# Tushar Gupta

4th Year Undergraduate Student
**Major** : Dept. of Chemical Engineering
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## Academic Qualifications

| Year | Degree/Certificate | Institute | C.G.P.A / % |
|---|---|---|---|
| 2013 - Present | Integrated Dual Degree [B.Tech+M.Tech] | Indian Institute of Technology Kharagpur | **8.5 / 10** (upto 6th semester) |
| 2013 | Class XII Board (CBSE) | St. John's Sr. Sec. School Kota | **94.8 %** |
| 2011 | Class X Board (CBSE) | St. Paul's Sr. Sec. School Kota | **10 / 10** |

## Skills and Experience

| | |
|---|---|
| **Programming Languages** | Python, C, HTML5, R, PHP, LaTex, CSS |
| **Software** | Matlab, Vim, UNIX Terminal Environment, Git (Version Control), Windows |
| **Development Tools** | Natural Language Toolkit **(NLTK 3.0)**, Jupyter **IPython Notebook**, XAMPP [PHP Development Environment], MySQL, RStudio [IDE] |

## Scholastic Achievements

- Stood among the **top 3%** in the **Joint Entrance Examination Advanced Examination** conducted by the Indian Institute of Technology **2013**
- Achieved **All India Rank - 1813** in **Joint Entrance Examination Mains** among 12 Lakh students **2013**
- Selected under the **Kishore Vaigyanik Protsahan Yojana ( KVPY )** [translated to: Young Scientist Encouragement Scheme] fellowship program conferred by the **Indian Institute of Science Bangalore** **2013**
- Scored in the **top 10%** in **National Standard Examination Chemistry** by Homi Bhabha Center for Science Education, Tata Institute of Fundamental Research , Mumbai **2013**
- Secured **All India Rank 101** in **National Science Talent Search Examination** by Unified Council **2010**

## Projects / Work Experience

**Affix-Sense Disambiguation,** *Natural Language Processing* [ Present ]

Guide : *Prof*. Pawan Goyal (IIT KGP) Lab : **CNeRG - Complex Networks Research Group**

- Used the facebook **FastText** lib. to obtain **word embeddings** by training on the **English Wikipedia corpus**
- **Compositional methods** were used to obtain a **representation of a derived word** using its source word and affix, obtained through **distributional semantics**
- **Retrofitting** was performed on the vectors to account for the **sense** an **affix** provides to the **source word**
- **Graph creation** and **Clusterings** on the representations was performed in **Python**.
- Quality of the results obtained by the model were evaluated with the help of corpus extracted results.

**Context aware Recommendation System** [ Present ]

Guide : *Prof*. Pawan Goyal (IIT KGP)

- The system returns **relevant citations** in a given **research document** for **specific query locations**.
- It incorporates **in-link** and **out-link** contexts for a citer, cited pair to match with a relevant document using different **word-vector models**.
- Various methods for computing similarity and candidate set generation have been implemented to improve upon the baseline performance

### Named Entity Recognition for Microblogging

Guide : *Prof.* Pabitra Mitra ( IIT KGP )

- Performed **Extraction and Disambiguation** of named entities such as Person, Location, Organisation etc.
- Category Information from **Freebase** was linked to the **extracted entities** for using as **additional features** in classification
- A Bag of words model was used for **training** over a **annotated dataset of tweets** in different domains

### Recommendation System for Biomedical Research papers

- Parsed over **1,00,000 research papers** using python's **BeautifulSoup Library** to obtain a citation network
- Used method of **Random Walk with restarts** over citation network for research papers to recommend the most suitable paper based on a user entered query paper
- The output was grouped into subcategories using the **Sections and Topical Information** for calculating relevance scores

### Stochastic Optimal Control of Seeded Batch Crystallizer, *Numerical Optimization*

Guide : *Prof.* Debasis Sarkar ( IIT KGP )

- Implemented **Deterministic control** using the **Stochastic Maximum Principle** to obtain particle size distribution of a **seeded batch crystallizer**
- Used **Matlab** to model the **Population Balance equations** for deriving the optimal temperature profile
- Integrated **uncertainties** in the **system parameters** through the use of **Stochastic Ito processes**

## Internship

### ITC Limited - Summer Internship 2016

- Offered a full time working position as a **Pre Placement Offer** after the completion of internship
- Implemented methods for improvising operation of utilities such as Boiler, Refrigeration, Water Treatment Plant
- **Mitigated losses** for **consumption of energy** in steam, chilled water, heated water, etc. improving **efficiency**
- Achieved a projected savings of **₹ 5,00,000 /-(7351 USD)** per annum through various suggestions

## Relevant Coursework

- Algorithms – I ( Theory + Lab)
- Programming and Data Structures (Theory + Lab)
- Computer Aided Process Engineering ( Theory + Lab )
- Machine Learning
- Mathematics – I & II
- Computer Methods in Chemical Engineering
- Speech and Natural Language Processing
- Information Retrieval
- Transform Calculus
- Product Development

## Extra- Curricular Activities

### Head, Student Welfare Group IIT Kharagpur (2014- Present)

- Ensured efficient organization of **Programming and Data Structures Doubt Sessions** for first year students in collaboration with the **Computer Science and Engineering Department, IIT Kharagpur**
- Organized **R – Programming Workshop** along OrangeTree Global with over 200+ student participation
- **Developed** institute's **Fresher's Forum** for student doubts and **Official SWG website** www.swgiitkgp.in
- **Promoted** as the **Advisor** and the overall head for the subsequent years of operation

### Code fun do, Hackathon (2015)

- Developed a money splitting app in 2 - Day long **Hackathon** hosted by **Microsoft**
- The app helped in managing finances in group transactions, thus made lending and sharing money easier