Pankaj Kumar **120040112**
Civil Engineering **U.G. Fourth Year (B.Tech)**
Indian Institute of Technology, Bombay **Male**
Specialization: Civil **DOB: 01/11/1994**

Examination	University	Institute	Year	CPI%
Graduation	IIT Bombay	IIT Bombay	2015	7.85
Intermediate/+2	Sri Guru Teg Bahadur Public School	Sri Guru Teg Bahadur Public High School	2012	84.80
Matriculation	Modern Senior Secondary School	Modern Senior Secondary School	2010	84.80

Academic Achievements

- Top **68th** in final level of **IOM**(International Olympiad of Mathematics) **2012**
- Selected in 3-day camp for Regional Olympiad of Mathematics(**RMO**-2011) held at Punjab University
- Pursuing **Honor**s in Civil Engineering and **Minor** degree in **Geo-informatics** in CSRE
- Secured All India JEE Rank 1387 from amongst 0.5 million appeared students **2012**
- Presented paper on '**Despeckling Radar Images using Stochastic Methods**' in 7th National Civil Engineering Student's Symposium, 2015

Key Research Projects

Undergraduate Thesis — Ongoing

*Estimating Vehicle location through crowd sourcing| **Intelligent Transport System*** — *Prof. N. R. Velaga*

- Proposed and implemented a new Particle Filter algorithm on GPS data
- Formulated **real time tracking algorithm** to precisely locate vehicle using **Sequential Monte Carlo** method and estimated the accurate position of vehicle using its variance in statistical parameters of real time **GPS** data from 3 mobile sources for 15 different routes by using **Gamma distribution** fit curve for newly estimated positions
- New algorithm works **21%** more accurate position with **less divergence** from crowd-source data
- Wrote a paper on research and planning to send it to '**IET Intelligent Transport Systems**' journal for publishing

Winter Project — Winter 2014

Image Processing using Stochastic Methods — *Prof. Avik Bhattacharya*

Awarded a letter of recommendation for exceptional work

- Proposed and implemented a new non-linear thresholding technique for filtering the images using existing **Stochastic methods** for depreciating noise in image and improving its adaptiveness for multispectral images
- Analyzed the performance of new technique on **Radar images** using various families of waveforms; analyzed the performance factors using various references filters e.g. Wiener, Lee, Enhanced Lee, LLMNSE wavelet shrink

Summer Project — Summer 2014

Machine Learning Techniques for Predicting Rainfall — *Prof. Raaj Ramsankaran*

- Analyzed the utility of **Artificial Neural Networks** for estimation of rainfall using satellite data
- Modelled rainfall values for temperature parameters from three different satellites and used the support vector machine(**SVM**) technique to classify the image pixel data in **Rain/No-Rain pixels** from the given rainfall values and cross checked the efficiency with backpropagation method

Mini Project — Ongoing

Predictive Spatio-Temporal Query Processor — *Prof. P. Venkatachalam*

- Predicting Future Location using Markov Model (**PFL-MM**) is proposed for improving precision of vehicle route prediction; Transition Probability Matrix (**TPM**) is created for different time period and updated iteratively with the new real time data
- Proposed model incorporate traffic and road conditions impact in the form of travel time; Simulated data is taken and compared with the existing location prediction model; proposed model predicts the location of moving objects in real-time with improved prediction accuracy

Course Projects

Centre For Resource Science and Engineering (CSRE)

- Courses: Remote Sensing and Image Processing, Introduction to GIS, ARC-GIS Lab, Land use Planning

Web Based GIS Application	• Created user interactive Web-based GIS tool using Postgresql (Post-GIS) to map soil and population density of India and added options of zoom in/out, screen divider
Urban sprawl	• Carried out Paper Review of "**Urban sprawl: metrics, dynamics and modelling using GIS**" and suggested improvements in methodology: using of method of moments for MLE, generalizing the methodology for Non-linear distribution.
Rail link project: A case study	• Carried out a detailed study of "**Kashmir Rail Project**" from different sources and papers and provide some possible changes for the improvement of the Quazigund-Baramulla link of the whole track.
Plant phenotyping	• Studied about destructive and Labour-Intensive limitations of phenotyping "image-based Phenotyping" and effective field-based high-throughput phenotyping platforms (HTPPs) and proposed a new solution for indian conditions

Civil Engineering Department

Continuous Flow Intersection Prof. Avijit Maji

- Assessed the pros and cons of introducing a continuous intersection in place of already existing round about for Indian traffic conditions with respect to a specific trisection in Kochi
- Developed and simulated a model to restructure the traffic flow using simulation software VISSIM

Pattern Analysis of GPS data Prof. N. R. Velaga

- Analyzed the temporal patterns of Bus - tripwise, hourly, daily, weekly for Maximum demand periods, least demand periods using GIS tool ARC-GIS
- Analyzed spatial patters Bus to identify communication problem locations, high speed locations, high delay locations and for Taxi - the maximum attraction points, maximum demand locations

Internships and Professional Experience

IFMR Capital (Financial Firm)| Risk Analyst Summer 2015

Designed and Implemented interactive Business Intelligence product

- Created a platform for Informed Decision Making using analysis tool – Pentaho and quantified firm's Exposure across various dimensions: **Portfolio at Risk** and **Days Per Due**
- Built **MySQL** data-base for automating retrieval and transfer of data to the tool
- Analyzed the process of risk traction by the risk team and automate the process by making online risk management tool for the effective working of the sales as well as corporate section of the company
- Estimated Risk by tracking **real time transaction** performance across a spectrum of different class and product

QUARKCITY Pvt. Ltd|Field Engineer Trainee Summer 2013

- Analyzed the enabling and major technological packages involved in Quarkcity's newly planned High rise building with specific focus on concreting and foundation works
- Studied important factors taken in consideration while planning Interior section of newly built floor
- Optimized the construction duration by using various project management techniques

SAMWAD (Social Club): Convener Jul'13-Dec'13

- Planned for Hangouts on various social inclined issues: Politics in India, Telangana issue, Rape: reasons-effect
- Coordinated in Institute's first ever Social Fest '**Abhyuday**'

Initiatives:

- Conceptualized and executed Voting Campaign- with turnout of around 400 students
- Improved social surmise by board representation of '**what India needs**' made by fresher's(2013)

Hostel2: Speaking Arts Secretary Jul'13-Apr'14

- Headed the Debate team of Hostel in JAM general championship and secured 2nd place
- Organized a series of 7 debating workshops with help of Institute's Speaking Arts Club

Technical Skills

- **Languages & Software:** Auto CAD, ARC-GIS, R, C++, Python, Digital Image Processing, OpenCV, Matlab, EGSAR
- **Key Department Courses:** Structural Stability, Construction Management, Numerical Methods, Advanced Solid Mechanics, Design of Structures I&II, Transportation engineering, Traffic Modelling and behavior
- **Key Non- Core Courses:**
  Coursera: Introduction to Marketing, Introduction to Operation, Supply Chain and Logistics, Game Theory using Combinatorics
  Management Courses: Macro Economics, Calculus, Linear Algebra, Developing Innovative Ideas for New Companies, Industrial Economics, Data Analysis and Interpretation

Extra Curricular Activities

Social	• Donated Blood twice in blood donation campaign organized in the institute • Organized **Satyamev Jayate** screening with **Aamir Khan**, telecasted by StarPlus • Guided people living in slum(phule nagar) about '**Swachh Bharat Abhiyan'** as course project
Cultural	• Awarded Hostel Color for Performing Arts Festival(**PAF-2014**) as part of Production Team • Secured **3rd** State rank in International Olympiad of English Language • Won second prize in GK quiz competition in **Kshitij**, college festival of Thapar Univeristy
Other	• XLR8 1.0 Mentor: Led 3 freshmen teams throughout the remote controlled car making event • Second best team in hostel in Line Follower Car Making Competition and Won Rs. 500/- prize • Familiarize about latest Technology used in BIM and GIS in **Bentley Advantage Seminar V8i**