

Root Access Project Definition Document

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AUTHORS

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VERSION HISTORY

Nov 2, 2019	1.0	Initial draft	Christopher McNeil, Dalton Overmyer, Thomas Abebe

APPROVALS

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1. PURPOSE

This Project Definition Document provides a brief overview of Root Access to promote a shared understanding of it before a more detailed Plan, Schedule, and Budget is prepared.

2. PROBLEM/OPPORTUNITY

In a research environment, a lot of time is taken up performing repetitive tasks to ensure that all data is processed in a thorough and consistent manner. If a program can be developed that automates these tasks, it will allow more time to be spent on furthering new research. In this case, the problem is being able to automatically crop many photos and perform an analysis upon cropped photos without a loss in the integrity of the analysis.

3. PROJECT GOAL

The goal for this project is to develop a MATLAB program that can automate a time intensive process and is able to perform the process as well as a human is able to.

4. PROJECT OBJECTIVES

Our primary objective is to create a MATLAB program that can automatically crop photos according to some criteria. Secondary objectives include but are not limited to: being able to crop batches of photos at once, automatically perform analysis upon all given photos, be able to provide scalability for future experiments.

5. PROJECT SCOPE

- Build a project website
- Define use case and functions
- Implement MATLAB solution
- Evaluate output against Human made test cases
- Integrate MATLAB solution into an automated analysis

6. KEY STAKEHOLDERS

- Dr. Geisler Lee
- Geisler Lee Laboratory
- Bardh Hoxha
- Root Access: Christopher McNeil, Dalton Overmyer, Thomas Abebe

7. OUTCOMES/SUCCESS CRITERIA

- This project must at a minimum be capable of automatically cropping images of root systems
- Should be able to perform as well as a human
- Should be able to perform automatic analysis of cropped photos

8. ASSUMPTIONS AND CONSTRAINTS

8.1 Assumptions

- No abnormalities will occur in photos
- Photographic methodology is consistent for all photos
- All roots grow in a similar manner

8.2 Constraints

- Must have output suitable for research purposes.
- Output must be at least as good as a human can do
- Time

9. RISKS

- Time risk due to an unknown workload from other classes
- Potential Scheduling issues for meetings due to group members having different class schedules

10. ESTIMATED DURATION

Jan 13, 2020 – May 1, 2020

11. FUNCTIONAL REQUIREMENTS

FR1: Image Upload
GOAL(S): FR1 provides functionality for the selection of a directory of pre-processed images.
DESCRIPTION: The user will click on a button and be prompted to select a directory from the users filesystem.

FR2: Image Submission
GOAL(S): FR2 provides functionality for the uploaded pre-processed images to be processed.
DESCRIPTION: The user shall click on a button and be prompted about the status of the processes/pre-processed images.

FR3: System logging
GOAL(S): FR3 provides the logging functionality for the user and also the admin.
DESCRIPTION: The system will log essential information while the images are being processed, like total pictures being processed, time elapsed, information about each processed image, etc. Also, past logs can be viewed as well.

FR4: Pausing Process
GOAL(S): FR4 provides functionality pausing the currently running program.
DESCRIPTION: The user will be able to click on a button to be able to pause the program from processing any pre-processed images.

FR5: Cancel Process
GOAL(S): FR5 provides functionality cancels the currently running program.
DESCRIPTION: The user will be able to click on a button to be able to cancel the program from processing any more pre-processed images.

FR6: Process Image View
GOAL(S): FR6 provides functionality to view processed images.
DESCRIPTION: The user will be able to view a window that shows the currently processed images.

12. NON-FUNCTIONAL REQUIREMENTS

NFR1: Directory Upload Limit
GOAL(S): NFR1 ensures that a certain number of images cannot be uploaded.
DESCRIPTION: The system will reject any images that are greater than the upload limit.

NFR2: Image Upload Type
GOAL(S): NFR2 ensures that a certain image type can be uploaded.

DESCRIPTION: The system will reject any images that do not follow a certain extension or size.

NFR3: Image Cropping Accuracy

GOAL(S): NFR3 ensures that images are cropped accurately.

DESCRIPTION: The system should set a high standard to image cropping and should resemble the likeness of what a human may produce.

NFR4: Image Processing Time

GOAL(S): NFR4 ensures that a single image should be processed in a reasonable amount of time.

DESCRIPTION: The system should be able to produce the images at a certain speed, so a large quantity of images can be processed in a timely manner.

NFR5: Image Altercations

GOAL(S): NFR5 ensures the original image cannot be altered in any way.

DESCRIPTION: The system should not be able to alter the original images uploaded by the user. The processed images should be placed in a separate location.

NFR6: Simple GUI

GOAL(S): NFR6 ensures that the application is simple to use.

DESCRIPTION: The user should not be able to struggle when having to use the application.

13. TECHNICAL REQUIREMENTS

14. USE CASES

15. DATA ELEMENTS

We are provided a file containing all JPG files needed for this project

Date: _____

Approved by: _____

Approver Signature:

Mentor Name:

Mentor Signature:
