Automated Data Acquisition System

Report Written by Mona Jalal
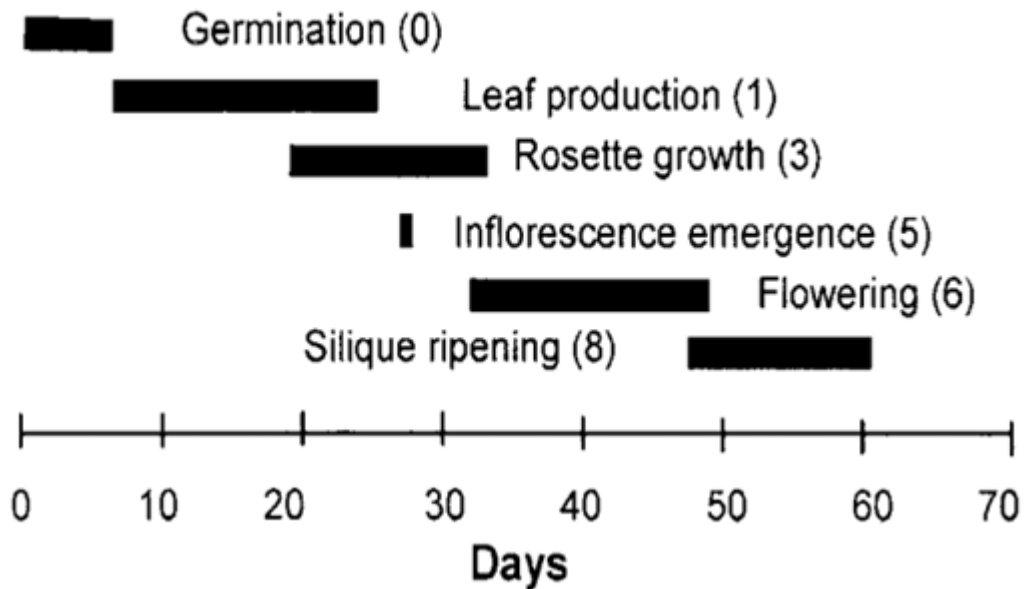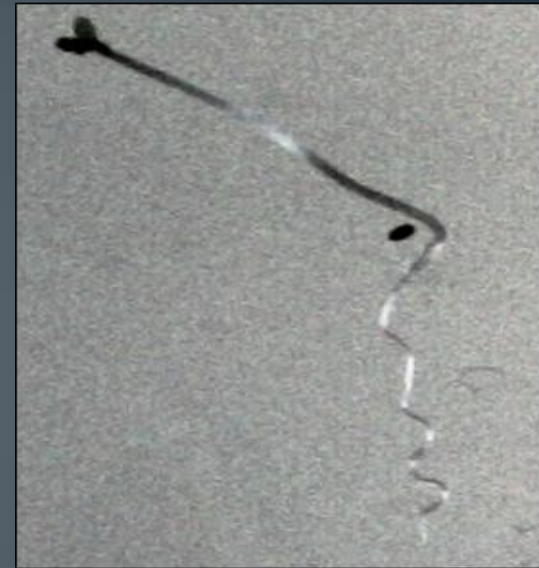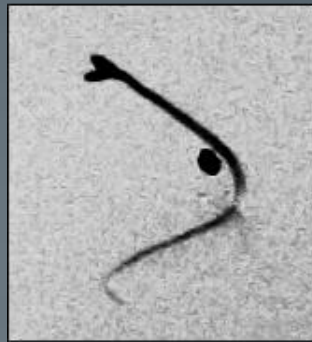
A member of Persepolis Research Group

Arabidopsis Thaliana

- The first plant genome to be sequenced
- Small size genome
- Popular tool for grasping Molecular Biology
  - Examples: Flower Development, Light Sensing
- Native to Europe, Asia and northwestern Africa
- An Annual (rarely biennial) plant
- Growing up to 20-25 cm tall
- A life cycle of 6 weeks

Different Stages of Arabidopsis Growth

Germination (0)

Leaf production (1)

Rosette growth (3)

Inflorescence emergence (5)

Flowering (6)

Silique ripening (8)

| 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |

Days

Automated Imaging System

- Taking raw images automatically from Arabidopsis plant
- Capable of changing raw images to TIFF format
- Completely parameterized
- Can be extended to other application else than plant imaging
- Including
  - A canon camera
  - Two robot arm (Horizontal and Vertical)
  - Step motor
  - A server
  - A case for petri dishes

- Camera goes to home position every time pressing start
- Works completely in a parametrized timely manner
- Taking n overlapping pictures from each petri dish in a sampleTime
  - For better image processing in upcoming phases
- Can run either in Repeated or Normal format
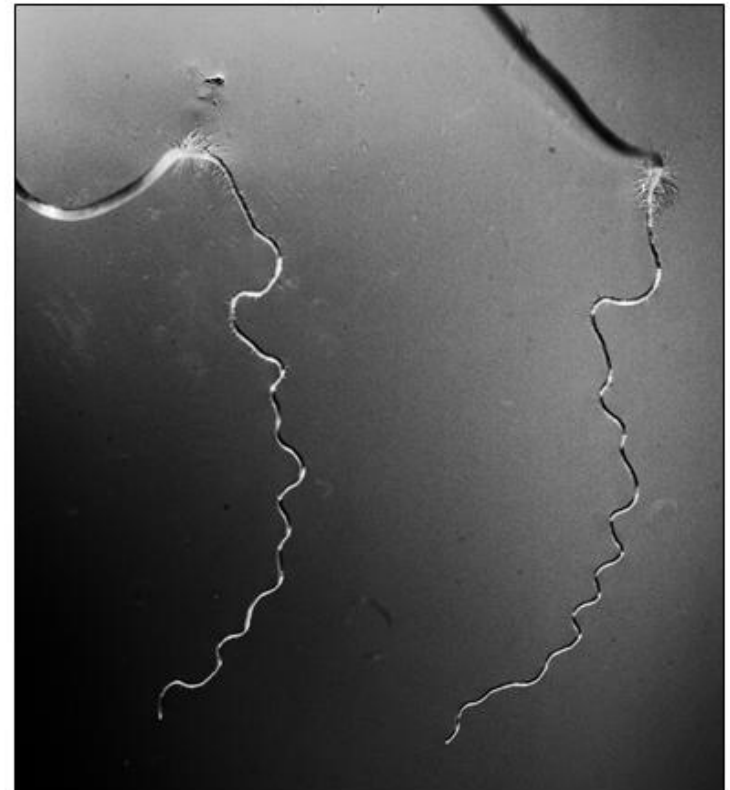- Wait for waitTime in Repeated format run in the home position
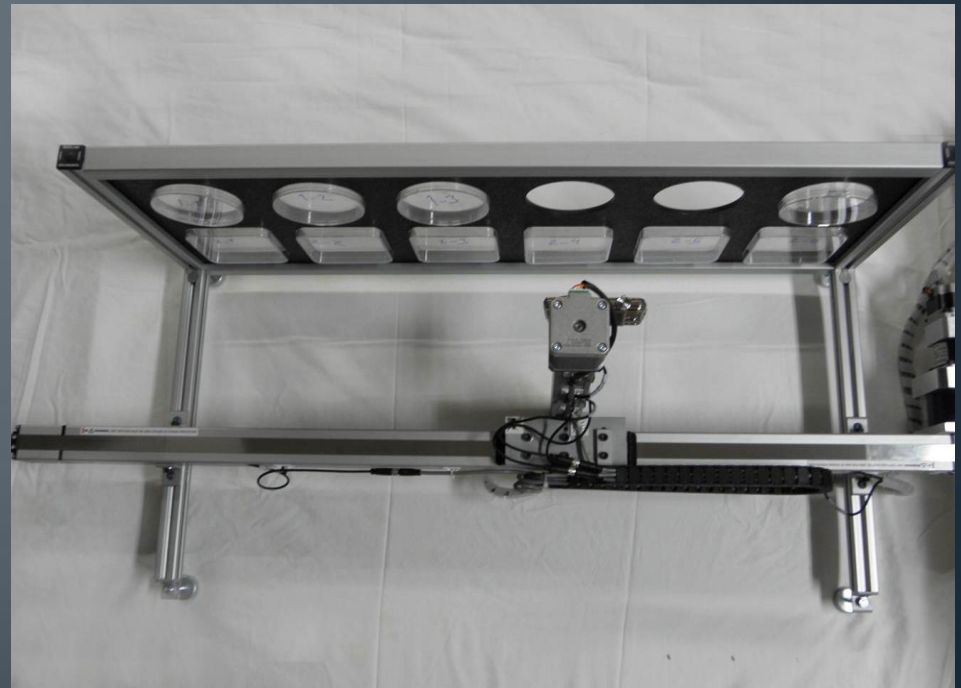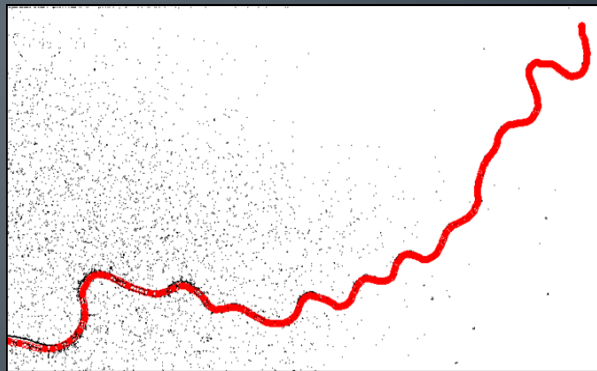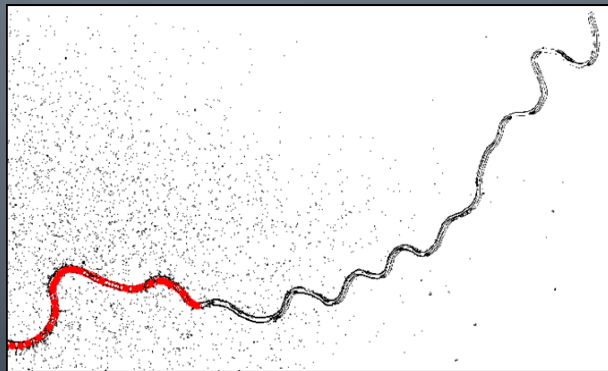
Raw Images and Processed Imaged

Trace Curve Algorithm

- Transforming .CR2 (RAW) images to .TIFF images
- Reducing noise by mean/median filters in MATLAB
- Changing the images from RGB to Grey color
- Using Sobel Algorithm in MATLAB for edge detection
- Running Trace Curve algorithm for finding the root

People Involved

- Arash Sangari

- Mona Jalal

- Alireza Fotuhi

- Hamisha Ardalani

- Ebru Selin Selen