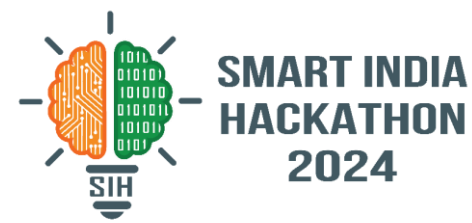


SMART INDIA HACKATHON 2024



- **Problem Statement ID - SIH1733**
- **Problem Statement Title - SAR image Colorization for Comprehensive Insight using Deep Learning Model**
- **Theme - Space Technology**
- **PS Category - Software**
- **Team Name - Milkdromeda**

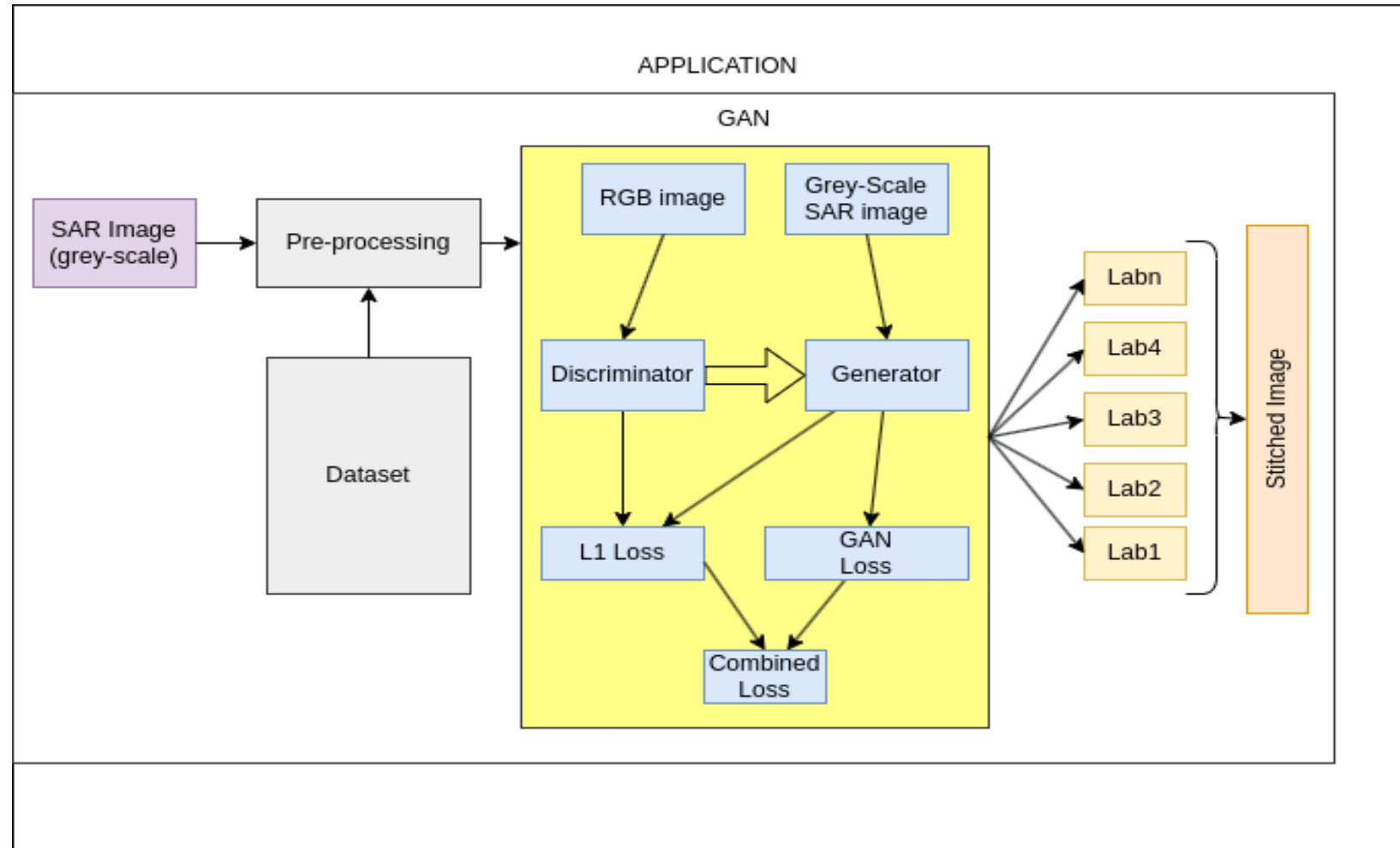


IDEA TITLE

Proposed Solution:

1. Dataset
 - Using high quality large dataset (43.7GB) for training the DL model
2. Preprocessing the images :
 - Using L*a*b color gamut instead if of RGB to reduce the computation
 - Applying noise filters to reduce the noise in the input images and for better performance
 - Reshaping to 256x256
3. Model :
 - Cyclic-GAN (U-Net Architecture) with customized loss function
4. Dashboard:
 - Simple user friendly interface that displays the colored image along with the metadata
5. For large SAR images:
 - Dividing into small size images to feed the model and then stitching the colored images together

Methodology and process for implementation



Technologies used:



Analysis of the feasibility of the idea:

1. Technical feasibility: Training on very high quality dataset is a challenge
2. Economic feasibility: Some low cost cloud resources can be used
3. Time feasibility: Time required to train the model locally (Nvidia RTX 4050) even on small scale dataset is very high

Potential challenges and risks:

1. Computational power
2. Memory limit
3. Collecting quality dataset

Strategies for overcoming these challenges:

1. Computational power: Cloud based GPUs (Use free credits / paid)
2. Memory limit: Cloud based machines (Use free credits / paid)
3. Collecting dataset: Contacting research institutions and universities

Potential Impact and Benefits of the solution :

1. Environmental monitoring:
 - Deforestation
 - Flood monitoring
 - Ice and snow cover monitoring
2. Military Site Activity monitoring:
 - Monitoring Ports, Borders, Maritime
3. Detection of Oil Spills in ocean.
4. Agriculture and terrain:
 - Vegetation health monitoring in agriculture.
 - Detection of terrain types for land use analysis.

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3. [G. Ramkumar, P. Parkavi, K. Ramya and M. S. Priya, "A Survey On Sar Images Using Image Processing Techniques," 2020 6th International Conference on Advanced Computing and Communication Systems \(ICACCS\), Coimbatore, India, 2020, pp. 1097-1100, doi: 10.1109](#)
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7. [Zhang, S.; Cui, L.; Zhang, Y.; Xia, T.; Dong, Z.; An, W. Research on Input Schemes for Polarimetric SAR Classification Using Deep Learning. Remote Sens. 2024, 16, 1826. <https://doi.org/10.3390/rs16111826>](#)