Product Design
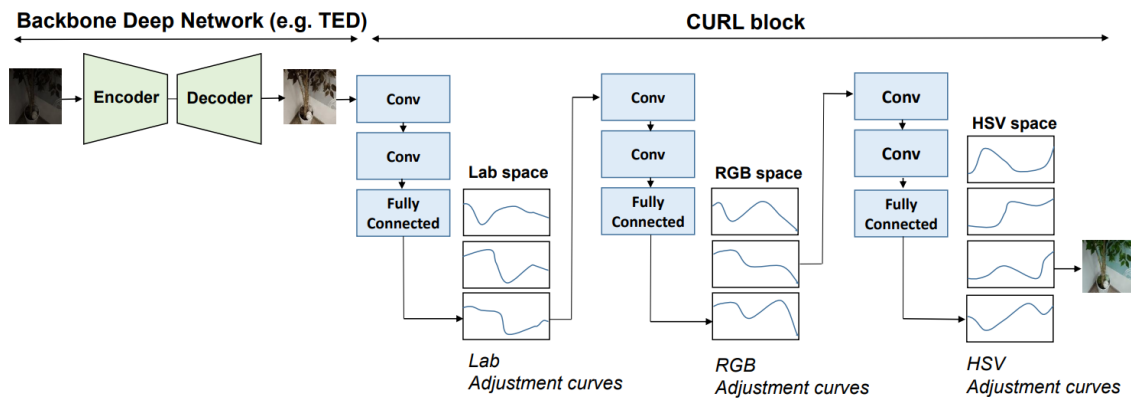
Team 26: Nandini Reddy, Ruchitha Jujjuru, Shreya Patil and Vinay s

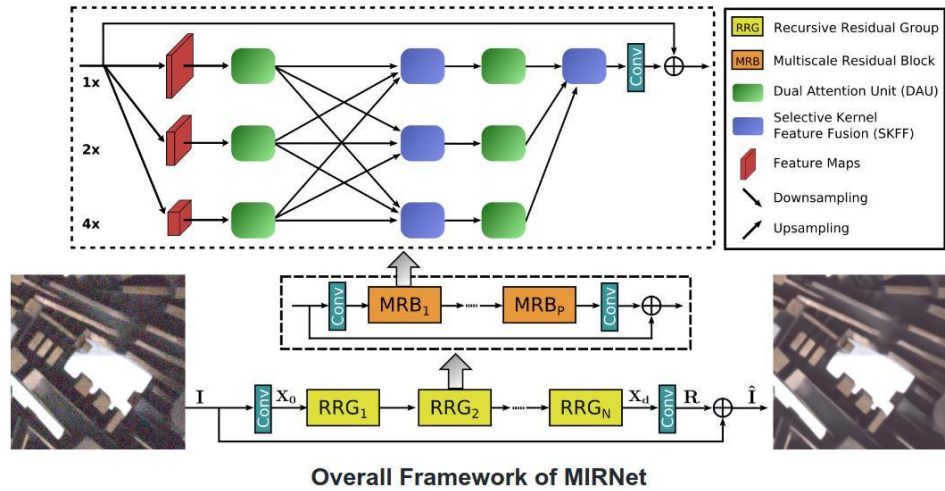## Design Overview

Architectural design
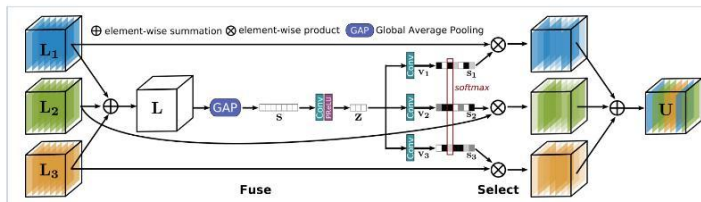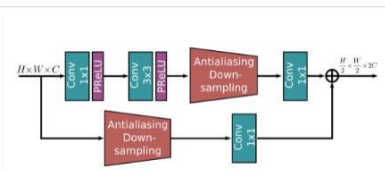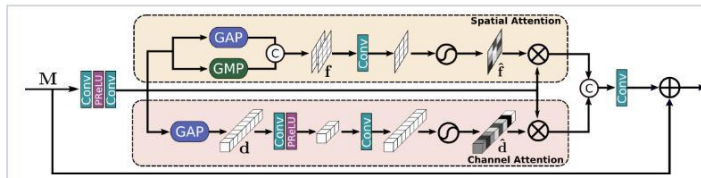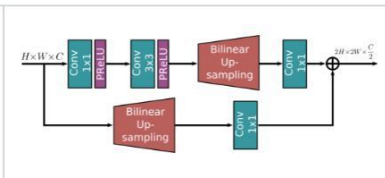
1. CURL

2. MirNET

Overall Framework of MIRNet

Selective Kernel Feature Fusion (SKFF)
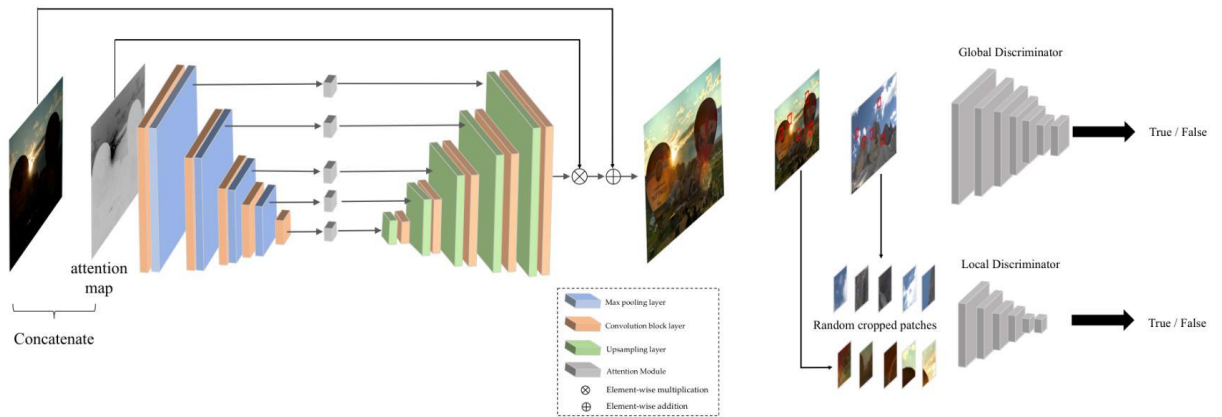
Downsampling Module
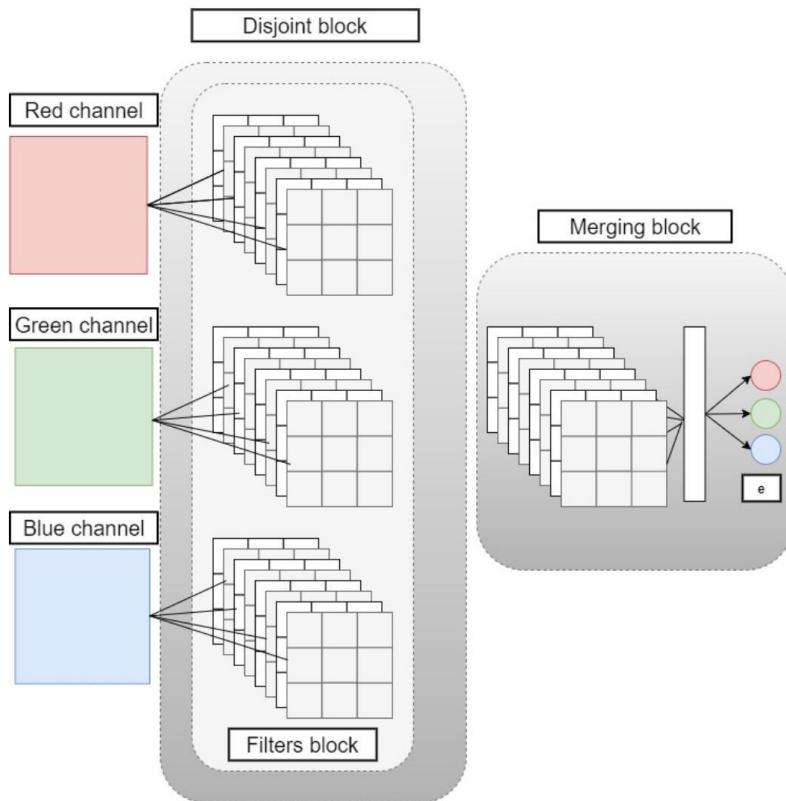

Dual Attention Unit (DAU)

Upsampling Module

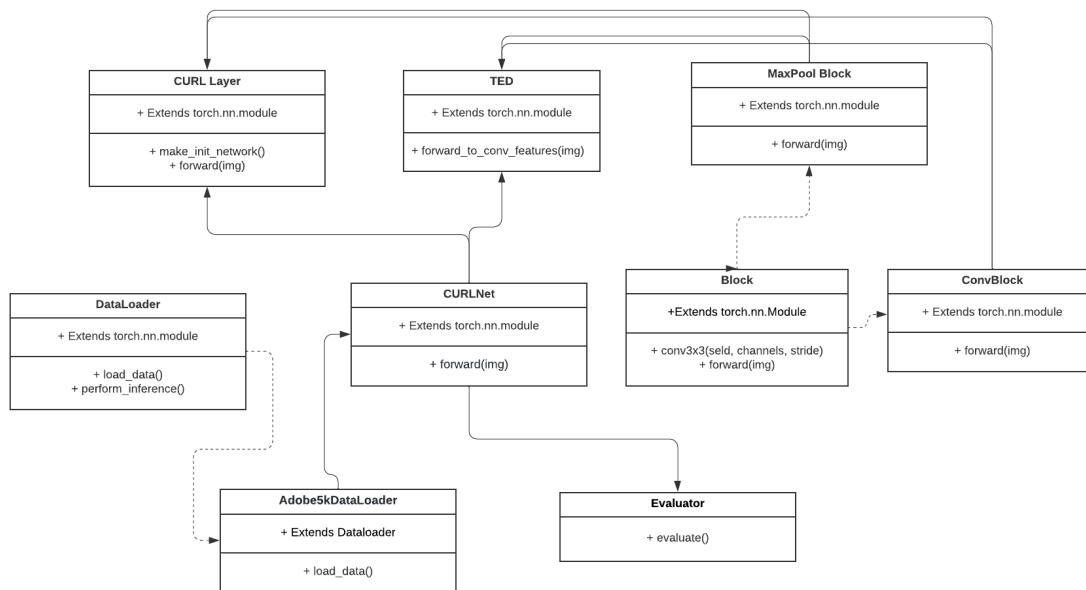## 3. EnlightenGAN

4. CWCC

System interfaces

APIs

The user is going to be provided with a python module, this module will later be integrated into the Joly AI product, functions from the module can be called to perform the required operations, i.e. editing a group of photos together.
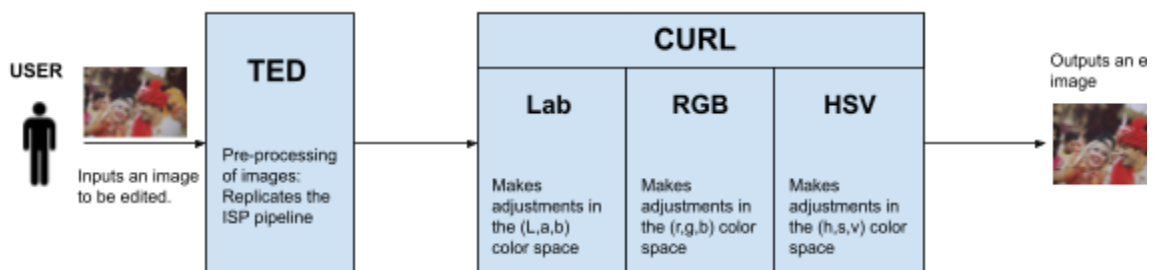
Model (CURL)

TED	Extends torch.nn.Module
	Class state
	    - It stores the structure of the TED Block.
	Class Behavior
	    - It has the functions for forward and backward pass in the TED Block

Evaluator	Class behavior - Has functions for running a forward pass, and calculating loss.

CURLLayer	Extends torch.nn.Module
	Class state
	    - It stores the structure of a layer of CURL blocks.
	Class Behavior
	    - It has the functions for forward pass, and to initialize a layer (network)

Block	Extends torch.nn.Module
	Class state
	    - It represents a lower level deepLFLPF block.
	Class Behavior
	    - Has a function to define a 3x3 convolutional block.

ConvBlock	Extends torch.nn.Module, Block
	Class state
	    - It represents a higher level convolutional block.
	Class Behavior
	    - Has a function for forward pass in the block.

MaxPoolBlock	Extends torch.nn.Module, block
	Class state
	    - It represents a max pooling block.
	Class Behavior
	    - It has the functions for forward pass.

CURLNet	Extends torch.nn.Module
	Class state
	    - It stores the structure of the CURL Block.
	Class Behavior
	    - It has the functions for forward and backward pass in the CURL Block

CURLLoss	Extends torch.nn.Module Class Behavior - It has the functions that are needed for the curl block. This includes functions to create a window, compute similarity index, etc.
DataLoader	Class Behavior - Has methods to load and process data.
Adobe5kDataLoader	Extends Dataloader Class Behavior - Has methods to load and process data from Adobe5k dataset.

Sequence Diagram(s)

CURL:

Design Rationale

-   The images produced by EnlightenGAN were grainy and overexposed. Hence, enlightenGAN was scrapped.
-   Though not satisfactory, MirNET and CURL produced better results. So, we chose to train CURL and MirNET.
-   CWCC, being an old and outdated model, was scrapped.