

A Computational Platform for Gene Expression Analysis

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Outline

- 1 Introduction
 - Domain Problem
 - Motivation and Objectives
- 2 Developed Solution
 - Overview
 - RNA-Seq Analysis Pipeline
 - RBP Analysis Pipeline (PBS Finder)
 - Integration
- 3 Case Studies
 - RNA-Seq Analysis Pipeline
 - RBP Analysis Pipeline (PBS Finder)
- 4 Conclusions
 - Objective Fulfilment
 - Future Work
- 5 References

Domain Problem

Introduction

NOTES:

- Molecular biology is a new subject.
- Many unknowns.
- Gene expression is important...
- Two areas of interest of IBMC experts: differential expression and RBPs.

Motivation and Objectives

Introduction

Tools are complex

Tools for biological data analysis
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Gather information

Information should be contextually aggregated, allowing for quick access of relevant information.

- Two distinct problems warrant two different solutions.
- The developed system should be available anywhere, through the internet.
- The system's footprint should be small enough to allow deployment in almost any available hardware.

RNA-Seq Analysis Pipeline

Developed Solution

NOTES:

- Show scheme, refer iRAP, the script and the web interface.
- Refer multiple differential expression tools.
- Refer user input and tool configuration.

RBP Analysis Pipeline (PBS Finder)

Developed Solution

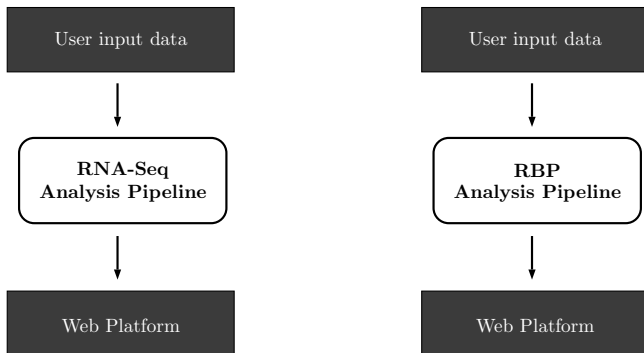
NOTES:

- Show scheme, RBP finding, gene enrichment, clustering.
- Refer web interface. - Refer that the tools is in production for several months, being extensively tested by experts.
- Refer user input and tool configuration.

Integration

Developed Solution

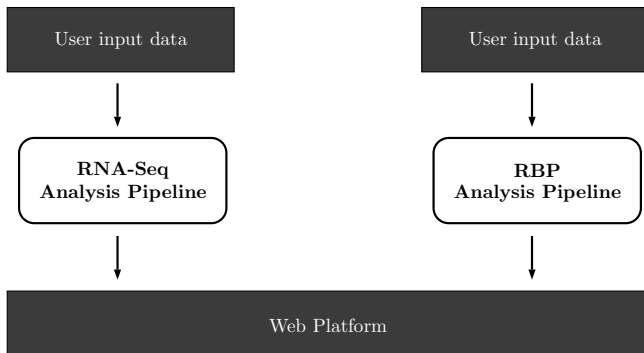
While focusing on aggregation and quick access to information, does it make sense to separate the results into two different platforms?



Integration

Developed Solution

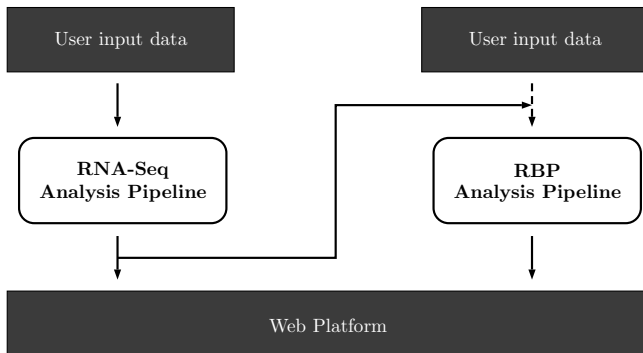
A list of differentially expressed genes is not very useful without further information about those genes. Does it make sense for a user to launch a new gene enrichment task by hand?



Integration

Developed Solution

A fully integrated solution: the analysis pipelines can be used separately or automatically executed in sequence; result visualization for both pipelines is isolated.



RNA-Seq Analysis Pipeline

Case Studies

NOTES:

- Refer objectives, data and experimental method.
- Refer results.

RBP Analysis Pipeline (PBS Finder)

Case Studies

NOTES:

- Refer objectives, data and experimental method.
- Refer results.
- Maybe show screenshot.

Objective Fulfilment

Conclusions

- RBP analysis pipeline and web platform (PBS Finder) fully implemented. PBS Finder has been in production for several months; during this time it was thoroughly tested by IBMC experts.
- RNA-Seq analysis pipeline partially implemented (iRAP deployed and result joining tool implemented).
- Integration of both tools could not be accomplished due to time constraints.

Future Work

Conclusions

- Fully integrate the RNA-Seq analysis pipeline with the web platform (automatic job configuration, result visualization, etc.).
- Study the requirements for deploying the platform in large scale, and assess the feasibility of making it available internet-wide.

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