



Enabling Data Fusion in Satellite Imagery using Generative AI

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VP of Product Development
GalaxEye Space



Bragging Time!

2018 – Avishkar Hyperloop

Pioneered the use of CFRP for building hyperloop pod chassis

2021 – IITM

Graduated from IITM and started GalaxEye

2020 – Siemens

Built Cognitive AI solutions that can reason using multimodal data

2023 – GalaxEye

Building world's first Multisensor satellite constellation
Raised \$ 3.5 Million in Seed Funding



SIEMENS





Outline of the Talk!

- Brief Intro to generative AI Models
- Enabling data fusion using generative AI
- Closing Remarks!



Generative AI – The new hot topic in town

→ Generative Adversarial Networks

Autoregressive convolution neural networks

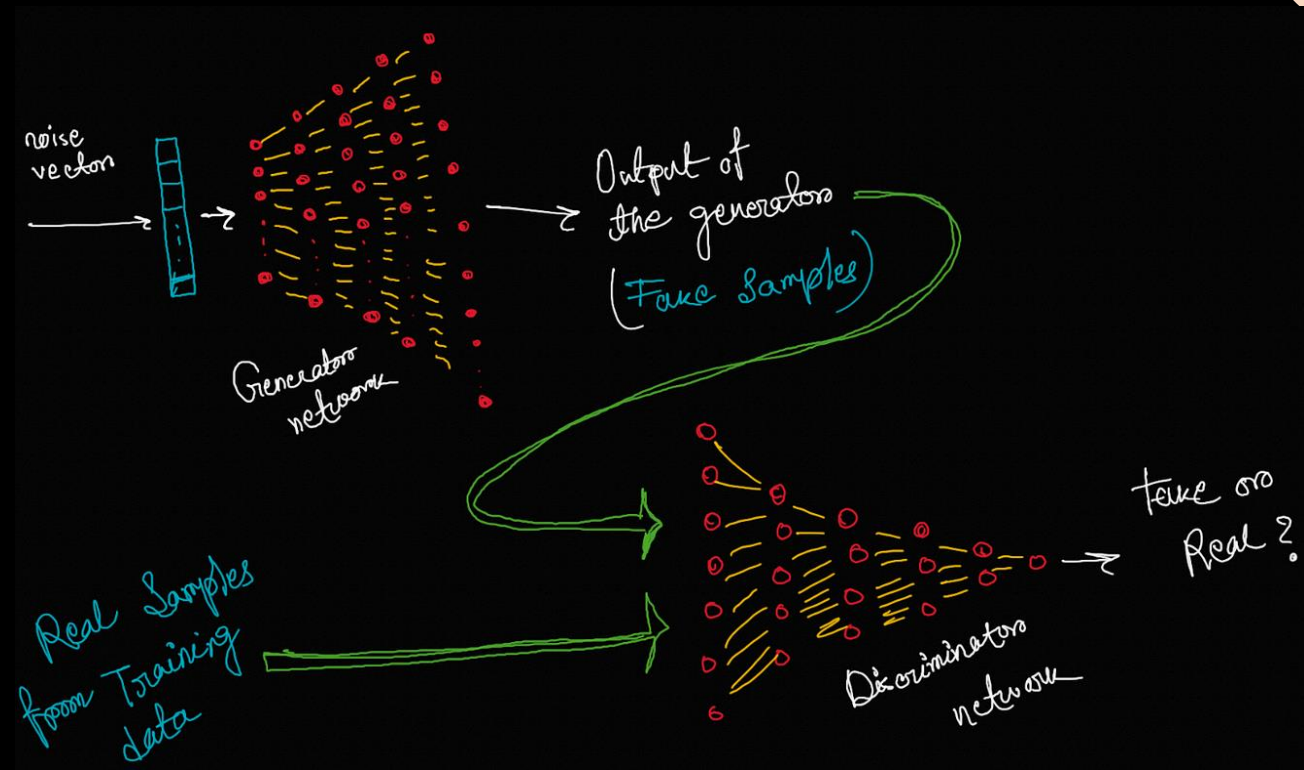
Transformer based models



give her a mohawk



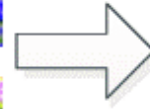
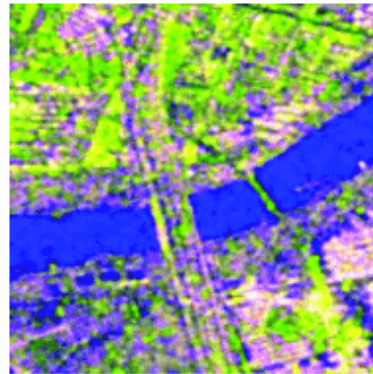
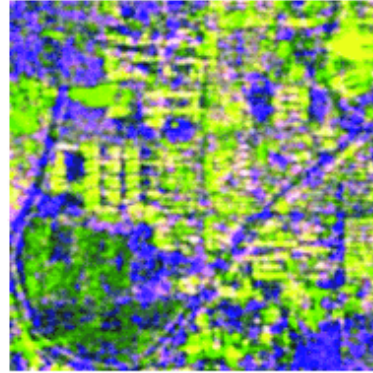
Generative Adversarial Networks



$$\min_G \max_D V(D, G) = \mathbb{E}_{\mathbf{x} \sim p_{\text{data}}(\mathbf{x})} [\log D(\mathbf{x})] + \mathbb{E}_{\mathbf{z} \sim p_{\mathbf{z}}(\mathbf{z})} [\log(1 - D(G(\mathbf{z})))].$$

SAR Colorization

Sentinel-1 SAR
images



Generated
images

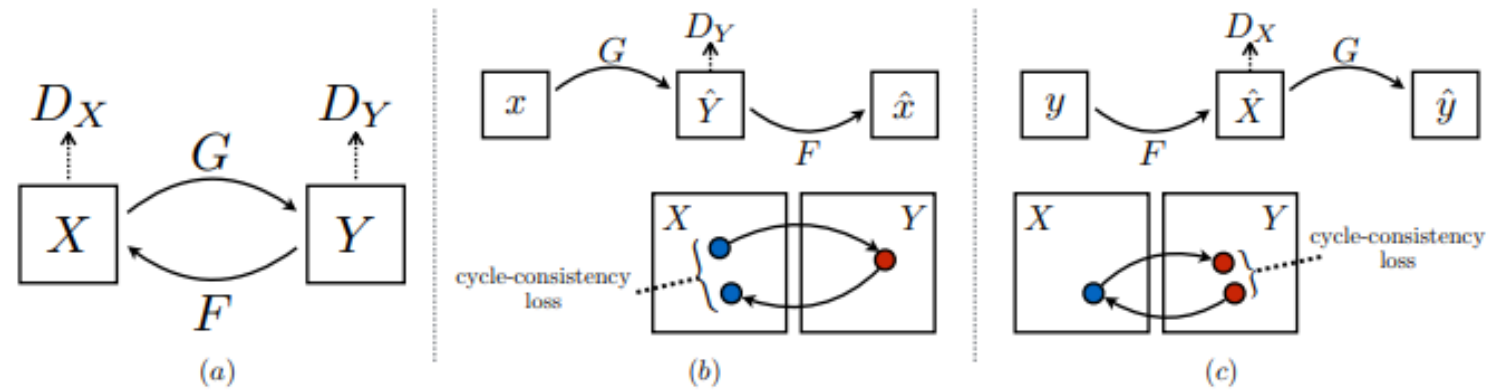


Sentinel-2 RS
images



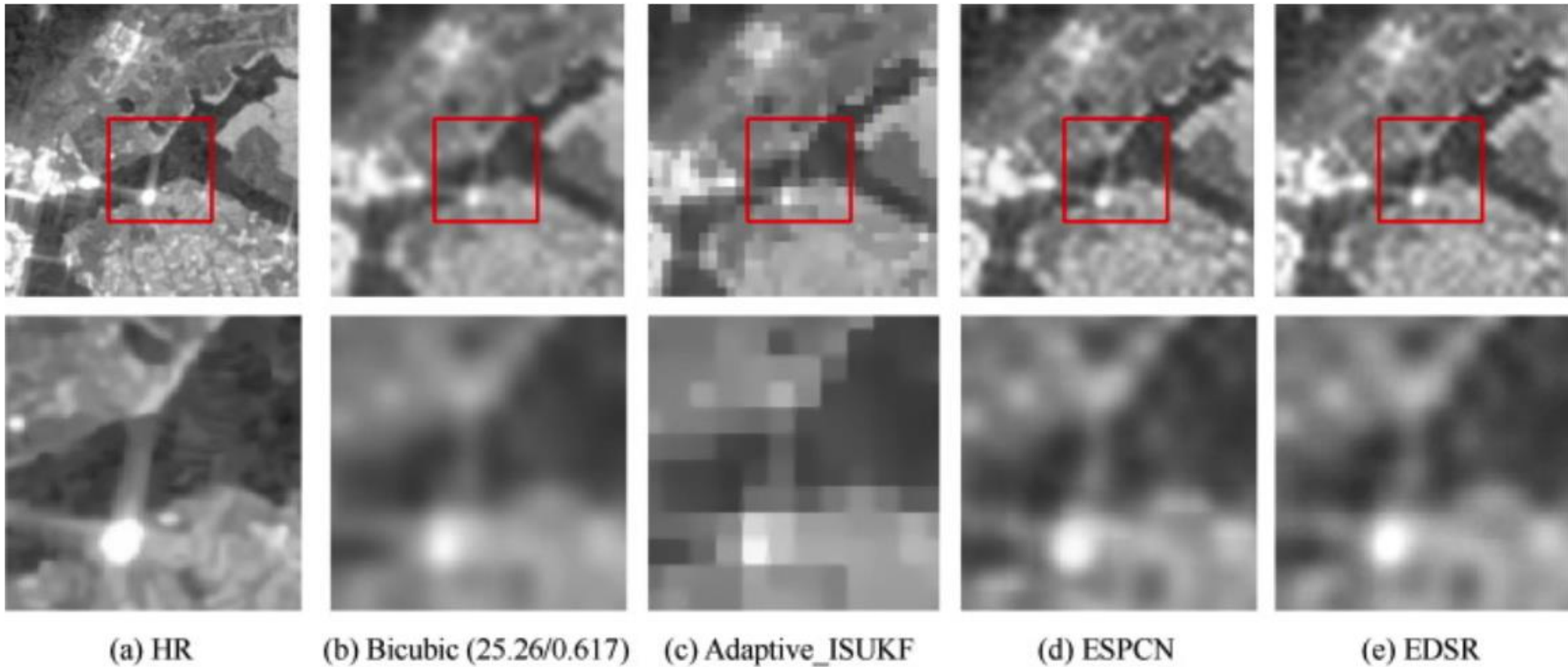
[Link to Publication](#)

Neural Style Transfer



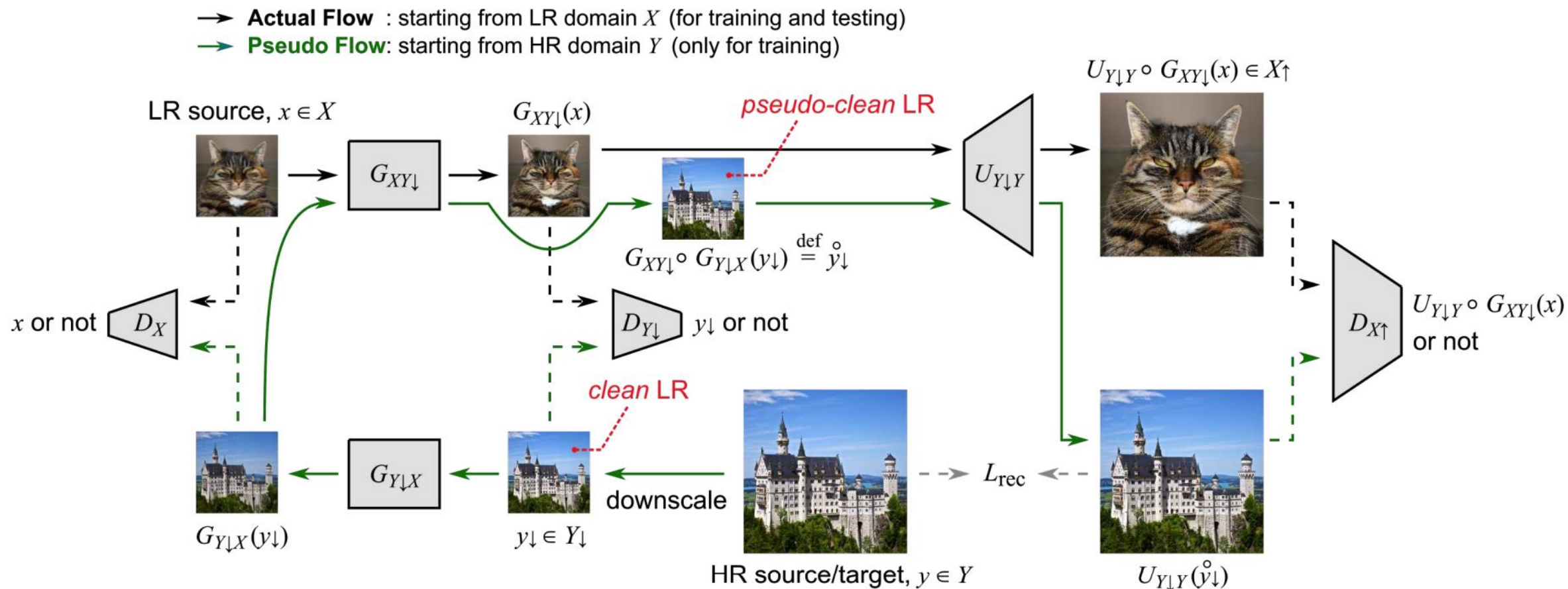
$$\begin{aligned} \mathcal{L}_{identity}(G, F) = & \mathbb{E}_{y \sim p_{data}(y)} [\|G(y) - y\|_1] \\ & + \mathbb{E}_{x \sim p_{data}(x)} [\|F(x) - x\|_1] \end{aligned}$$

Optical Guided Super Resolution of SAR



[Link to Publication](#)

Unpaired Image Super Resolution



Challenges with the Data



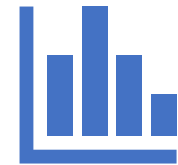
Image Registration and
Geometric Distortion



Temporal Mismatch



Noise in SAR Image



Limited availability of
training Data

GalaxEye Space

- Lead by 5 Co-founders from **IIT Madras** who build and demonstrated hyperloop technology to Elon Musk
- Based out of **IIT Madras**
- Raised **₹ 28 Cr** in Seed Funding
- Team of **35** highly competent Individuals
- Highly esteemed panel of Advisors from **Google, ISRO, DRDO** etc.

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GalaxEye Raises \$3.5 Million In Seed Funding Round

The fund raised will be used to bolster the hiring of top-tier talent and accelerate the launch of the world's first multi-sensor satellite for earth observation

BY TEENA JOSE • DEC 15, 2022

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