Automatic Photometric Analysis of Primula Seeds

Approach Draft:

One possible approach for achieving this objective would be to segment the seed foreground objects away from the background by utilising binarization, where the pixels representing a seed foreground object would be classified based on a pixel intensity threshold (Jin et al, 2015). The length and width properties of each seed could be identified through the use of edge-detection techniques, for example a Sobel filter could be utilised to establish an outline of the seed shape. An angularity property of the seeds will be established based on the observed roundness of the seed, this could be calculated with the following equation: , where R = roundness value, A = seed area, B = seed boundary. This angularity value could then be compared with the angularity values observed in the training dataset of seed images, and subsequently use this data to categorise the seed with a numerical value between 1 – 9. The colour of the seed could be established by comparing the seed pixel data with the training set samples, calculating the Euclidian distance between each sample to establish which sample is justifiably the most similar to the seed image. This could be achieved through a nearest-neighbour search algorithm using a similarity criterion.

Image Segmentation

K-Means Clustering

Watershed