

Development of an integrative and interactive online platform for teaching of Bioinformatics-related courses

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Abstract:

Bioinformatics are an important interdisciplinary field that is intensively relying on cutting-edge tools, applications and resources. The department of Biomedical Sciences has several courses related to Bioinformatics such as 'BMS4001 Medical Informatics and Laboratory Management'. Although Canvas provides an efficient online system for coursework management, Bioinformatics-related courses request a more interactive platform with specialized functionalities that are currently not available at Canvas. The proposed project will aim to develop a more dedicated and customized integrative platform, with the following 3 objectives in 6 months:

1. Establishing a website with enriched studying materials. A research assistant will be hired to first develop a website framework with studying materials related to courses, introductory information about popular Bioinformatic tools such as software packages for analysis of microarrays and next-generation sequencing data. The website will also contain hyperlinks to important public databases such as the Gene expression Omnibus (GEO) and the Cancer Genome Atlas (TCGA). These resources will provide the students with enriched information in a very convenient platform so that they will be better guided during their study.
2. Developing an interactive user interface. Our second objective is to further develop a user interface for the students to access course-related resources that require computing facilities. Some Bioinformatic tools need powerful computing to backup, such as genome browser for visualizing sequence alignments. A user-interface with registration regulations will be an efficient approach to make sure that only students currently enrolled to relevant courses are using the computing resources.
3. Deploying tools for advanced Bioinformatics. For more advanced learning of Bioinformatics, deployment of programming packages to the platform is critical. Our third objective will be to install popular web-based tools such as Rstudio and Shiny. Students with strong interests in studying R programming will be encouraged to use these resources.

The online platform will be developed and deployed on the high-performance PC (HPC) in my laboratory. Since the system is platform-independent, it can be easily transferred/deployed to another computer server, e.g. a server at the CSE college or the university in the future.



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We will dedicate to provide a temporary system with basic information for students in 2017, and once the project is finished, students can fully benefit from the online platform. We believe the proposed online platform will greatly enhance the teaching of courses related to Bioinformatics, and will be a valuable system for students at CityU in the future.