IMAGE PLAYER

TEAM 9:

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DESCRIPTION:

SAVimage is a web-based application that lets one edit an image in real-time.

The application provides a variety of filters and features which the user can interact with to get the desired image.

The application also lets you capture images in real time and then apply filters on it.

The user can then download the generated image onto its system.

A variety of filters are available to choose from like basic filters i.e contrast,hue,etc. to advanced filters like Summer,Invert and also AI filters like cropping or expanding an image using seam-carving algorithm.

TECHNOLOGY STACK:

1) **Frontend**

The frontend has been implemented using HTML, Javascript, CSS and BootStrap.

Bootstrap has been used for some templates like the navigation bar. The frontend is written in HTML and styled using CSS. Javascript has been used to make the page dynamic and send requests.

The user can also capture a photo which then gets sent to the backend. All the requests are sent to the backend using javascript fetch calls.

2) <u>Backend</u>

The backend is made using python and flask. The backend server runs on flask. The request is received from the frontend and then the filter is applied.

After applying the filter, the image is sent back to the frontend in the form of base64 along with the status of the operation (whether the application of the filter has failed).

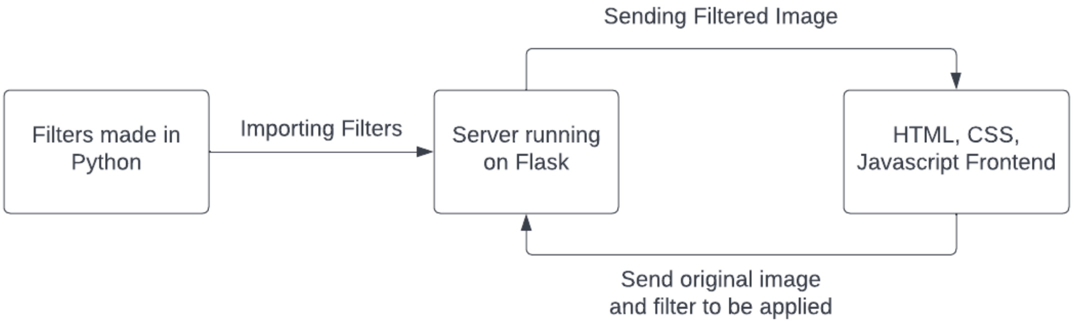
When an image is first uploaded, all the advanced filters are processed and sent back to the frontend at once. This allows the frontend to display the previews of all the advanced filters. This also means that no new request is required to be sent to the backend for advanced filters giving faster response times.

3) <u>Filters</u>

The filters have been implemented using python and OpenCV. There are about 25 filters. Some other libraries like PIL (python image processing libraries) have been used for conversion to and from base64.

OpenCV works mainly on numpy arrays and so the filters work faster than when they would work on normal arrays. SOme other scientific libraries like matplotlib and scipy have also been used for some of the filters.

PROJECT ARCHITECTURE:



The filters have been implemented in python and stored separately from the flask server. The flask server imports the filters made.

First the user uploads a photo from the front end. This photo is sent to the flask backend using the fetch API. The photo is stored as the original image on the flask server.

Whenever the user toggles a filter or moves a slider a request is sent to the server which then applies the necessary filter and returns the image with the filter applied. The frontend then displayed the filtered image.

Whenever the user saves an image, the filter sliders are reset and this image is saved as the new original image on the backend. Further filters are applied on this and so the filters can be stacked.

List of Pages

- **Home Page** - This is the landing page from where you can go to the editing page or the features page.

- **Edit Page** - This is the main page where you can upload an image, apply filters and then download the new image.

- **About page** - This page contains information about the group and the project description and a few sample filters.

- **Features page** - This page contains a sample image of all the implemented filters along with a short description of the filter.

List of Filters

Contrast	Opacity	HDR	Summer	AI Crop
Hue	Crop	Emboss	Winter	Hatify
Brightness	Rotate	Grayscale	Gradient	Dogify
Value	Pencil Sketch	Median Blur	AI Expand	Coolify
Blur	Color Sketch	Invert	Dilation	Erase Background

AI FILTERS

Intelligent cropping of an image has been performed using seam carving algorithm.Seam carving is an algorithm for content aware image resizing.It functions by establishing a number of seams(paths of least importance) in an image and automatically removes seams to reduce image size or inserts seams to extend it.

CLASSIFIER BASED AI FILTERS:

Classifier are models trained for some object(s), this is a achieved by using set of positive and negative photos.The classifier can identify the object and provides the coordinates using which we can resize and place the object.This method can work for both photo and video format.

USE CASES AND CONCLUSION:

Thus, we have created a simple yet powerful image player. The vast number of filters provide an easy way to quickly test how an image would look if an image is applied and also provides an easy way to filter and download images.

A good application of this is to check how the images of a machine learning dataset would look after basic processing. The user just needs to take a few samples from the dataset and apply filters like grayscale, gradient, etc.

The application can also be used as an educative way to show what filter provides what action which can be useful in image processing or image editing courses.