Research Plan

Question Addressed: How can researchers use a mobile device to perform on-the-go DNA aligning procedures? And how can this be done in the most efficient way possible?

Goals/Expected Outcomes: The main goal of this research project is to create an iPad application to perform on-the-go DNA aligning procedures and to publish this application on the Apple App Store. Due to the weaker processors of iPads compared to those of computers, it is expected that the DNA aligning will take longer on the iPads.

Procedure: Using Objective-C (the language in which iPhone and iPad applications are programmed) and advance computer algorithms, I will develop an iPad application to efficiently perform DNA alignments in a mobile environment. Some of the algorithms used will include the Burrows-Wheeler Transform and computation of the Levenshtein distance of two strings. The results of the aligning will be able to exported through services such as Email and Dropbox.

Risk and Safety: There are no risks or safety hazards involved in this research project.

Data Analysis: In order to see the efficiency of the application, I will use the Instruments application made by Apple to record the CPU power and memory used while the app is running on a designated iPad. These measurements will be compared to measurements made when running the application on other generation iPads. For checking the accuracy of the alignment results, the results from the app will be compared to alignment results (for the same files using the same parameters) from trusted sources. To make sure my application’s results match the trusted source’s results, I will use the ‘diff’ command in Unix to view the differences (when the application is finished there should be none) between the files. Eventually, when the application is on Apple’s App Store, users will be able to review the application and provide feedback on how it performs on their own iPad.

Bibliography: