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| **Protein Analysis using Principal Component Analysis** | | |
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1. Business Case:
   1. A mobile application for using Principal Component Analysis (PCA) to visually represent similarity between proteins and their reaction trays. The program will allow users to create reference files, and compare input against those files using information taken from images taken with the mobile camera.
   2. To provide a cheaper alternative to using spectrographs to obtain this information, which are expensive and bulky.
   3. Working mobile app for Android.
   4. A cheaper alternative to lab equipment. The application runs on devices that students likely already have.
2. Project Scope:
   1. Tenative functionalities
      1. Take images of the protein trays
         1. Using these images select areas that information will be gathered, an area’s color will be averaged and used as a data point in an element representing the image.
      2. Using multiple images an instructor can create a reference file
      3. Students will be able to import reference files
      4. Students can compare images they take against the reference file
         1. Same process of image processing
         2. Will give a closest match and a % confidence in match metric based upon distance between input and closest reference point.
      5. The reference file can be visualized in 3D
      6. The reference file and user input can be viewed in 3D
   2. Environment/Platforms/Tools/Technologies:
      1. C# and Xamarin
         1. Used to create the mobile application
      2. Android
      3. Google Cloud Platform for PCA computations
   3. Expected deliverables
      1. Android mobile apps
      2. Processing core for cloud based computations(if time allows for this feature)
   4. Acceptance Criteria : Mobile application which can process images using PCA to create both reference files, and input results. PCA core is hosted on the mobile device. The information will be able to be viewed using graphs on the device.
   5. Tentative Deadlines:
      1. Our SRS document will be completed by September 14.
      2. Sprint 1
         1. Basic application interface + taking pictures
      3. Sprint 2
         1. Allow gathering of information from images
            1. Two methods

One for instructor who can multiple images

One for students who can take a single image for input

* + 1. Sprint 3
       1. Information gathered from instructor images able to be used to generate reference file
       2. Information gathered from student image able to be used to generate a result
       3. This will be using a PCA core hosted on the android device (may be slow)
    2. Sprint 4
       1. Graphical representation of the reference file’s data points + user input data point
    3. Sprint 5
       1. Host the PCA core on google cloud platform
    4. Sprint 6
       1. Touch ups and finalization
    5. December 12 our project will be completed and will be ready for the final demo.

1. Stakeholder Communication Plan:
   1. Team members
      1. All team members have already joined a slack group to handle text communications.
      2. This slack group will be where both group and specific member information is disseminated.
      3. Team members are expected to check slack at least once a day, preferably anytime between noon-5pm, to allow them to see any new information produced during the day.
      4. All documents will be hosted on a members google drive in a folder labeled “CSC 450 Protein Analysis”
      5. The code for the project will be hosted on a bitbucket repository
   2. Dr. Iqbal
      1. The team will be available before or after class, respecting other class times; and during class if Dr. Iqbal has any thing he needs to communicate to our team.
      2. Dr. Iqbal can also request to be shared the google drive folder and bitbucket access.
      3. Additionally all team members have university provided emails Dr. Iqbal can use to contact us.
      4. Dr. Iqbal can request access to our slack if he wishes to communicate to us or view progress being made.
   3. Keiichi Yoshimatsu
      1. Professor Yoshimatsu will have all of the same methods and access requests available to Dr. Iqbal.
      2. However the team members are unlikely to be able to meet Professor Yoshimatsu before, during, or after our CSC 450 class, in replacement Professor Yoshimatsu can request meetings via any channels provided above.

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| Approved by: | Date of Approval: |
| Comments: | |