



LEARN PYTHON & R FOR BIOINFORMATICS

Creation of Gene Structure using Gene Structure Display Server

Prerequisite Terminologies

Before proceeding to the topic, it is **strongly recommended** to have the good understanding of:

- Genomic Annotation Retrieval through Any Genome Browser
- Generic Model Organism Database
- Biological Sequence File Formats

Introduction:

Gene Structure Display Server (GSDS) is designed for the visualization of gene features, such as the composition and position of exons, introns, and conserved elements .etc.

Input

The input could be sequences, GenBank Accession Number (or GI), or features in BED/GTF/GFF3 formats. After inputting gene features, a high-quality image can be generated.

Feature Modifications

Shape and color for features can be customized by users and further modifying functions on figures are provided. To facilitate evolutionary analysis, a phylogenetic tree can be uploaded and added on the figure.

Purpose

The major purpose of the GSDS is to ease the Genome-Wide Association Studies. A genome-wide association study GWAS is an approach used in genetics research to associate specific genetic variations with particular diseases.

Steps

The basic steps to use the GSDS are given as:

- Browse the GSDS via any internet browser using the link <http://gsds.cbi.pku.edu.cn/> or you can just search via Google by type GSDS in the search bar.
- When we reach the homepage, we can see the text box and above this Input box we can see the selection bar that lets us to choose the type of the format of the sequence we want to analyze.
Note: The format can be a BED, GTF/GFF3, GenBank Accession Number (or GI) or FASTA sequence. It is better to avoid using FASTA sequence in order to avoid complexity.
- This Input box requires the sequence we desire to visualize and annotate on the GSDS. You can also just upload the sequence file saved on your computer that you want to analyze.
- Once you have given the Input Sequence click on the submit to start analyzing. The server will take few seconds to generate the results.
- The generated result be displayed in a graphical form and you can do the detailed analysis based on the nature of your work. You can change the orientation and visualization of the results according to your needs.
- You can also create the phylogenetic tree using the Newick Format if your work desire so. Moreover, a user-specified phylogenetic tree can be added to facilitate further evolutionary analysis.

Summary

In this tutorial, we have learnt to visualize and annotate the Biological Data using GSDS. We have utilized the basic operations on GSDS and how it can be used to create Gene Structure in GWAS.