Vivek Rai

Undergraduate student at IIT Kharagpur
A303, LBS Hall of Residence
vivekrai@iitkgp.ac.in[1] https://vivekiitkgp.github.io

Interests

Computational Biology, Bio Inspired Artificial Intelligence, Sequence Analysis, Machine Learning and Analytics.

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**,
- Pursuing Minor in Mathematics and Computing,
- **Ranked 2** in class of 50 students,
- Completed 2 additional courses with **8.5 GPA**.

Shree Jain Vidyalaya Kolkata, WB (Till 2012)

- Cumulative average of 93% & 80% in final high school and senior high school examinations respectively,
- Class Topper for entire duration during schooling,
- **Awarded**: Best Student Award, Scholarship for 5 years of schooling during 2007-2012, Hindi *Sahitya Pratibha Puraskar* 2010.

Term Papers

Comparison of Fuzzy guided Gene prediction Methods Guide: Prof. S.K. Barai, Mar 14

- The paper compared 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,
- Studied the application and future prospects of different machine learning and heuristic techniques like Genetic Algorithm, Neural Networks, and Fuzzy theory for gene annotation and classification.

Coursework

Core Courses T/L indicates Theory and Laboratory classes

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

Additional Courses #To be completed by Spring 2015

- Discrete Structures
- Soft Computing Tools in Engineering

Open Source Experience https://github.com/vivekiitkgp/

SequenceServer https://github.com/yannickwurm/sequenceserver

- Worked with parsing and storing of the **BLAST+** output information and creating a backend data-layer for improving the overall application architecture, navigability, and modularity.
- Designed graphical overview scheme for obtained hit information using **d3.js** (http://www.d3js.org), a Javascript visualization library,

[1] Alter: vivekrai.iitkgp@gmail.com

Projects

Sign Language Interpreter
Collaborated project — Guide: Prof. Priyadarshi 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 with 90% accuracy using **K-means clustering**,
- Exploring further possibility of providing service through chat applications or online widget/web based services.

Jigsaw Puzzle solver
Collaborated project — Guide: Prof. S.K. Barai (Mar, 14)

- Worked and explored different techniques based on **Genetic Algorithm** to solve large piece jigsaw puzzle (randomly shuffled pieces of an image); implemented mutation strategies,
- Co-developed program entirely from scratch in C++; Used OpenCV as image processing library; could solve up to 1000 pieces in reasonable time.

Automated Torn Paper Mosaicing
Collaborated project — (Mar, 14)

- Developed and implemented algorithms to digitally stitch manually torn pieces of a document to reconstruct original one with minimal loss of information; could stitch images up to 8-10 pieces.

Skills

Laboratory Skills

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

Programming Skills

Production Quality (> 2000 lines)	Python (scipy stack), Javascript, C
Dabbled In (< 2000 lines)	C++, Ruby, R, BASH, d3.js, LaTeX
Platforms	Linux (primary), Windows
Bioinformatics	BLAST+, Sequence Analysis, BioPython
Practices and Tools	Git, Scientific Computing

Extra Curricular

- Initiated and promoted campaigns to increase participation of students from village communities for further schooling on voluntary basis.
- Coorganized and mentored multiple hackathons, online coding competitions, a Google blogger challenge, and other activities officially sponsored by Google,
- Coauthored numerous articles for *Alankar*, college's annual magazine for graduating students,
- Lead 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]
- Secured Merit-cum-means scholarship for 2 consecutive years by IIT Kharagpur.

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