Istituto di Informatica e Telematica

Consiglio Nazionale delle Ricerche

Bioinformatic Research at IIT: the Highlights

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Bioinformatics at IIT-CNR

- **Biological sequences analysis/classification**
  - Gene and microRNA expression data analysis
  - Motif and Tandem Repeat identification/extraction
  - Next generation sequencing: CNV detection
- **Diseases classification and gene expression profiling**
  - Biological networks (PPI)
  - Prediction of Genes/microRNA markers in Tumors
- **Web tools development**
  - for the analysis and visualization of biological sequences and Bio-networks (AMIC@, Core&Peel, Excavator2, Dot2Dot,..)

In collaboration with:
IFC - CNR, Pisa
Dept. of Computer Engineering , Univ. of Modena & Reggio Emilia

http://bioalgo.iit.cnr.it

Bioinformatics: focused projects

Recent Projects

- **Analisi del ruolo di alcuni complessi miRNA/mRNA nel tumore della prostata** .
  Funded by ***ITT (Istituto Toscano Tumori)***
  Partners: IIT e IFC

- **Eligibility of miRNAs modified by docetaxel in prostate cancer cells to plasma biomarkers in patients responsive and no more responsive to docetaxel.**
  Funded by ***ITT (Istituto Toscano Tumori)***
  Partners: IIT e IFC

- **REPEATALS: Analisi di sequenze tandem repeats polimorfici nella Sclerosi Laterale Amiotrofica (SLA) .**
  Funded by ***Arisla (Associazione italiana per la Ricerca sulla Sclerosi Laterale Amiotrofica)***
  Partners: IIT, Univ. Novara, ITB (Istituto di Tecnologie Biomediche, MI)

- **PRIN2015: "The role of tandem repeats in neurodegenerative diseases: a genomic and proteomic approach"**
  Funded by ***MIUR*** . Partners: IIT, Univ. Novara, U. Insubria.

Bioinformatics

Strategic Factors:

- **Strong links with Biologists (IFC CNR , U. of Eastern Piedmont, IEO Istituto Oncologico Europeo)**
- **Tuscany Bioinformatics Days – Bioinformatiha**
- Editorial Activity: **Special Issues** of Frontiers in Bioengineering and Biotechnology (Nature Group) .
- **M.P. Associate Editor of: *Frontiers in Genetics*** and ***BMC Cancer.***

Thesis Topics

- Algorithms for Long-reads Sequencing: Using Single-Cell Sequencing to Improve Structural Variants Detection in Clinical Practice

- Precision Oncology:

- Multi-Omics data Analysis for Biomarkers Discovery in Cancer Research
- Integrative Analysis of multi-omics data to study Tumor Heterogeneity

- Computational Genomics: Study of the impact of Genomic Structural Variations on dysregulation of coding and non-coding genes.

- Genomics and Informatics: Development of tools for Copy Number Variants annotation

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Thesis Topics

- - Tandem repeat and SV analysis in human neurological disorders
  - Integrated data mining methods for biological sequence analysis
  - Metagenomic sequence classification

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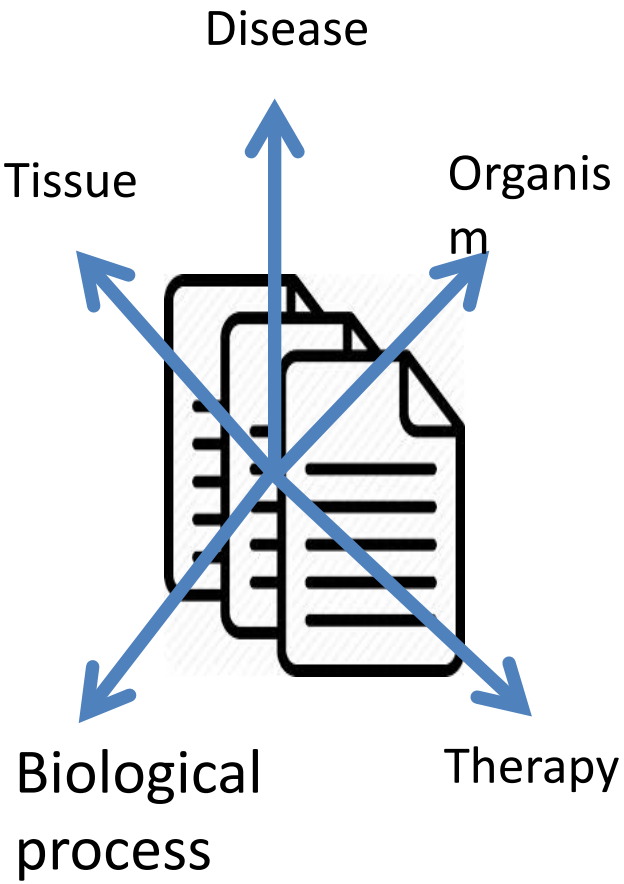
Information retrieval on biomedical documents



- Goals:
  - Use machine learning and AI to extract categorical information from biomedical texts
  - Use categorical information to build a social network of concepts
  - Extract new knowledge from the network
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Thesis Topics

- Network based drug repositioning.
- Detection of borderline CNV (small copy number variations) in cancer genomes.

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