Project Synopsis/Project Concept Document

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Description:

When photographers capture 1000s of photos in events , they select 100s of good photos after which they perform editing of this photos. Editing 100s of photos manually is hard.The Aim of this project is to automatically perform editing on 100s of photos at one time and perform color correction on all of them at once.Here we need to implement the algorithms which calculates the factors by which we need to change or adjust the parameters such as brightness ,contrast and color tone of given photo and apply these filters to 100s of photos.

Profile of Users:

- Experienced photographers who cover events such as weddings can efficiently edit 100s of photos by performing specific colour editing techniques for all of photos at once
- Users can also access their photos after editing of that photos by photographers

Usage Model and Diagrams :

Initialisation:

• Users access the photo editing application through a web or desktop interface.

Image processing:

- The application analyzes each imported photo to identify areas requiring color correction and enhancement.
- Algorithms calculate the factors/deltas needed to adjust parameters such as brightness, contrast, and color tone based on the image analysis results.

Filter Application:

- Using the pre-computed parameters stored in the SQL database, the application applies appropriate filters to each photo.
- Filters are applied in a batch processing manner to efficiently handle multiple images simultaneously

Parameter storage:

- Upon confirmation of the edited images, the application stores the calculated parameters in a SQL database for future reference.
- Parameters include the factors/deltas for adjusting brightness, contrast, and color tone, associated with each edited image.

1. Training Module:

- The Training module is responsible for training the machine learning models used for image enhancement or prediction.

- It takes a dataset of raw images and their corresponding ground truth images as input.

- The module preprocesses the dataset, splitting it into training and validation sets.

- It defines the architecture of the machine learning models, such as neural networks or other suitable algorithms.

- The models are trained using the training set, iteratively adjusting their parameters to minimize the difference between the predicted output and the ground truth.

- Various training techniques, such as data augmentation, regularization, and optimization algorithms, can be employed to improve the models' performance.

- The trained models are evaluated using the validation set to measure their accuracy and generalization ability.

- Once the models achieve satisfactory performance, they are saved for future use in the Models module.

2. Models Module:

- The Models module serves as a repository for storing and managing the trained models.

- It maintains a CSV (Comma-Separated Values) file that contains information about the available models.

- Each row in the CSV file represents a specific trained model and includes relevant details such as the model's name, architecture, hyperparameters, and file path.

- The CSV file acts as a catalog or index for the trained models, making it easy to retrieve and utilize them in the writing module.

- The Models module may also include functionality to add new models to the CSV file, update existing model entries, or remove obsolete models.

- It provides an interface for the writing module to query and retrieve the appropriate model based on the desired image enhancement or prediction task.

3. Writing Module:

- The Writing module is responsible for applying the trained models to raw input images to generate enhanced or predicted output images.

- It takes a raw image as input and retrieves the relevant model information from the CSV file in the Models module.

- Based on the selected model, the Writing module loads the corresponding trained model from the specified file path.

- It preprocesses the raw image, if necessary, to match the input requirements of the trained model.

- The module then feeds the preprocessed image into the loaded model and obtains the predicted output.

- The predicted output is post-processed, if needed, to ensure compatibility with the desired image format and characteristics.

- Finally, the Writing module saves the enhanced or predicted image to a specified location or returns it to the user.

The interaction between these modules can be summarized as follows:

1. The Training module trains the machine learning models using a dataset of raw and ground truth images.

2. The trained models are stored in the Models module, and their details are recorded in a CSV file.

3. The Writing module retrieves the appropriate model information from the CSV file based on the desired image enhancement or prediction task.

4. It loads the trained model, applies it to the raw input image, and generates the enhanced or predicted output image.

This modular design allows for flexibility and extensibility. ***New models can be easily added to the system by training them in the Training module and updating the CSV file in the Models module. The Writing module can then utilize these models to process raw images and generate enhanced or predicted outputs based on the available options in the CSV file.***