With the growth in new technologies, using online tools have become an everyday lifestyle. It has a greater impact on researchers as the data obtained from various experiments needs to be analyzed and knowledge of programming has become mandatory even for pure biologists. Hence, VTT came up with a new tool, R Executables (REX) which is a web application designed to provide a graphical interface for biological data functions like Image analysis, Gene expression data analysis, plotting, disease and control studies etc., which employs R functions to provide results. REX provides a user interactive application for the biologists to directly enter the values and run the required analysis with a single click. The program processes the given data in the background and prints results rapidly.

Due to growth of data and load on server, the interface has gained problems concerning time consumption, poor GUI, data storage issues, security, minimal user interactive experience and crashes with large amount of data. This thesis handles the methods by which these problems were resolved and made REX a better application for the future. The old REX was developed using Python Django and now, a new programming language, Vaadin has been implemented. Vaadin is a Java framework for developing web applications and the programming language is extremely similar to Java with new rich components. Vaadin provides better security, better speed, good and interactive interface.

In this thesis, subset functionalities of REX was selected which includes IST bulk plotting and image segmentation and implemented those using Vaadin. A code of 662 lines was programmed by me which included Vaadin as the front-end handler while R language was used for back-end data retrieval, computing and plotting. The application is optimized to allow further functionalities to be migrated with ease from old REX.

Future development is focused on including Hight throughput screening functions along with gene expression database handling

Keywords
Data Analysis, software tool, Vaadin, Java, R, VTT, web interface, REX2.