| Examination | University | Institute | Year | CPI/ % |
|---|---|---|---|---|
| Intermediate/+2 | Bihar Board of secondary Education | V. M College | 2010 | 73 |
| Matriculation | CBSE | P.P Public School | 2008 | 91.8 |

## Academic Record

- Selected for Indian National Physics Olympiad(INPhO) and secured state wise **Top 1%** in National Standard Examination In Physics(NSEP) [Feb '10]
- Selected for Indian National Astronomy Olympiad(INAO) exam and placed in **Top 1%** in the state [Feb '07]
- Awarded certificate of Merit for getting 93% in Circuits and Electronics, 16 week online course offered by Massachusetts Institute of Technology(MIT) [Apr '12 – Jul '12]
- Secured All India Rank 117 and 120 (State Rank 1) for two consecutive years, 2007 and 2006 in National Science Talent Search Examination
- 1st prize in Matholympics (a math based competition) conducted by the Math and Physics club of IITB in 2011

## Lead Programmer, FloatPage

- FloatPage (https://www.floatpage.com)
- A categorical (with anon, private and public) social network which enables users to float, read and discover resources. Users can build their own online resources and search other users' resources as well
- Developed the backend **APIs in PHP**, front-end libraries in **JavaScript, AJAX**. **JSON** as data-interchange format and **MySQL as Database** have been used

## Android Apps

- **Gluon:**
- An application of Java **multithreaded networking and Socket programming**. Users connect to its instant neighbours by tracing people connected to the same Wi-Fi network. The App recognizes people in a local network and let them interact instantly without any login/signup required
- Server implementation in **Java**
- **Tachyon:**
- Monitors user's location and pin all the captured images within two mile at a single marker on **Google Map**. Markers get updated every two mile, thus creating Travel-Cum-Photo map.
- Clicking on a marker displays all the previously captured images around that location. Server in **PHP**

## Dual Degree Thesis

*Prof. Nikhil Karamchandani, Prof. Kumar Appaiah* [Apr '15 – Present]

- **Development of Client-Server architect based on Coded-Multicast Caching in Java**
  - Design of placement and delivery phases such that the load of the shared link in the delivery phase is minimized using a single coded multicast transmission
  - Implementing a **Decentralized Coded Caching Algorithm** to reduce network traffic during peak-traffic times

## Major Projects (Reports and Codes: *http:// homepages.iitb.ac.in/~alokkumar*)

- **Face Recognition Algorithm based on 2D Gabor Wavelet Transform** [Apr '15]
  *Prof. Vikram M. Gadre*
  - Developed a "Face Recognition Algorithm" based on the Gabor Wavelet Transform in **Python**
  - Gabor Wavelet having different scales and orientations constitute a filter bank. Applied these filters on a Training data set to get the "Features vectors" for the pattern recognition
- **Adaptive Filters repository in Python** [March '15]
  *Prof. Kumar Appaiah*
  - Implemented Noise-Cancellation filter, and Kalman and Weiner filters using adaptive algorithms
  - Implemented Least Mean Square adaptive filter using method of steepest descent
- **Interference Alignment and Channel Capacity | Supervised Research Exposition** [Feb '15]
  *Prof. Kumar Appaiah*
  - Conducted an extensive survey on Interference Alignment, an approach widely used in **Distributed File Storage Systems** like Hadoop, BigTable
  - Analysis of MIMO broadcast and MIMO multiple-access channel using interference alignment. The recent approach of interference alignment in MIMO system have shown radical result in channel capacity with increase in number of users
- **3D reconstruction of scene from 2D images** [Feb '15]
  *Prof. Subhashis Chaudhuri*

- ➢ **Python** implementation of stereo matching algorithm to construct depth map from two stereo images. Implemented **SIFT algorithm** for local features extraction and correspondence matching based on correlation
  - ➢ Implemented shape from shading algorithm to recover surface shape from a single image. The algorithm uses regularization technique and functional minimization
- **Ordered Binary Decision Tree(OBDT)** [Nov '14]
  *Prof. Sachin Patkar*
  - ➢ Wrote **JavaScript Code** for reduced form of OBDT(ROBDT) using Shannon Expansion Theorem
  - ➢ Implemented "Reduced Binary Decision Tree" data structure for computation of Boolean expressions and comparison of values of two logical expressions in less than exponential time order
- **Edge detection and edge linking of an image** [Dec '14]
  *Prof. S.N. Merchant*
  - ➢ **Matlab** implementation of Canny edge detection algorithm
  - ➢ Implemented edge linking and boundary detection algorithm using Hough transform. (Only edge detection yields edges with breaks due to noise, non-uniform illumination and other effects)
- **Design and Implementation of Costas Loop** [Dec '13]
  *Prof. Jayanta Mukherjee*
  - ➢ Worked on the recovery of "carrier phase" from suppressed-carrier modulation signals, such as from double-sideband supressed carrier signals
  - ➢ Designed these blocks for Costas Loop: Mixer(to achieve multiplication of Analog Signals), Phase shifter circuit (to get 90 degree phase shift), Sallen-Key based Low pass filter, VCO and Non-inverting Amplifier with variable gain
- **Mathematical Expression parser** [July '12]
  *Prof. A.Ranade*
  - ➢ Wrote code in C++ for a mathematical expression parser
- **Hardware Tic-Tac-Toe Game** [Apr '13]
  *Prof. Sourabh Lodha*
  - ➢ Created 'Tic-Tac-Toe' game, using Digital Circuit, and displayed the game on LED matrix

# Technical activities
- Working on **IITB official App,** and IITB Community Network portal with IITB Developer Group
- Developed a chrome app, **TabPocket**, to save tabs for later use. The app let you create a use and throw bookmark, helping you maintain a list of tabs for future reference
- Wrote a multithreaded **python chat server** and client and developed GUI in TKinter

# Technical Skills
- Programming languages: C/C++, Java, Python, PHP with MySQL, JavaScript, **Erlang**, 8085 Assembly
- Packages: NumPy, SciPy, TKinter, SciKit, Scilab, Matlab, Latex

# Relevant Courses
- Signal processing: Adaptive Signal processing, Wireless & mobile communication, Wavelets, Estimation and Identification, Digital Image Processing, Digital Signal Processing, Signals and Systems
- Mathematics: Applied Linear Algebra, Probability & Random Processes, Matrix Computation, Data Analysis And Interpretation, Games and Information, Quantum Mechanics
- Computer Science: Advanced Computing for Electrical Engineering, Computer Vision, Foundation of VLSI CAD, Digital Image Processing, Computer Programming and Utilization

# Position of Responsibility
- Coordinator of Green Campus, a part of **National Social Service, IIT BOMBAY**
- Selected as Teaching Assistant for **Signals and Systems**, responsible for conducting tutorials, evaluation of assignments and examination-scripts of more than 50 students
- Worked as a Co-ordinator for the event Media Ethics and Journalism,(Mood Indigo 2012 ) inviting top journalists of India for panel discussion

# Extracurricular Activities
- Worked at Spanedea, an online coaching classes in winter 2013
- Volunteer of Group Rural Activity, a part of NSS-IIT BOMBAY, in my 1st year
- Pursue algorithmic programming as a hobby, passionate about products based on Machine Learning, game development and design