

# Ankit Kumar

STUDENT · M.TECH

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*"Necessity is the mother of invention."*

## Education

### Indian Institute of Technology, Kanpur

Kanpur, India

M.TECH IN COMPUTER SCIENCE AND ENGINEERING

July 2015 – June 2017

- Area: Type Theory
- Advisor: Dr. Anil Seth
- CPI: 8.67/10
- Courses: Type Theoretic Foundations of Programming Languages, Programs Proofs and Types, Category Theory, Functional Programming, Mathematics for Computer Science, Finite Automata on Infinite Inputs, Principles of Programming Languages, Design and Analysis of Algorithms, Online Learning and Optimization

### Indian Institute of Technology (BHU), Varanasi

Varanasi, India

B.TECH IN ELECTRICAL ENGINEERING

July 2006 – May 2010

- GPA: 7.94/10

### Delhi Public School

Dhanbad, India

SCHOOLING

- 12th Board (CBSE 2006): 89.8%, awarded proficiency in Physics by CBSE board
- 10th Board (CBSE 2004): 92.2%, awarded proficiency in Maths by CBSE board

## Research Projects

### Polymorphic extension of a language combining proofs and types

Kanpur, India

M.TECH DISSERTATION

Oct 2016 - May 2017

- Worked on extending the LTheta language proposed in Casinghino et al's MSFP 2012 paper "Step-Indexed Normalization for a Language with General Recursion" with polymorphic types under Dr. Anil Seth.
- We proved type safety of the programmatic fragment and normalisation of the logical fragment of the extended language.
- The results from this work have been submitted to APLAS 2017 titled "Step-Indexed Normalization for a Language with Impredicative Polymorphism and General Recursion".

### Mechanizing the Metatheory of TAL-0 Language

Kanpur, India

COURSE PROJECT

Aug - Nov 2016

- Mechanized the proof of soundness of the TAL-0 type system in Coq. TAL-0 type system was introduced by Greg Morrisett in his paper Typed Assembly Language. This project was undertaken as part of Programs, Proofs and Types course taken by Prof. Piyush P. Kurur.  
Project repository: <https://github.com/ankitku/TAL0>

### Optimizing Non-decomposable Performance Measures in On-line Active Learning Setting

Kanpur, India

COURSE PROJECT

Jan - Apr 2016

- Theory project in which we tackled the problem of classification in extreme class imbalance in an active learning setting. We setup Narasimhan et al's stochastic primal-dual solver (SPADE) algorithm with selective sampling and derived bounds on sampling complexity and regret. This project was undertaken under the guidance of Prof. Purushottam Kar, for Online Learning Course in the second semester.  
Project Report: <https://gist.github.com/ankitku/4074778f81b0f1a84b0d0ba408da25cc>

### LambdaJudge

Kanpur, India

COURSE PROJECT

Aug - Nov 2015

- Wrote a library to easily host Haskell based programming competitions, in Haskell, as part of the functional programming course taken in first semester.  
Hackage link: <https://hackage.haskell.org/package/Lambdajudge>

### Interpreter in Oz

Kanpur, India

COURSE PROJECT

Aug - Nov 2015

- Implemented an interpreter for a language following the declarative sequential model in Oz language. Some features of this language include variable creation, variable binding, if-then-else, records, pattern matching, procedure calling and application and multi-threading. This project was done as part of Principles of Programming Languages course.  
Project repository <https://hub.darcs.net/ankitku/MozartHW>

## Teaching Experience

### IIT Kanpur

TUTOR

Kanpur, India

Aug - Nov 2016, Jan - Apr 2017

- As a tutor for the course Esc101 titled "Fundamentals in Computing", my duties included taking course lectures, setting lab problems and clearing doubts. I was selected to continue as tutor for the next semester (Jan-Apr 2017) as well.
  - In Jan - Apr 2017, under the guidance of Prof. Rajat Mittal and Prof. Sandeep Shukla of CSE Dept., we tutors teamed up to record lectures for the Esc101 course in Hindi, and upload them to the online courses link of IITK. Hence students who face trouble attending lectures in English in class can refer the same lectures in Hindi on the online courses website.
- Link to one of my lectures : <https://youtu.be/IReBFFx1PBE>

## Professional Experience

### Olacabs

SDE II

Bangalore, India

September 2012 - November 2013

- Rewrote the second version of Olacabs android consumer app.
- Performance enhancement of the Olacabs driver app which sends the location of cab to backend services.
- Worked on cashless payment and online wallet systems.
- Skills: Android, Ruby on Rails, shell, mysql, mongoDB

### Morgan Stanley Advantage Services

ASSOCIATE

Mumbai, India

August 2010 - September 2012

- Worked on updates and maintenance of Third Party Derivatives trading platform, and rolled it out to new markets by making the code region aware, modular and pluggable.
- Developed an app that could visualize data in large xml files, validate them against their schema files and identify cross linking between two xml files.
- Skills: Java EE, Spring, C#, Hibernate, shell, Sybase

## Publications

### Step-Indexed Normalization for a Language with Impredicative Polymorphism and General Recursion

Suzhou, China

SUBMITTED TO APLAS 2017

November 2017

- Authors : Dr. Anil Seth and Ankit Kumar
- Based on results obtained from my Master's thesis on extending a language combining proofs and programs with polymorphic types

## Awards and Achievements

### Pin-Bhabha Pass trek

16000FT

Bhabha Pass, H.P. India

July 2016

- Successfully completed 7 day trek organized by the Adventure Club at IITK.
- My experiences : <https://ankitku.github.io/posts/2016-08-02-BhabhaPassTrek.html>

2013 **First Prize**, Hacknight at Droidcon India

Bangalore, India

2013 **Third Prize**, Tnooz THack

Bangalore, India

2009 **Third Prize**, AnaDigix, Sparx IIT (ISM), Dhanbad

Dhanbad, India

2005 **Second Place**, All India Erore Scholarship Exam

Dhanbad, India

2004 **Third Place**, Regional Mathematics Olympiad, Chhotanagpur Mathematical Society

Bokaro, India

2000 **State Level Winner**, Amul-cheese boy and butter girl contest, Surabhi

Anand, India

## Conferences Attended

2017 7<sup>th</sup>, Indian Conference on Logic and its Applications and Methods for Modality Workshops

Kanpur, India

## Skills

<b>Programming</b>	C/C++, Java, Ruby, Haskell, Coq
<b>Web</b>	Android, Ruby on Rails, Haxyll
<b>Languages</b>	Hindi, English
<b>Others</b>	Git, Tex