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Final Year Project Proposal

TU858

Restoring the Past

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Declaration

I hereby declare that the work described in this dissertation is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree at this or any other university.

Signed:

Chung Ho Lung

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30/09/2023

Summary

This project is going to make an application that is using to restoring damaged images. Many different types of damaged on the images. I will focus on 5 main types of the damaged (Fading, Scuffs, Tears and Rips, Stains and spots, water and mold) and going to restore those images with different algorithm and function.

Images are proof of people's past and their lives in the present. It recorded every bit of people's live. People can use Image to recall the joys and sorrows in life. Unfortunately, even Images that can store the 'time' are inevitably subject to the wear and tear of time.

Therefore, I want to do this project. Images are not just a normal photo only. They can be contains someone memory , they also contains the history of our life. I want to restore those images and allow our 'time' able to keep as long as possible during the wear and tear of time.

Anyone that wants to keep their 'time'. They can use this application to restore the damaged image. I hope they all able to keep their joys and sorrows in their life.

Background (and References)

While valiant efforts have been made to painstakingly, manually restore old films to their former glory by enthusiasts, this process is slow and makes for little headway into the preservation of the vast archives of decaying films. Even a single minute of film contains over 1000 individual frames and each frame must be manually processed. Technology has since advanced to a point that much of this time-consuming but important work can be automated. The expertise for automating this process can be found in the area of Computer Vision and Image Processing. The extent to which this processing can be automated, depends on the intelligence of the algorithm used. However, even just semi-automation could speed up the process

considerably and allow for the rescue of whole archives of otherwise lost gems. In this project, a post-processing algorithm will be designed to tackle the main effects of film damage, towards automating / semi-automating the restoration process.

During the feature, I have a project that required to restore some simple damaged images. I believe that the project will help me to find out more about restoring image.

For example, reference 2 give me a hints to find our the area of damaged by water. Although the paper is focused on CNN to detect the bacteria , the idea in the paper still able to help my to get some idea.

Proposed Approach

Before starting do this project or application. I need to do some research of different types of images damaged. This allows me to understand what kind of the damage that I need to restore from the Image.

1. Fading
   - Colourless
     - We can use clach function to make the image have better contrast and brightness
   - Colour Shift
     - Most colour shift are made the image turn yellow but some images can turn blue, red or others . There I think the best idea is give a BGR channel to allow the user can change by themselves and I will prove a sample input to give the users have the idea to restore this type of damaged
2. Scuffs
3. Tears and Rips

- Scuffs, Tears and Rips damage results are very similar. They are damaged by physical damage and cause the image lost some parts or area.
    - Using inRange() to fund out the white area. As the missing area are always represent as white color
    - And use deliate and inpaint method to fill those area colour.
    - However, This method are not work well with Rips. This is because rips damage always lost large area of image. Inpaint method not good to fill large area of image lost.
4. Stains and Spots
    - Stains and Spots can be assumed to be larger size of noise. Therefore we can use denoising function to restore this type of damage
5. Water and Mold
    - Water and Mold damage results are not similar, but they are caused by something.
    - Those damage always have a large amount of area got damaged. We can use erosion to detect the damaged area but I didn't find a good way to restore this type of damage yet

After find out most of the methods to restore the images. I will need to test those methods with code.
I will run those code with python with opencv. The reasons that I pick this language and library is I have a module is taking about opencv with python. This will help me to safe lots of time to learning a new language or new library to implemented this project. And opencv code are coding with C/C++. As this reasons, I not need to warry about python will slow down my application.

Finally, This application will be a web based application. The reasons that I will implement my application with a web, I wanted everyone are able to use this application easily. Web environments allows user only need to access my website only. The second reason is, I have experimented with set up a website, This also allow to spend less

time to learn a new technique and reduce the number of bugs will be created during the implementation.

Deliverables

This project product should be a website. This website will allow users to upload put their Image in and using the functionality in the website to restore the Image. These functionality will send the request to the backend to restore the image with some algorithm and send back to frontend display to the users. Users able to download the restored image.

Technical Requirements

- Python
- Html, CSS, JavaScript
- NodeJS

Conclusion

This project is an idea to create an web based application using to restore image. Many people want to repair their damaged Images. As those images are contains their memory and life.
I believe this web based application allow everyone able to restore their Image easily.

References

Hint:

Use Zotero to manage your references (see Brightspace resources).

Use the **Harvard** referencing style

1. https://www.zotero.org/support/quick_start_guide
2. https://www.sciencedirect.com/science/article/pii/S0010482520304601

Hint: review a past project from the library website that relates to your project idea.

Title:

Student:

Description (brief):

What is complex in this project:

What technical architecture was used:

Explain key strengths and weaknesses of this project, as you see it.

Appendix B: Second Project Review

Hint: review a past project from the library website that relates to your project idea.

Title:

Student:

Description (brief):

What is complex in this project:

What technical architecture was used:

Explain key strengths and weaknesses of this project, as you see it.