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# Mantri Krishna Sri Ipsit

*Best way to predict the future is to create it.*

## Education

- 2018–Present **B.Tech**, *Indian Institute of Technology Bombay*, Mumbai, 9.28.  
Electrical Engineering with Minor in Computer Science & Engineering
- 2016–2018 **Intermediate/+2**, *Sri Chaitanya Narayana Jr.College*, Hyderabad, 98.40%.
- 2016 **Matriculation**, *Sri Chaitanya High School*, Vijayawada, 10.00.

## Interests

- Machine Learning Biomedical Image Analysis, Image Classification and Segmentation
- Circuit Design Analog and Digital Circuit Design

## Projects

### Machine Learning

- Winter 2019 **Multi-Organ Nuclei Segmentation | Medical Deep Learning and Artificial Intelligence Lab**, *Prof.Amit Sethi*, Department of Electrical Engineering, IIT Bombay.
- Used state-of-the-art **image processing** techniques and **neural networks** for segmenting nuclei from Hematoxylin and Eosin (H&E) stained tissue images after **thoroughly reviewing** relevant research papers
  - Implemented **Structure-Preserving Color Normalization** (SPCN) on stained whole-slide images (WSIs) as a **sparse non-negative matrix factorization** (SNMF) problem and made the use of **SPAMS** package
  - Trained a **sliding window CNN** and a **UNet** separately, from scratch on over **22,000** hand annotated nuclei spanning 4 different organs and tested them on 3 unseen organs for **3 classes** in Pytorch
  - Adopted **iterative region growing** algorithm to convert the ternary class scores to n-ary Nuclear Maps
  - Used **Aggregated Jaccard-Index** as proposed, as the accuracy metric
- September 2019–December 2019 **Team Rakshak**, *Member*, Software Subsystem, IIT Bombay.
- It is an IIT Bombay student initiative to develop a fleet of robust **Unmanned Aerial Vehicles** (UAVs) to support **Search and Rescue Operations** (SROs) in the event of disaster
- Worked on the task of classifying objects of interest detected by the onboard camera of UAV
  - Used the python library OpenCV to preprocess the images before feeding it to a neural network
  - Trained a neural network with architecture inspired from **VGG16** in **PyTorch** and achieved an accuracy of 69%

### General

- Summer 2019 **Constellation Detection**, *Institute Technical Summer Project*, Institute Technical Council, IIT Bombay.
- Devised a mechanism to detect constellations from an image, irrespective of rotation or scaling
  - Processed images using OpenCV library and implemented **Geometric Hashing** for every 4-tuples of stars
  - Used **similarity metrics** like L1 and L2 norms, cosine similarity and gaussian similarity to compare hashcodes
  - Designed a graphical user interface using **Tkinter** library in python to check for the constellations

- Summer 2019 **Machine Learning and Convolutional Neural Networks**, *Summer of Science*, Maths n Physics Club, IIT Bombay.
- In-depth study of topics like regression, classification, Support Vector Machines, K - Means clustering, **Principal Component Analysis** and regularization
  - Endeavoured to understand and implement various aspects like **backpropagation**, dropout, different activation functions like **ReLU**, gradient clipping, adaptive learning rate algorithms like Momentum, Adagrad and **Adam**
  - Explored CNNs like **AlexNet** and VGG16 and tried to implement them on CIFAR-10 dataset in **Tensorflow**
- Autumn 2018 **Bluetooth Modulated Bot**, *XLR8 Competition*, Electronics and Robotics Club, IIT Bombay.
- Constructed a four-wheeled bot with **Differential** steering via H-Bridge motor driver
  - Controlled the bot via **wireless interconnection** between onboard bluetooth module and a mobile app
- Course**
- Autumn 2019 **Fourier Analysis and ECG | Network Theory**, *Prof. Vikram Gadre*, Department of Electrical Engineering, IIT Bombay.
- Made a **detailed study** on different components of the electric circuitry of an ECG machine
  - Demonstrated different applications of Fourier analysis in electrical engineering and in ECG
  - Was among the **top 3** teams who presented their work to students from various colleges of India as a part of **Immersive Pedagogy Workshop** under the '**KITE**' initiative of the **MHRD, Govt. of India**
- Spring 2019 **1 Hz MM:SS Stopwatch | Introduction to Electronics**, *Prof. Mahesh B Patil*, Department of Electrical Engineering, IIT Bombay.
- Designed an **IC555 timer circuit** in order producing a 1 Hz clock signal, dual-IC counter circuit in order to provide mod-6 and mod-10 counting mechanisms, a start-stop mechanism and a reset mechanism
  - **Simulated the circuit components** of the circuit in EAGLE in order to test results of the hence designed circuit, and eventually created a **working model** of the same
- Self**
- Summer 2019 **Python Art**, *Sketching Images using Python*, IIT Bombay.
- Developed an algorithm to sketch any given image
  - **OpenCV** was used to detect all the edges in the image. **Turtle** library was used to draw them edges on a canvas
  - Suitable adjustments were made to handle *.png* and *.jpg* formats

## Academic Achievements

- 2018 **All India Rank 242**, *JEE Advanced*, Among over 0.2 million candidates.
- 2018 **All India Rank 123**, *JEE Mains*, Engineering Stream, Among over 1.3 million candidates.
- 2018 **All India Rank 630**, *JEE Mains*, Architecture Stream, Among over 0.1 million candidates.
- 2016 **Kishore Vaigyanik Protsahan Yojana Fellowship**, *KVPY*, Department of Science and Technology, Government of India.
- 2018 **National Top 300**, *NSEC*, Selected to appear for INChO, Conducted by Homi Bhabha Centre For Science Education.
- 2018 **National Top 300**, *NSEA*, Selected to appear for INAO, Conducted by Homi Bhabha Centre For Science Education.

## Languages

C++

MATLAB

VHDL

Python

Julia

HTML, CSS

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## Softwares

EDA	Eagle,Xcircuit	Web Dev	Django
Device Simulation	Quartus	Circuit Simulation	NgSpice
CAD	AutoCAD,Solid Works	Documentation	MS Office, Libre Office, L <sup>A</sup> T <sub>E</sub> X
ML	Pytorch	Application	GNU Plot

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## Key Courses Undertaken

Signals and Systems*	Machine Learning for Remote Sensing*
Logic in Computer Science	Data Structures & Algorithms*
Analog Circuits & Lab*	Digital Systems & Lab*
Data Analysis & Interpretation	Electronic Devices
Network Theory	Linear Algebra
Calculus	Complex Analysis
Differential Equations-1	Differential Equations-2
Quantum Physics & Applications	Electricity & Magnetism

\*to be completed by Fall 2020

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## Positions of Responsibility

- 2018 **Event Organizer at Techfest, IIT Bombay**, Asia's Largest Science and Technology Festival, Footfall:175,000.
- Helped carry out the event **Speak - Stand to Express**, hosted by Bollywood Actress **Ms.Yami Gautam**
  - Personally contacted **50+** journalists from various agencies to cover the event
- 2018 **Event Organizer at Mood Indigo, IIT Bombay**, Asia's Largest College Cultural Festival, Footfall:143,000.
- Helped carry out the event of India's **first** and only comedian illusionist **Karan Chauhan** during the fest
  - Actively handled a large crowd during various other events along with **15+** fellow organizers

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## Extra Curriculars

- **Class Representative** of the students from various departments and years of study taking the course **CS228 : Logic in CS**, as a minor; scheduled tutorials and quizzes
- Successfully finished year-long training in **Lawn Tennis** under **National Sports Organization**
- Contacted **100+** alumni out of a total of **12000+** as a part of Phonathon, a telephonic marathon for contacting alumni under Student Alumni Relations Cell (SARC), IIT Bombay
- Volunteered in **IIT Bombay Half Marathon** organized by IIT Bombay Sports
- Participated in the **Web Development** Bootcamp in Technical Summer School, IIT Bombay
- Volunteered in organizing the **Guinness World Record** event that happened at IIT Bombay where **5700** students gathered to light solar lamps together under the **Solar Urja Lamp** (SoUL) project
- Attended the **Vijyoshi Science Camp** organized by the **Indian Institute of Science** (IISc)