

# Aarat Satsangi



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## Education

**DAYALBAGH EDUCATIONAL INSTITUTE | AGRA, INDIA**

**JULY 2019 - MAY 2023**

- **Bachelor of Technology**

Electrical Engineering with Specialization in Computer Science | *First Division with Distinction*  
CGPA - 9.152

Relevant Coursework: Neural Networks | Software Design | Digital Image Processing | Design and Analysis of Algorithms | Data Structures | Advanced Programming Labs (Java, C) | Advanced Optimization Techniques | Computer Architecture | Discrete Mathematics | Quantum Computing

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## Skills

- **Programming:** Python (PyTorch, Keras, Scikit-learn, NumPy, Pandas, Matplotlib, Seaborn, MoviePy, Librosa, OpenCV, Multithreading) | Java | C | C++ (basic) | MySQL | HTML | CSS
- **Deep Learning | Machine Learning:** Neural Networks | Autoencoders | CNN | RNN | LSTM/GRU | Transformers | Transfer Learning | K-Nearest Neighbors | Naïve Bayes | Linear & Logistic Regression | Natural Language Processing (BoW, TF-IDF, Word2Vec, GPT) | Data Visualization & Dimensionality Reduction (PCA, SNE, T-SNE)
- **Version Control System:** Git | GitHub

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## Experience

**RESEARCH INTERN | TORONTO METROPOLITAN UNIVERSITY**

**JUNE 2022 - AUGUST 2022**

Project: *"Analyzing User Generated YouTube Videos to Understand Ageing, Old Age, and Older Adults"*

Supervisor: [Asst. Prof. Amira Ghenai](#)

- Conducted comprehensive literature reviews, contributing to project understanding and shaping research methodology.
- Successfully navigated the challenges posed by Google's strict API limitations to gather crucial data for the project by designing a program utilizing object-oriented programming in Python, which is now being transformed into a data paper.

**SOFTWARE DEVELOPER INTERN | KEYSIGHT TECHNOLOGIES**

**APRIL 2022 - MAY 2022**

- Worked on fixing bugs and errors in C++ for the M8040A, a product used by R&D teams to characterize chips, devices, transceiver modules and sub-components, and gained practical experience in utilizing Git on the command-line and working with Git repositories.

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## Research Work

**CRICS - A CRICKET SCENE DATASET AND CLASSIFIER** 

*Intending to author a paper upon project completion*

(Pytorch | Torchvision | Scikit-learn | OpenCV | OOP Python)

**JUNE 2023 - PRESENT**

Supervisor: [Prof. C. Patvardhan](#)

- Created a large dataset from 55 match highlights, refined through Denoising Autoencoder-based semantic Hashing to eliminate redundancy and enhance scene detector model's generalizability.
- Currently working on annotating each frame for detecting objects on the cricket field to aid in commentary generation in a cricket match.

**EXTENDING THE MONTY HALL PROBLEM**  

(NumPy | Pandas | Matplotlib | Seaborn)

**NOVEMBER 2022 - NOVEMBER 2022**

- Created a simulation of The Monty Hall Problem and showed that switching from the original decision always results in a higher number of victories in the case of 3 doors.
- Generalized it to show that if we switch from the original decision each time and if either the total number of doors or the number of doors opened by the host increases, then the total number of wins tend to increase.

# AUTOMATING COMMENTARY GENERATION IN A CRICKET MATCH USING VIDEO ANALYSIS



OCTOBER 2022 – PRESENT

Presented in National Systems Conference

Supervisor: [Prof. C. Patvardhan](#)

(NumPy | Pandas | TensorFlow | Keras | Scikit-learn | Matplotlib | Seaborn | Librosa | MoviePy | OpenCV | Pillow | OOP Python)

- Gathered cricket highlights video data from YouTube and annotated it for the and trained state-of-the-art CNN models to accurately detect scene (pitch, field, miscellaneous), ball, batsman, bowler, bounce, shot-direction and used transfer learning to construct a model using ResNet50 as its backbone to detect hit using the Mel-spectrogram of the audio from the collected video data.
- Currently working on detecting pitch key-points for detecting various other events such as wide ball, no ball, ball length, ball velocity etc.

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## Conference Presentations

- 'Automating Commentary Generation in a Cricket Match Using Video Analysis', Oral Presentation in National Systems Conference 2023, India.

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## Project Work

- Anime Face Generator Using DC-GAN 🔄 & VAE 🔄 May 2023 – June 2023
- Overfit Detection In Neural Networks Using t-SNE March 2023 – April 2023
- Emotion Detection Using Audio 🔄 📄 December 2022 – December 2022
- Sentiment Analysis Of Amazon Fine Food Reviews 🔄 July 2021 – August 2021
- Extensive Study Of T-Sne For Visualization 🔄 📄 July 2021 – August 2021
- Highlights Of Developed Algorithms 🔄
  - Multithreaded Matrix Multiplication (Java) | Achieved 70% speedup in large matrix multiplication.
  - External Sorting for large files (C) | Achieved a speed of 3MB/second on i7 7th gen.
  - Classical Knight Tour and N Queen Problem in chess using backtracking (C).

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## Achievements & Interests

- **Achievements**
  - Received MITACS Globalink Research Internship Award conferred by MITACS, Canada (2022)
  - Youth Festival (State): Group Singing – 4th position
  - Drama Festival (Inter University) – Best Actor
  - Football Team (Inter Faculty) – Winner
  - Instrumental solo (Inter Faculty) – Winner
  - National Cadet Corps - Captain (High School)
- **Volunteer Work**
  - Weekly Volunteer in Community Farms
  - Volunteer in National Service Scheme and Unnat Bharat Abhiyan
- **Extracurricular Activities:**
  - Playing Guitar, Piano, and Flute
  - Recording Music from Scratch
  - Acting, Singing and Reading
  - Playing Football, Basketball, Volleyball, and Chess