Contents

1 Rotating the image to minimize

1.1 helper functions

1.2 getWH

- threshold the image
- get the roi
- get the bounds of the roi
- crop the image
- find its width and height

1.3 getAngle

- measure getWH at each rotation angle
- whole image is rotated using bilinear interpolation from imagej
- the rotated image is then passed through getWH
- compare the height of the image is smaller than the previous height keep rotating the image
- the idea is that the image with smallest height is the best aligned image
- this method only works for root systems which are wider than tall

1.4 lineExtent

- scan a line from left to right
- on the first black pixel that it encounters, set it to the left boundary
- on the last white pixel that it encounters, set it to the right boundary
- the lineExtent is the diff of these two numbers (+1)

1.5 getVolumeFromExtents

- calculate the volume by computing the area of the slice
- use lineExtent to get the diameter, then use it to compute
- d*d/4 * pi
- since each pixel is of height one, the volume is simply the accumulation of the all the areas above

1.6 getVolume

- same a getVolumeFromExtents but we rotate the image first
- this is necessary because the unaligned images have incorrect radial thinning as calculated with the volume from line extent