Vivek Rai

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Interests

Computational Biology, Bioinformatics, Machine Learning, Sequence Analysis, and Systems Biology.

Education

Indian Institute of Technology Kharagpur Kharagpur, WB (2012-2017 expected)

- Bachelor's and Master's degree in Biotechnology and Biochemical engineering - **8.56 GPA** (up to sem IV),
- Pursuing Minor in Mathematics and Computing,
- **Ranked 2** in class of 50 students,
- Completed 2 additional courses with **8.5 GPA** out of 10.

Shree Jain Vidyalaya Kolkata, WB (Till 2012)

- Cumulative average of 93% & 80% in final high school and senior high school examinations respectively,
- **Awarded**: Best Student Award, Scholarship for 5 years of schooling during 2007-2012, etc.,

Work Experience

SequenceServer
Dr. Yannick Wurm http://github.com/yannickwurm/sequenceserver

- The project aims to provide biologists with an intuitive and easy to setup custom BLAST server to effectively query and handle large sequence data;
- Implemented **BLAST+** output parser module and back-end data-layer thereby improving application architecture, usability, and modularity;
- Designed graphical overview scheme for obtained hit information using **d3.js** (http://www.d3js.org), a Javascript visualization library, translates to over **70** commits and **4000** lines of code changes.

Sign Language Interpreter
Prof. P. Patnaik Apr, 2014

- Conceived and designed a gesture to text (or speech) application to interpret sign language gestures (non-motion) with a team of 4 people for aiding deaf and dumb people;
- Implemented image processing techniques to obtain noise free information from real time video; classified data into relevant clusters and predicted unknown information using **k-means clustering**;
- Exploring further possibility of providing service through chat applications or online widget/web based services.

Jigsaw Puzzle Solver
Prof. S.K. Barai Mar, 2014

- Studied different techniques based on **Genetic Algorithm** to solve large piece jigsaw puzzle (randomly shuffled pieces of an image); implemented mutation strategies; came up with an approach to use this technique to solve images with non unique components;
- Implemented the program entirely from scratch in C++ using OpenCV image processing libraries; could solve up to 1000 pieces.

Automated Torn Paper Mosaicing Mar, 2014

- Collaborated with team to develop and implement algorithms to digitally stitch manually torn paper pieces to reconstruct original one with minimal loss;
- Familiarized myself with Object Oriented Design pattern, **OpenCV** image processing algorithms (Canny, Douglas-Peucker etc.,), feature extraction and analysis techniques.

Coursework [1]

Term Paper

Comparison of Fuzzy Guided Gene Prediction Methods Supervisor: Prof. S.K. Barai

- Reviewed different state-of-art techniques to analyze and annotate whole organism's genome in an automated way to predict genes and other regions of interest;
- Discussed the future prospects and application strategies of **SVM, NN** learning and heuristic techniques (**GA, Fuzzy Logic**) as hybrid methods for better annotation of raw genomic data.

Core Courses (T)heory and (L)aboratory classes

- Cell and Molecular Biology (T/L)
- Microbiology (T/L)
- Genetics
- Biochemistry
- Biochemical, and Bio analytical Labs.
- Bioinformatics (T/L)#
- Protein Engineering#
- Probability and Statistics
- Statistical Decision Modelling
- Mathematics I & II

Additional Courses #To be completed by Spring 2015

- Discrete Structures
- Soft Computing Tools in Engineering

Skills

Laboratory Experience:

- Microscopy
- Aseptic Techniques
- Centrifugation
- Staining, Culture, and Isolation of Microorganisms
- Cell Fractionation
- Assay techniques
- HPLC, FPLC
- Spectrophotometry & Spectrofluorometry
- Gas/Column Chromatography
- Gel Electrophoresis
- DNA Amplification (PCR)
- DNA, RNA & Protein Isolation and Purification

Programming Skills:

Production Quality	Python (scipy stack), JavaScript, Ruby
Dabbled In	Haskell, C, R, BASH, Node.js, d3.js, LaTeX
Platforms	Linux (primary), Windows
Bioinformatics	BLAST+, Sequence Analysis, BioPython
Practices and Tools	Git, Scientific Computing, Design Patterns

Extra Curricular Activities

- Initiated and promoted campaigns to increase participation of students from village communities for further schooling on voluntary basis,
- Co-organized multiple hackathons, online coding competitions, a Google blogger challenge, and other activities as a member of official Google Students Club,
- Co-authored near 10 articles for *Alankar*, college's annual magazine for graduating students,
- Led a team of 6 people for participation in Inter Hall *Opensoft* competition, an annual software design competition,
- Contributed over **30 articles** and more than **1600 edits** to the English Wikipedia,[2].

[1] Online courses not mentioned

[2] http://en.wikipedia.org/wiki/User:Vivek_Rai