Ayan Sengupta   16307R005
Electrical Engineering   **M.Tech.**
Indian Institute of Technology Bombay   **Male**
Specialization: Control and Computing   **DOB: 06/02/1993**

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2019	8.83
Undergraduate Specialization : Electrical Engineering				
Graduation	IIEST, Shibpur	IIEST, Shibpur	2015	7.77
Intermediate/+2	WBCHSE	Bidhan Chandra Institution	2011	84.20
Matriculation	WBBSE	Nava Nalanda	2009	82.25

AREAS OF INTEREST

Machine Learning, Deep Learning, Reinforcement Learning, Control Systems, Optimal Control.

TECHNICAL SKILLS

- **Programming Skills:**
  o Programming: Python, C, C++, Swift
  o Libraries/Framework: Flask, TensorFlow, Keras, scikit-learn, pandas, OpenCV, Beautiful Soup, Selenium
  o Others: HTML, CSS, Javascript, PHP, Bootstrap, SageMath, LaTeX, Markdown, Git
- **Software and Tools:**
  o MATLAB & Simulink, Adobe Photoshop, Adobe InDesign, MS-Office

MAJOR PROJECTS

- **M.Tech Project (Ongoing)**   [Jul'18 - Present]
  Title: Boundary Control of Infinite Dimensional Systems
  Guide: *Prof. Debasattam Pal, Department of Electrical Engineering, IIT Bombay*
  o Involves boundary control of systems represented by partial differential equation(s).
  o Involves algebraic analysis of motion planning of systems governed by partial differential equations.

- **Research Project (Ongoing)**   [Jul'16 - Present]
  Title: Algorithms for Fast Computation of Exact Solution of Partial Differential Equation(s)
  Guide: *Prof. Debasattam Pal, Department of Electrical Engineering, IIT Bombay*
  o Implemented an algebraic solver for partial differential equations using Oberst-Riquier algorithm.
  o Implemented the algorithms for Characteristic Cones given by equation ideal and equation module.
  o All the implementations were done in **Python** using open source **SageMath** libraries.

- **M.Tech Seminar**   [Jul'17 - Nov'17]
  Title: Algebraic Solution of n-D Systems
  Guide: *Prof. Debasattam Pal, Department of Electrical Engineering, IIT Bombay*
  o Presented a method of solving polynomial equations by eigenvalue approach.
  o Presented an application of the same for first-order representation of strongly autonomous system.

- **B.Tech. Project**   [Aug'14 - May'15]
  Title: Implementation of FPGA based Protective Relays
  Guide:*Prof. Paramita Chattopadhyay, Department of Electrical Engineering, IIEST, Shibpur*
  o Implemented an Impedance Relay model in **Xilinx** platform.
  o Implemented efficient floating point square-root algorithm and division algorithm in **Xilinx** platform.

COURSE PROJECTS

- **Inverse Image Captioning Using Generative Adversarial Networks**   [Jan'18 - May'18]
  Course: Advanced Machine Learning
  Guide: *Prof. Sunita Sarawagi, Department of Computer Science and Engineering, IIT Bombay*
  o Generates realistic image from text descriptions using **Deep Convolution GAN** architecture.
  o The network was trained separately on **CUB** and **COCO** dataset.
  o Implementation was done in **Python** using **TensorFlow** framework.

- **Extracting Water Resources From Satellite Images**   [Jul'17 - Nov'17]
  Course: Foundations of Machine Learning
  Guide: *Prof. Ganesh Ramakrishnan, Department of Computer Science and Engineering, IIT Bombay*
  o A Convolution Neural Network (**CNN**) was trained to detect water bodies in satellite images.
  o Obtained **98.1**% accuracy, **97.34**% precision and **98.4**% recall on test dataset.
  o Implemented in **Python** using **Tensorflow** based **Keras** library.

- **Classification of Poker Hands using Artificial Neural Network** [Jul'17 - Nov'17]
  Course: Foundations of Machine Learning
  Guide: *Prof. Ganesh Ramakrishnan, Department of Computer Science and Engineering, IIT Bombay*
  o Designed an Artificial Neural Network from scratch in **Python** for classifying poker hands.
  o The model with two hidden layers, showed best performance with a score of **0.983** on test data set.
- **Design of Non-Linear Controller of Rotary Inverted Pendulum** [Jan'17 - May'17]
  Course: Non Linear Dynamical Systems
  Guide: *Prof. Debraj Chakraborty, Department of Electrical Engineering, IIT Bombay*
  o Simulated a **Sliding mode Controller** for an Inverted Pendulum to control it in upright position.
  o Simulated the model and the controller action in **MATLAB & Simulink**.

OTHER PROJECTS AND COMPETITIONS

- **Control and Computing Website**
  o Designed the website of Control and Computing specialization of Electrical Engineering Department,
  IIT Bombay using **Bootstrap** framework.
  o Implemented a **Python** based parser for parsing publications from Google scholar page.
  o Deployed **Markdown** for simplified formatting of web-pages in plain text without any CMS.
- **Kaggle: Toxic Comment Classification Challenge** [May'18]
  o Used **Bidirectional LSTM** for the model and received a **Kaggle** score of **0.972**.
  o Deployed the model as a web app on **Heroku** using **Flask** framework and created an **API** for it.
- **Kaggle: Home Credit Default Risk Challenge** [ongoing]
  o Challenge is to predict how capable each applicant is of repaying a loan from the given set of data.
  o Implemented **LightGBM** based classifier and received a **Kaggle** score of **0.792** on public leaderboards.
- **Kaggle: Airbus Ship Detection Challenge** [ongoing]
  o Challenge is to find ships on satellite images with minimum computation time.
  o Implemented model received a **Kaggle** score of **0.847** on public leaderboard.
- **Analytics Vidhya Student DataFest 2018: The Data Identity Challenge** [Jul'18]
  o Implemented model received a score of **0.812** and received a rank of 31 on private leaderboard.

RELEVANT COURSES

o Foundations of Machine Learning	o Advanced Machine Learning
o Foundations of Intelligent and Learning Agents (ongoing)	o High Performance Scientific Computing
o Applied Linear Algebra	o Statistical Signal Analysis

ADDITIONAL LEARNING

o An Introduction to Number Theory and Cryptography	o Optimal Control Systems
o Matrix Computations	o Non Linear Dynamical Systems
o Control and Computational Laboratory	o Multivariable Control Systems

POSITIONS OF RESPONSIBILITY

- **System Administrator, Hostel 1, IIT Bombay** [Apr'17 - Jul'18]
  o Responsible for the maintenance of LAN network and proper functioning of the hostel computer room.
- **Designer, Background Hum, IIT Bombay** [Sep'16 - Present]
  o Responsible for the design and layout of the department newsletter of Electrical Engineering Department.
  o Used **Adobe InDesign** for designing the 2017 edition of Background Hum.
- **Design Nominee, Post Graduate Academic Council, IIT Bombay** [Jul'17 - Present]
  o Responsible for designing T-shirts, Certificates and Posters for any events organised by the Post Graduate
  Academic Council.

EXTRA CURRICULARS

- Presented a talk in **Students Reading Group (SRG)** session titled *SageMath - An open-source Python based mathematical software system.* [Aug'17]
- Volunteered for **Spreadsheet Workshop** for IRCC, IIT Bombay. [Jan'17]
- Secured 2nd position in Competition on Projects and Models organized by Techno India, Kolkata for the project entitled **Object Detection and Tracking by Image Processing**. [Apr'14]
- Won 2nd prize in the event **Shadow** in **Instruo** (Technical festival of IIEST, Shibpur). [Mar'14]
- Recieved **Academic Merit Award** for brilliant performance in Higher Secondary Examination from Bidhan Chandra Institution, Durgapur. [Feb'11]