Image Processing Group Assignment Plan

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# Rubric

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **EXPECTATIONS**  **EXCEEDED** | **EXPECTATIONS**  **MET** | **EXPECTATIONS**  **NOT MET** | **NOT DONE** |
| **Research: Publications** | Up-to-date peer-reviewed publications  12 | Some research in the area  6 | Little Research done  3 | 0 |
| **Research:**  **Comparisons** | Comparison with other designs  4 | Awareness of existing designs  2 | Limited Comparisons  1 | 0 |
| **Research: Theory** | Explanation and application of theory  4 | Some theory outlined  2 | Theory is unclear  1 | 0 |
| **Research: Citations** | IEEE style citations of correct sources  4 | Some citations, not weblinks  2 | Incorrect citations  1 | 0 |
| **Design: Specifications** | Design fully meets all objectives  12 | Design does something useful towards the main objective  6 | Design does not meet specifications  3 | 0 |
| **Design:**  **Testing** | Tested on a variety of different inputs of the required type  8 | Tested on an input of the required type  4 | Not sufficiently tested  2 | 0 |
| **Design: Approach** | Design reflects a technical complexity beyond module content  4 | Design complexity is typical of module content      2 | Basic design    1 | 0 |
| **Design: Innovation** | Innovative compared to other approaches  4 | Implementation of existing approach  2 | Design lacks originality | 0 |
| **Presentation:**  **Knowledge** | Comprehensive knowledge of the area demonstrated  4 | Awareness of the area demonstrated  2 | Knowledge of area not demonstrated  1 | 0 |
| **Presentation:**  **Content** | Presentation is clear, engaging and entertaining  4 | Presentation is clear  2 | Presentation unclear  1 | 0 |
| **Presentation:**  **Discussion** | Significant contribution and insight in discussion  16 | Ability to discuss concepts demonstrated  8 | Limited participation in discussion  4 | 0 |
| **Blog:**  **Content** | Engaging blog with demonstrations of methods and ongoing research and results  16 | Some blog records kept  8 | Limited blog maintenance  4 | 0 |
| **Blog: Progress** | Project is well organised and progresses from week to week  8 | Some progress throughout  4 | Poor organisation. Little progress.  2 | 0 |

# ROLES

**Weekly Blogger**: Take note of changes, and progress and update the project blog to show progress each week

**Designer**: In charge of creating use cases, and the prototype design for the project and designing how they will be implemented.

**Lead Tester**: In charge of coming up with tests for unit testing, system testing, flow testing, etc

**Git Hub Manager**: In charge of managing the main branch of the git hub and overseeing permanent changes.

# PLAN

## RESEARCH PHASE:

* 3-4 Research Papers on Face Tracking, Feature Identifying, Race Identifying, and Clear Image Capturing
* Report Comparing the paper to our explanation of our Project outline and comparing what we can take from it or learn
* Use IEE citations

### Research Papers:

* Facial Detection Techniques: <https://www.researchgate.net/publication/326667118_Face_Detection_Techniques_A_Review/link/5db59d0a92851c577eca8abb/download> - Aaron Burton (Already Started Reading)
* Facial length and angle feature recognition for digital libraries: <https://www.researchgate.net/publication/382523599_Facial_length_and_angle_feature_recognition_for_digital_libraries> -
* Facial mesh tracking: <https://www.researchgate.net/publication/382419400_Formulating_facial_mesh_tracking_as_a_differentiable_optimization_problem_a_backpropagation-based_solution>
* Facial Feature Recognition with Multi-task Learning and Attention-based Enhancements: <https://www.researchgate.net/publication/384896369_Facial_Feature_Recognition_with_Multi-task_Learning_and_Attention-based_Enhancements>

BTW IF YOU DON’T THINK THESE RESEARCH PAPERS ARE USEFUL YOU CAN PICK ONE ON YOUR OWN ON RESEARCH GATE JUST BE SURE TO REFRENCE IT TO THIS DOCUMENT

### Research Competitors: Tony DJ

* List of competitors with similar ideas 5-10
* Reference the sources
* What features they have
* What can be improved

### Research Theory:

* Explanation of what the app is Aaron
* Why we are making it Aaron
* What it will be used for Aaron
* How it differs from competitors Tony DJ
* How it works Aaron
* How we made it Aaron

### Risk Assessment: Aaron Tony DJ

* Potential Risks
* Severity of Risks
* Mitigation of Risks

## Design Phase:

* Ensure all features are specified and identified
* Rank them from Easiest to Hardest, and Highest to Lowest on priority level
* Create a Use Case Diagram to ensure that all features are identified
* Create a Use Case Narrative to show how the interactions will be handled in each use case
* Create a Prototype for what we will be aiming to develop
* Determine the features to be developed by each person
* Create Testing Python files for each type of test
  + Unit
  + System
  + Flow
* Have a well designed and simple user interface (Be Creative something new but not overcomplicated)
* Create a use case narrative for the diagram

## Implementation:

* Database for user profile and login
  + Name
  + Password (Hashing)
  + Image (Face) (Encryption)
  + Features ID
    - Hair Colour
    - Skin Colour
    - Eye Colour
    - Face Shape
    - Facial Hair Colour
    - Piercing
      * No of Piercings
* Login Page
* Account Page – Details of Face along with changing password and uploading images
* Scan Page
  + Tracks Face
  + Takes Screenshot of Face pressing S
  + Reduces Noise in Image
  + Sharpens Image
  + Outlines Face
  + Identifies Features (Can use different functions for each feature)
    - Eye Colour
    - Hair Colour
    - Skin Colour
    - Face Shape
    - Facial Hair Colour
    - Piercings
      * No. of Piercings
  + Outputs Description of Face
  + Error Checking
    - Image not clear
    - Camera not turned on
    - Camera covered
    - Too Bright
    - Too Dark
* Design the UI for the Page to be integrated with the programs

## Testing:

* Unit Testing
* System Testing
* Flow Testing
* End-User Testing
* Co-designer Testing
* Debugging Code
* Fixing Any Errors

## Presentation

* Design Presentation Slides
  + Introduction
  + Why this Project
  + Our Research
  + Our Competitors
  + Design Process
  + Implementation Process
  + Testing Process
  + Libraries used
  + Sources of information
  + Feedback
* Ensure slides are clear and engage with class
* Be entertaining
* Show Significant contribution to each slide and work done

Functions:  
Read image:

Returns image (1 image at time)

Tk tinker

Read Video (extra):

Return Video file

Preprocessing Image:

Parameter frame

Resizing

Noise Reduction

Equalize Histograms / Enhance Contrast CLAHE

Normalization (Might not be needed)

\*UNSHARP MASKING\*

Vertical Alignments

Combine Frames (extra):

Parameter read in video frame

MotionBlur

CaptureROI (FACE):

Parameter preprocessed image

DivideQuadrants: (3 rows 1 Column of the image)  
E.G.

|  |  |
| --- | --- |
| Forehead | Q1 |
| Eyes | Q2 |
| Mouth | Q3 |

Detectbeard:

Parameter skin\_color, Q3

Compare average color of Q3

SkinColor functions:  
 Skin detection on Github

Show Image:

Parameters: Preprocessed Image

Show Video:

Parameters: Video file

While loop to iterate through frames