

Initial Plan
Face image decomposition and manipulation
2021 - CM3203

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1 Project Description

In the background of internet big data era, the information people share via the internet has gradually changed from textual content to multimedia materials, mainly pictures and videos. According to a study by the International Association of the Imaging Industry on content captured on mobile phones and a survey of uploads by users of the photo-sharing site Flickr, more than 60% of content shared by users is of people, and most of it includes faces.¹ This percentage will rise further as new applications such as live video streaming continue to develop.

Based on the above application background, the problem of image decomposition has received much attention in the last few years. This project will also focus on this aspect.

This project will decompose the face image into three parts albedo, normal, and lighting according to the existing decomposition method, and then modify one or more of the algorithms to recompose the three parts into one image, and evaluate and analyze the algorithm and the whole system.

¹ Chen Li. 2017. *Face eigenimage decomposition and its application*

2 Project Aims and Objectives

2.1 Primary (Core system functionality)

- Implement image decomposition to decompose the face image into its albedo(reflectance) normal map(shape) and lighting.
- Change one of the decomposed components and combine them into one image with altered appearance.
- Create a Graphical User Interface for this system.

2.2 Secondary (Desirables)

- Change the remaining decomposed components.

3 Work Plan

3.1 Week 1(31/01/22 – 06/02/22): Initial Research and Plan

- Background research on technologies that may be needed in the project
- Write and submit the initial plan
- **Deliverable:** Initial plan
- **Meeting: Thursday 12:00-12:30**

3.2 Week 2(07/02/22 – 13/02/22): Method implementation

- Select an existing image decomposition method
- Configure the running environment

- Think about the changing direction of one of the decomposed components
- **Milestone:** Implement image decomposition
- **Meeting: Thursday 12:00-12:30**

3.3 Week 3(14/02/22 – 20/02/22): Alter component(draft)

- Select a direction to make a change
- Search existing ways to change a decomposed component
- A preliminary alteration of a decomposed component
- **Meeting: Thursday 12:00-12:30**

3.4 Week 4(21/02/22 – 27/02/22): Alter component(implement)

- **Milestone:** Fully implement an algorithm to change a component

3.5 Week 5 (28/02/22 – 06/03/22): Algorithm evaluation

- Evaluate the written algorithm

3.5 Week 6-7 (07/03/22 – 20/03/22): GUI design

- Design the GUI
- Create a structure for the report
- **Milestone:** Fully implement GUI
- **Meeting: Thursday 12:00-12:30**

3.6 Week 8(21/03/22 – 27/03/22): Testing and evaluation

- Test and evaluating the entire system
- **Meeting: Thursday 12:00-12:30**

3.7 Week 9-10(28/03/22 – 10/04/22): Modify

- Modify the system according to the evaluation
- **Milestone:** Complete the core system functionality

3.8 Week 11-12(11/04/22 – 24/04/22): Desirable functions

- Alter the rest of the decomposed components
- Merges all changed decomposed components

3.9 Week 13-15 (25/04/22 – 12/05/22): Check & Report

- Final check of the entire project
- Finish the final report
- **Milestone:** Fully implement final report
- **Meeting: Thursday 12:00-12:30**