Name Rebecca Tsekanovskiy

RIN 662038623

You need to fill out the two tables below and create histograms of the length and area of each image below the tables to receive credit. Be sure to add figure captions and take-home messages. Graphs should be made in R / ggplot with clear labels etc.

Fill out the below table for each image you analyze. Try to measure at least 10 cells within an image when possible. You may do more if time permits.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Image ID | Subject | Units | Scale Bar? (Y/N) | Scale Conversion | Metrics to measure |
| 36659 | Nucleolus | UM | Y | 0.25 | Length and Area |
| 19129 | Plant Cell Wall |  |  |  | Length and Area |
| 36630 | Protozoa |  |  |  | Length and Area |

We just measured many cells in each image. It is time to calculate summary statistics to characterize the size of cells in each image. Record your summarized measurements for length **AND** area below for each image below. Add more rows to the table as needed. You should be able to import data into R and then do calculations.

**HINTS:**

* You should have a data set for each cell image.
* I recommend reading each file into R separately.
* You should then filter data in R for length or area measurement. This is confusing because you get values for both metrics for every row. **Measurements of 0 length must be area.**  So, you can filter for area when the length column is equal to 0. For the length measurements, you cold filter by length >0.
* Now calculate your summary statistics and fill in the below table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Image ID | Metric **(length or area)** you should have two rows for each image | Units | Mean | Median | Standard Deviation | Minimum | Maximum |
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Copy and Paste graphs below. You want to make a histogram for each image one for the length and one for the area (two total for each image). Histograms give you an idea of the distribution of the data set. The code is similar to making a box plot, but this time use geom\_histogram(). In aes() you should make x = to your variable and you should not have a y variable.  See this resource to customize your histogram. <http://www.sthda.com/english/wiki/ggplot2-histogram-plot-quick-start-guide-r-software-and-data-visualization> Please include a figure caption and bullet point take away for each graph. Compare the size of each cell (length and area).