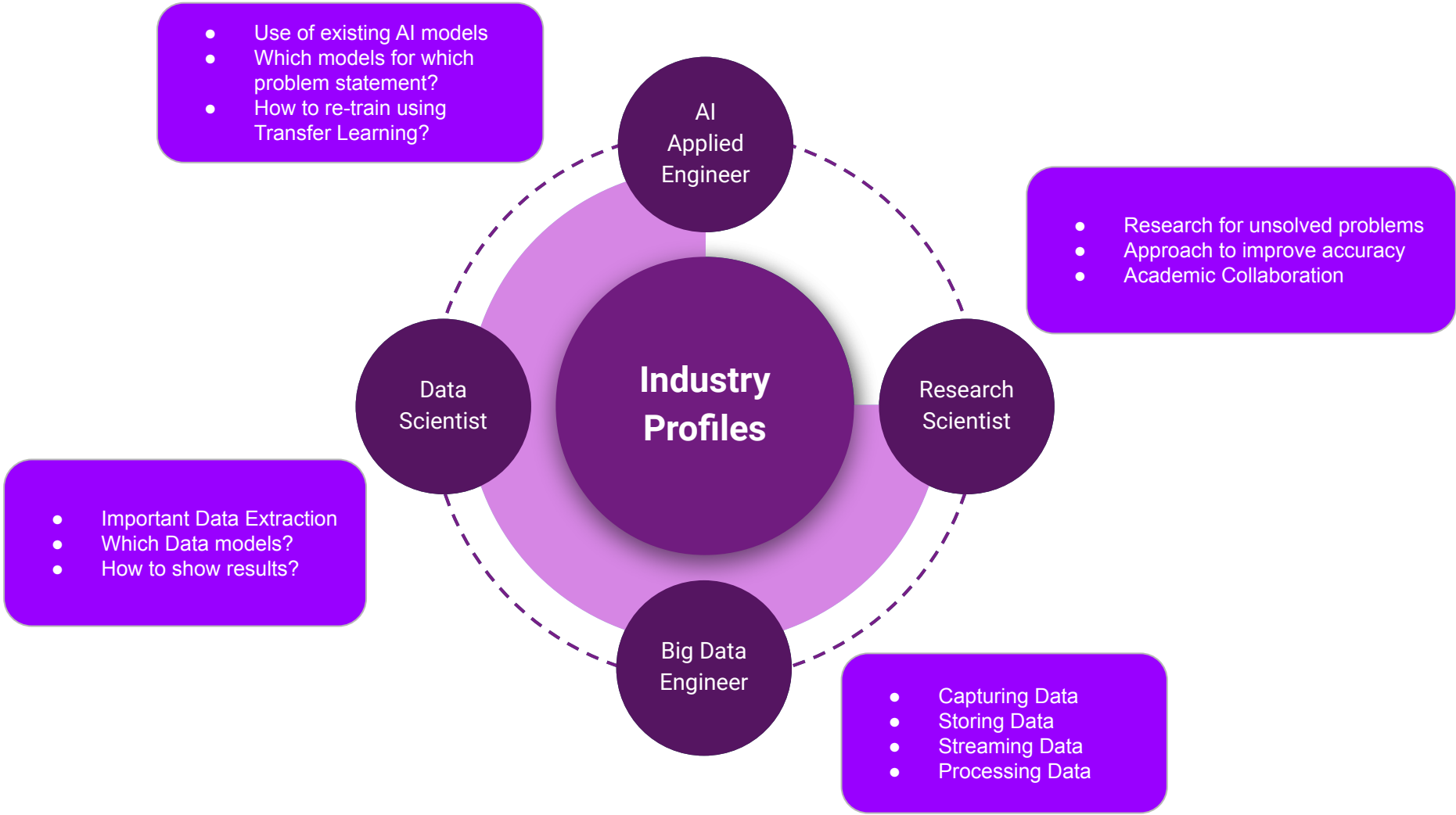
Nitish Bhardwaj

Overview of Session-4:

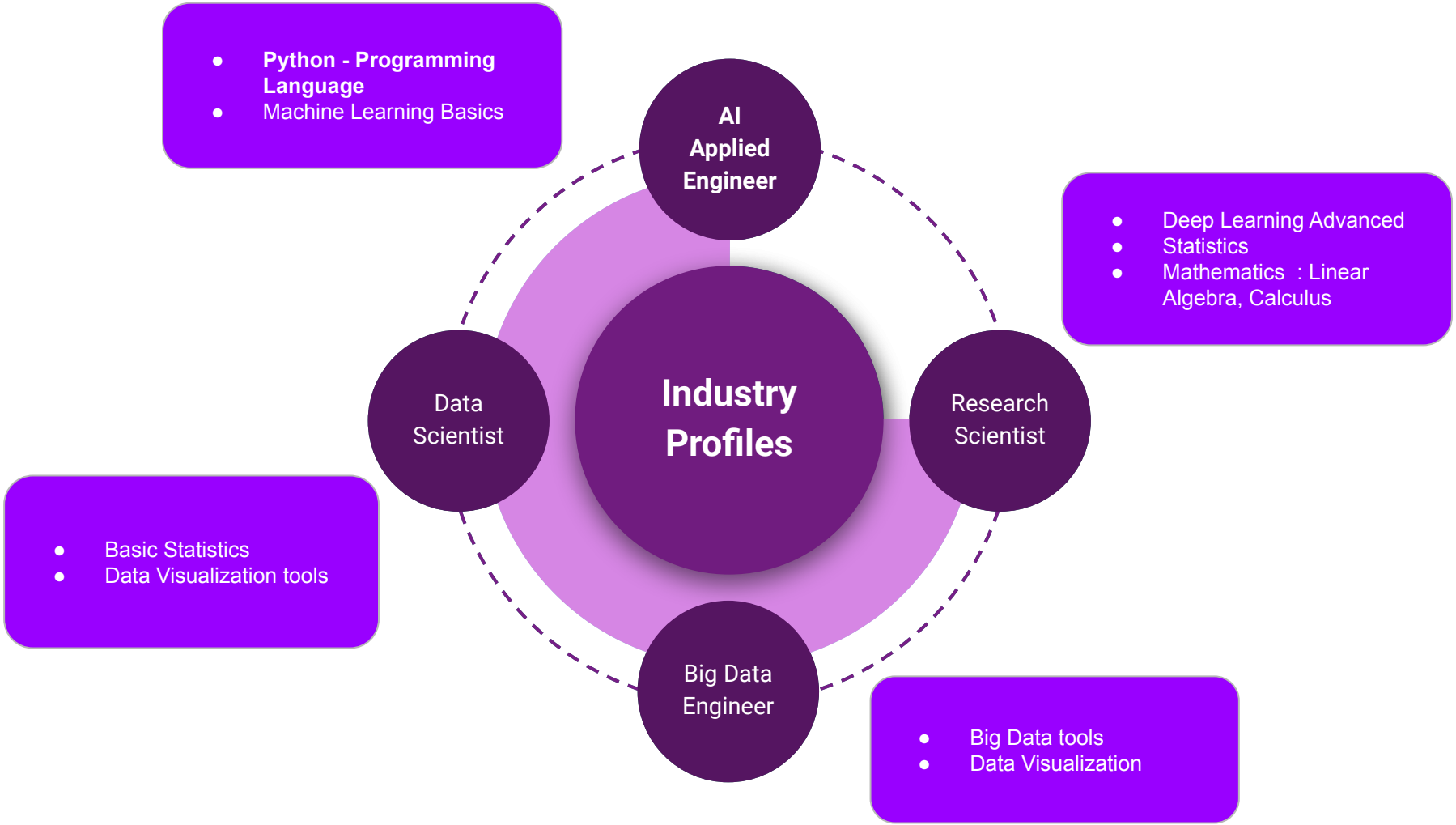
- Different AI roles in Industries
- Building required skill-set
- Industry-university co-research

Industrial Requirement


AI
Applied
Engineer
Data
Scientist
Industry
Profiles
Research
Scientist
Big Data
Engineer


Use of existing AI models
Which models for which problem statement?
How to re-train using Transfer Learning?
AI Applied Engineer
Research for unsolved problems
Approach to improve accuracy
Academic Collaboration
Data Scientist
Industry Profiles
Research Scientist
Important Data Extraction
Which Data models?
How to show results?
Big Data Engineer
Capturing Data
Storing Data
Streaming Data
Processing Data

Building AI Skill Set


Python - Programming Language
Machine Learning Basics
AI Applied Engineer
Deep Learning Advanced
Statistics
Mathematics : Linear Algebra, Calculus
Data Scientist
Industry Profiles
Research Scientist
Basic Statistics
Data Visualization tools
Big Data Engineer
Big Data tools
Data Visualization

Building Internship Projects

- Build a **github** profile
- Understanding of end-to-end approach
  - https://www.youtube.com/playlist?list=PLQY2H8rRoyvwWuPiWnuTDBHe7I0fMSsfO
  - https://www.youtube.com/playlist?list=PLQVvvaa0QuDfhTox0AjmQ6tvTgMBZBEXN
- Do your own experiments
- Explore **kaggle** : Add sample codes in github
- Dig deeper into technical details :
  - https://www.coursera.org/specializations/deep-learning?#courses
- Reach out to connections : LinkedIn, Alumni Network, Open Conferences, Meetups,

Industry Academic Collaboration

Industry Academic Collaboration

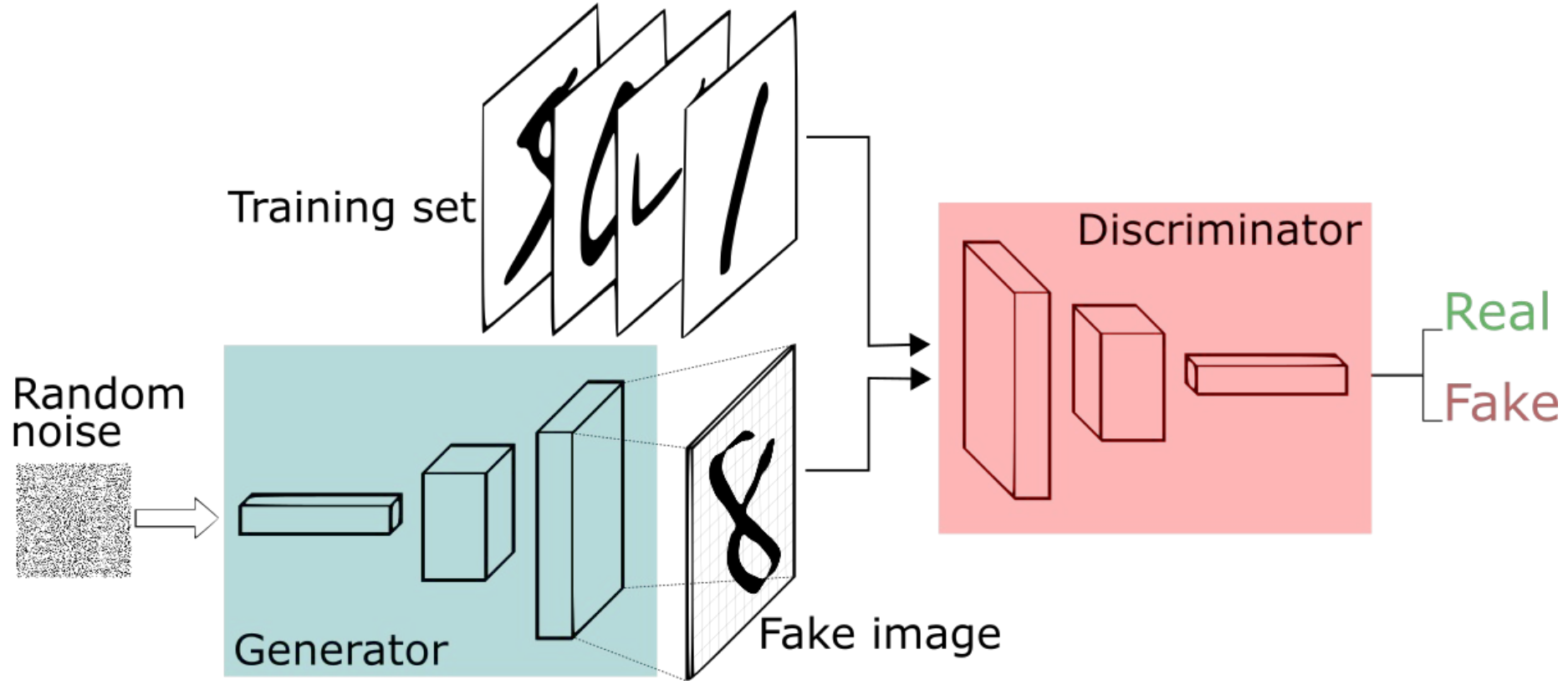
- Research to find new mathematical approach, ex. Loss functions
- Exploration of new domain like 3D, Graph neural Nets
- A lot of experimentations and Trials-Errors
- Solving new problems : COVID-19
- Internship Projects

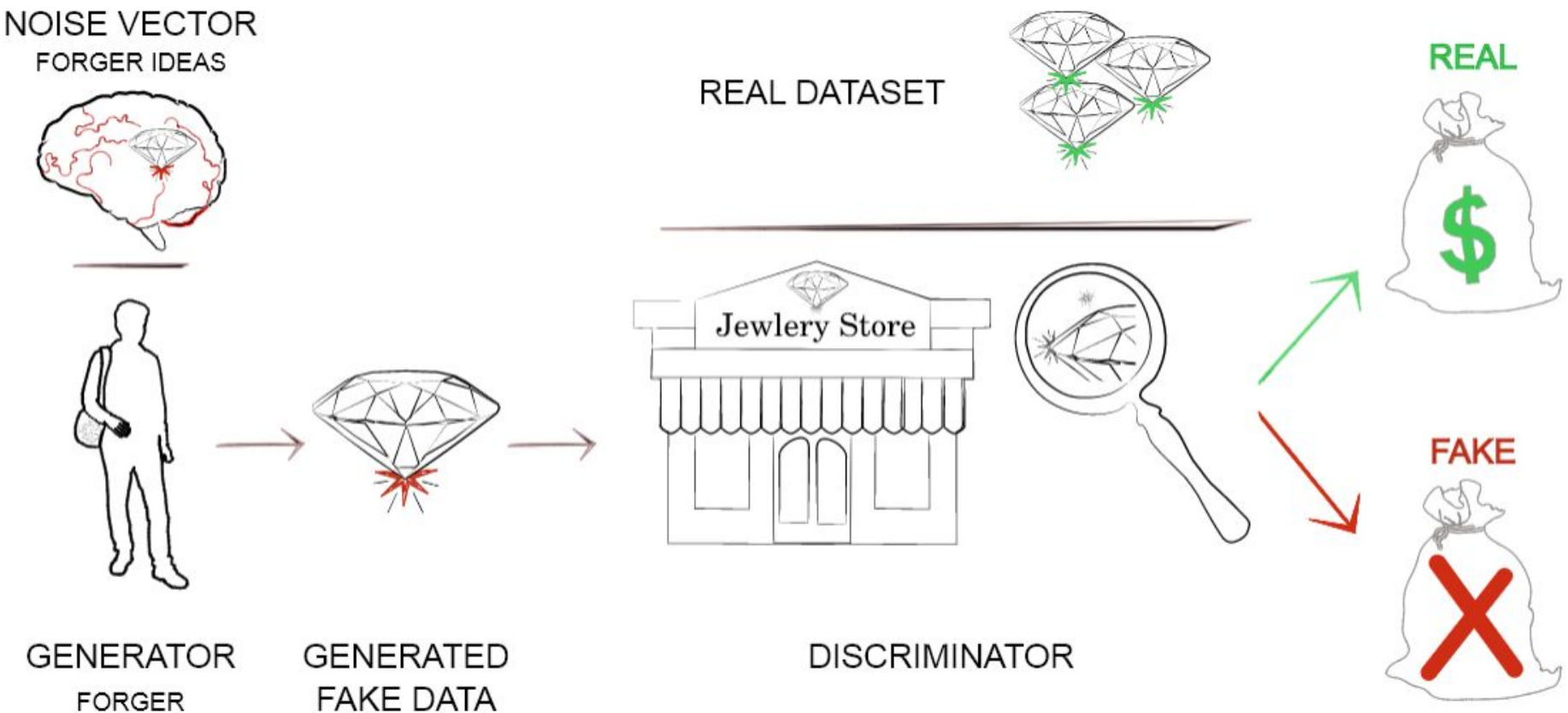
Sketch-to-3D (S3D)

https://arxiv.org/pdf/2203.03157.pdf

Similar Project : https://colab.research.google.com/drive/1POhW6byMeuzV2gW4tgtPHV00JaDnL7wu?usp=sharing

Elephant in the House : **GAN**


Training set
Discriminator
Real
Fake
Random noise
Generator
Fake image


NOISE VECTOR
FORGER IDEAS
REAL DATASET
REAL
Jewlery Store
$
FAKE
GENERATOR
FORGER
GENERATED
FAKE DATA
DISCRIMINATOR

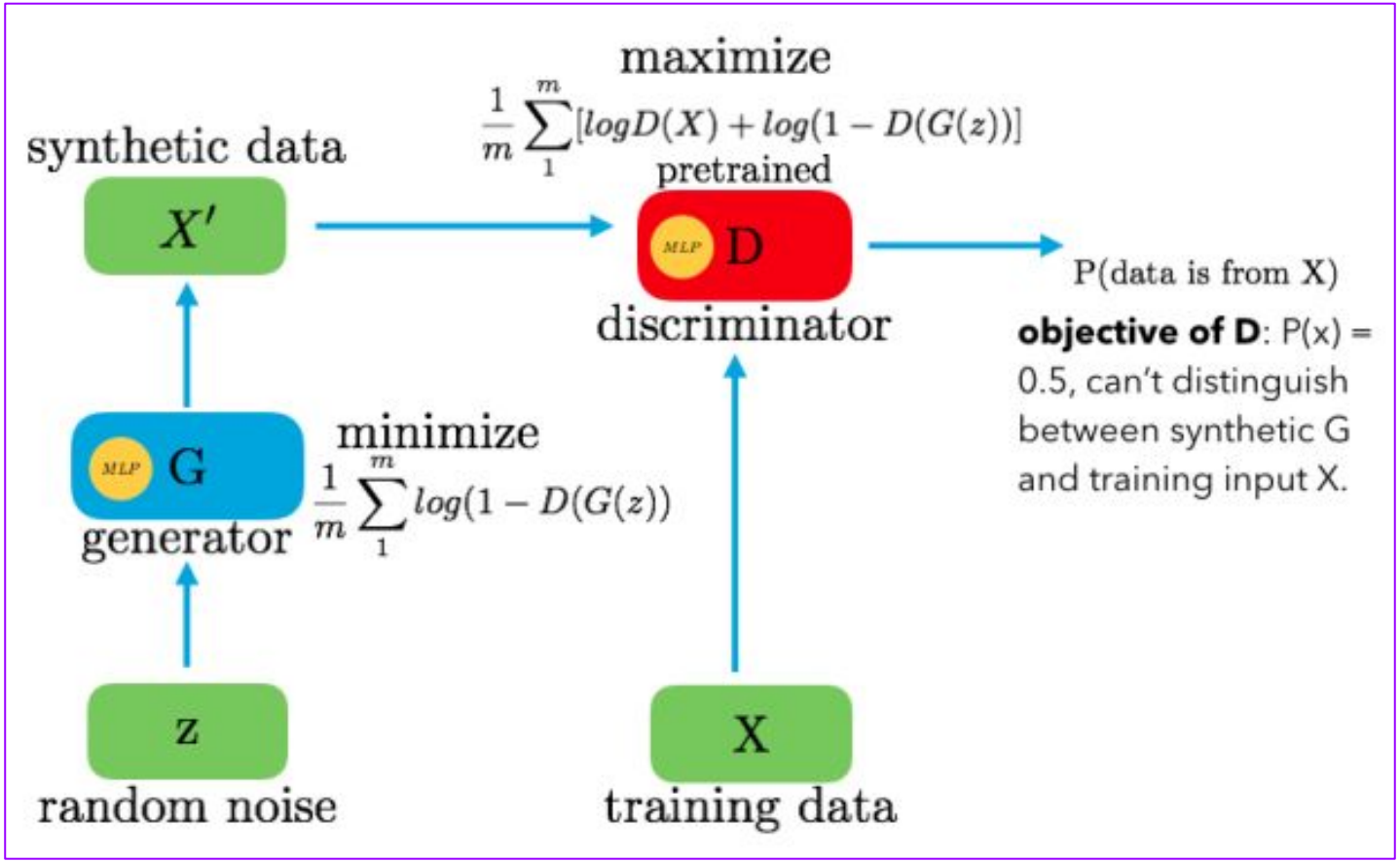
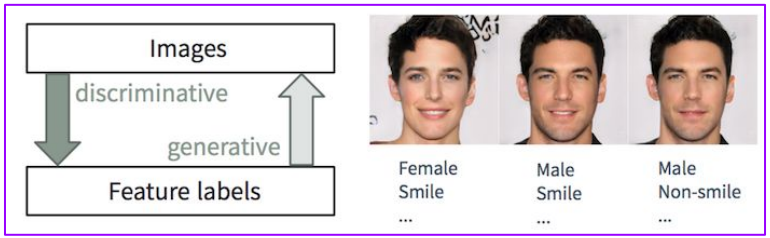
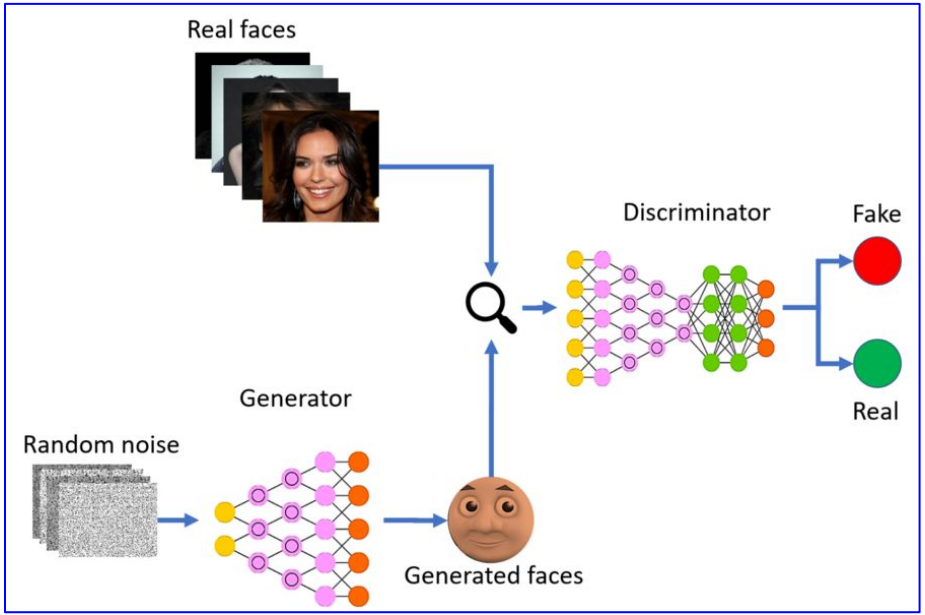

maximize
$\frac{1}{m}\sum_{1}^{m}[logD(X) + log(1 - D(G(z))]$
synthetic data
X'
pretrained
MLP D
discriminator
P(data is from X)
objective of D: P(x) = 0.5, can't distinguish between synthetic G and training input X.
MLP G
generator
minimize
$\frac{1}{m}\sum_{1}^{m} log(1 - D(G(z))$
z
random noise
X
training data

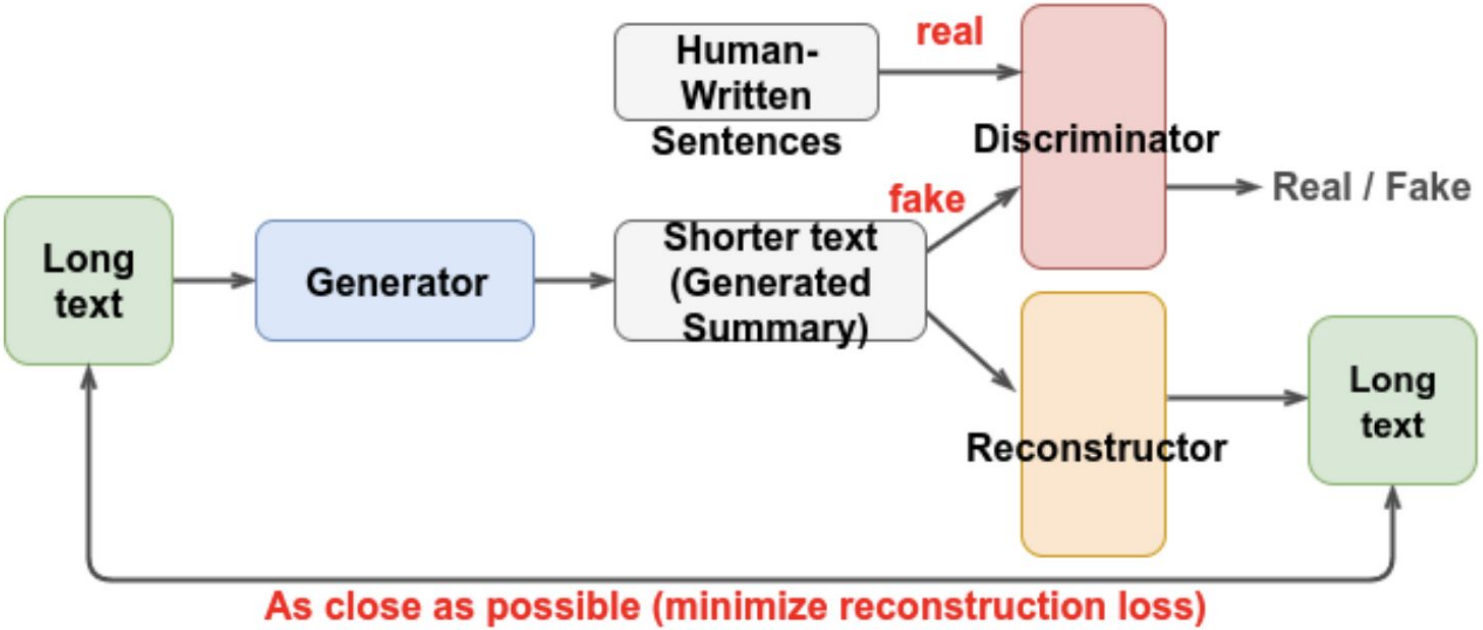
Image generation

[Image Generation Demo]





Sentence Generation



Interesting GAN Projects

- Face Generation : https://this-person-does-not-exist.com/en
- GAN Lab : https://poloclub.github.io/ganlab/
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- GANs : https://happy-jihye.github.io/gan/
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Overview of Session :

- Industrial requirement
- Internship projects
- Different Roles

Building Internship Projects

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References

- https://paperswithcode.com/
- https://www.kdnuggets.com/2020/01/top-10-ai-ml-articles-to-know.html
-
- GAN :
  - https://blog.insightdatascience.com/generating-custom-photo-realistic-faces-using-ai-d170b1b59255
  - https://github.com/ageitgey/face_recognition
  - https://www.aclweb.org/anthology/D18-1451.pdf
  - https://medium.com/what-is-gan/conditional-gan-d62a76e1724f
  - https://machinelearningmastery.com/what-are-generative-adversarial-networks-gans/
  - https://github.com/hindupuravinash/the-gan-zoo

Thank you!

https://github.com/nitish11/Applied-Deep-Learning-MA321M

Compiled By Nitish Bhardwaj
https://www.linkedin.com/in/nitish-bhardwaj/