**Aditya Senthilnathan**
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## Education

- **Indian Institute of Technology, Delhi** — New Delhi, India
  *Dual Degree (B.Tech and M.Tech) in Computer Science; CGPA: 7.864* — *Jun. 2017 – Present*
- **Maharishi International Residential School** — Chennai, India
  *Class XII Board Examination (CBSE); Score: 95.2/100* — *Jun. 2016 – May. 2017*
- **Vikaasa School** — Madurai, India
  *Class X Board Examination (ICSE); Score 92.8/100* — *Jun. 2014 – May 2015*

## Scholastic Achievements

- Awarded the **KVPY fellowship** by the Dept. of Science and Technology, Govt. of India
- Topped in Computer Science subject in the Class XII Final Exams(Achieved **100/100**)

## Projects

- **Object Detection in Low Light Conditions** — Prof. Balakrishnan
  *Research Assistant* — *Dec 2018 - Apr 2019*
  - Investigated the performance of object detection models trained on datasets like COCO on *infrared images* of environments with low lighting conditions and developed a heuristic for training object detection models with custom datasets to detect objects in low light conditions using IR imaging technology.
  - **Utilized**: C++, Python, Tensorflow, Intel RealSense R200 camera, Bash, OpenCV
- **Call by Value and Call by Name Interpreters** — Prof. Sanjiva Prasad
  *Programming Languages, Course Project* — *Jan 2019 - Apr 2019*
  - Implemented a functional language with limited expressions and definitions
  - Implemented *Krivine abstract machine* (in closure form) for call by name semantics and *SECD abstract machine* for call by value semantics
  - Implemented Parser and Lexer using Ocamlyacc and Ocamllex for toplevel.
  - **Utilized**: Ocaml, Ocamllex, Ocamlyacc
- **Image Processing Library** — Prof. Rijurekha Sen
  *Design Practices in Computer Science, Course Project* — *Jan 2019 - Apr 2019*
  - Designed code to implement mathematical functions for image processing like ReLU, tanh, sigmoid, softmax, pooling, convolution, etc.
  - Used *Toeplitz Matrix Multiplication* method to accelerate convolution and compared performance for matrix multiplication using libraries like OpenBLAS and Intel MKL and pthreads.
  - Implemented *MNIST Digit Recognizer* using LeNet-5 architecture using the developed library to test it.
  - **Utilized**: C++, MKL, Pthreads, OpenBLAS, GnuPlot
- **Traffic Simulator** — Prof. Rijurekha Sen
  *Design Practices in Computer Science, Course Project* — *Jan 2019 - Apr 2019*
  - Designed a simulator for Indian road traffic intersection with realistic lane changing behaviour, haphazard bike movements and other random features.
  - Designed an interface for the user to enter various parameters for the simulator like dimensions of various vehicles, max speed, time intervals for changing signals, etc.
  - Designed a graphical display for the road, traffic lights, vehicles, etc. using OpenGL.

- **Utilized**: C++, RapidXML, OpenGL

- **ARM CPU** Prof. Anshul Kumar
  *Computer Architecture, Course Project* *Jan 2019 - Apr 2019*
  - Designed an ARM CPU based computer complete with a memory and processor.
  - Designed CPU with multi-cycle design style with a combined Instruction and Data Memory.
  - Implemented exception handling in CPU and various assembly level instructions.
  - **Utilized**: VHDL, Xilinx Vivado, BASYS3 Artix-7 FPGA

- **Image Filtering** Prof. Anshul Kumar
  *Digital System Design, Course Project* *Jul 2018 - Nov 2018*
  - Designed a UART for asynchronous serial communication between the computer and the FPGA board used (BASYS3 Artix-7)
  - Implented image filtering using a 3x3 sliding window with the coefficients kept in memory on the FPGA.
  - **Utilized**: VHDL, Xilinx Vivado, BASYS3 Artix-7 FPGA

- **Search Engine** Prof. Amitabha Bagchi
  *Data Structures and Algorithms, Course Project* *Jul 2018 - Nov 2018*
  - Developed a search engine capable of answering search queries on documents
  - Implented an *inverted index* to maintain data obtained from the given set of documents using a balanced search tree and hashtables (used chaining to resolve collisions).
  - *Term frequency* and *inverted document frequency* were used to calculate relevance of a document for a given search query.
  - **Utilized**: Java

- **Mobile Phone Tracking** Prof. Amitabha Bagchi
  *Data Structures and Algorithms, Course Project* *Jul 2018 - Nov 2018*
  - Developed a tracking system to identify the location of phones in a network and route calls between them in the shortest path possible.
  - Used tree data structure to implement a hierarchical call routing structure which consisted of a central server connecting area level exchanges which consist mobile phones.
  - **Utilized**: Java

## Courses Undertaken

- **Computer Science**: Programming Languages, Computer Architecture, Design Practices, Data Structures and Algorithms, Discrete Mathematical Structures, Digital Logic and System Design, Introduction to Computer Science
- **Electrical Engineering**: Signals and Systems, Principles of Electronic Materials, Introduction to Electrical Engineering
- **Mathematics**: Probability Theory and Stochastic Processes, Linear Algebra and Differential Equations, Calculus
- **Online Courses**: Machine Learning (Stanford), The Bits and Bytes of Computer Networking (Google)

## Programming Skills

- **Languages**: C/C++, Python, Java, Ocaml, Matlab, VHDL, ARM Assembly, LaTeX, Bash, HTML, CSS
- **Technologies and Software**: OpenCV, Tensorflow, Xilinx Vivado, Xilinx ISE, gnuplot, matplotlib, ARMSim, Autodesk Inventor, Git, Portable Batch System (PBS), Unity Game Engine, OpenGL

## Positions of Responsibility

- **Journalist**: Worked as a journalist for the Board of Student Publication, IIT Delhi. Had several articles published in various BSP magazines like Inquirer, Inception, Elemental, etc.