Commitment Document

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1 Accomplished tasks:

- Received images of Fluorescently-labeled neurons in culture, using a confocal microscope, from Prof. Baranes and Dr. Minnes.
- With the following images, we used the existing analysis technique, needed during image processing, involves semi-automatic approaches and some manual interventions, for measure the number of the dendrites to get an indication of the execution process in this manner.
- Collect theoretical material of segmentation, image processing and architecture of dendrites.
- Submission of abstract document.
- Learning Python Language and openCV library.
- In our first attempt, we choose to focus on a feature extraction technique used in image analysis with OpenCV libraries. We used Probabilistic Hough Line Transform that detect straight lines, and Canny Edge Detector Algorithm, that used to detect edges in an image while suppressing noise.
- Code: We used segmentation to distinguish dendritic branches from the image background through the following steps:
  - Blurring the image and turn it into a binary image.
  - Merging duplicates lines that marked to a single line.
  - Receiving database of the dendrites with their directions in space, coordinate and length.
  - Analysing the obtained information and calculating the prevalence of pairs, triplets, foursomes etc. of parallel dendritic branches.
- Create GUI with the QT Creator software:
  - Create an interface template.
- Create a poster project.

2 To be accomplish tasks:

- Writing a code simulation, based on simple combinatorics, of random growth to display the statistics of the parallel line groups that supposed to be.
- Comparing the results to the random statistic simulation with the program result, of the realistic biological conditions, to substantiate that there is indeed communication between the cells.
- GUI:
  - Linking interface's buttons to the function in the program code.
  - Displays information tables.
  - Adding option to export the results to an Excel file.
- Extra analysis:
  - Finding preferred angles relative to the image field.
  - Division lengths of lines for ranges.
- Improving the code of system aesthetically.
- Writing the project book.
- Submitting the final report.