

# KARTIK SHARMA

## CS Undergraduate

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### RESEARCH INTEREST

I am a Data Science enthusiast with primary research interests in Machine Learning, Artificial Intelligence, and Data Analytics. My research experience and projects have inculcated a strong passion for Machine Learning, especially in Computer Vision and Natural Language Processing. I am fascinated by human-computer interaction and its applications in real life. My current research focuses on video understanding, multivariate time series analysis, object detection, instance segmentation, and solving real-life problems using computer vision.

### EDUCATION

**B.E.(Hons.) Computer Science and Msc.(Hons.) Economics** Aug 2018 – May 2023 | Pilani, India  
*Birla Institute of Technology and Science, Pilani, Pilani Campus*

**CGPA: 8.68**

**Higher Secondary School** Apr 2016 – Mar 2018 | Bhopal, India  
*Mansarovar Public School*

12th Percentage: 94.2%

**Secondary School** 2015 – 2016 | Bhopal, India  
*Delhi Public School*

CGPA: 10

### SKILLS

**Programming Languages** Proficient: Python, Java, SQL | Familiar: C, HTML, CSS, JavaScript, Octave

**Libraries** Proficient: Keras, Pandas, NumPy, Scikit Learn, Matplotlib | Familiar: OpenCV

**Frameworks** Proficient: TensorFlow | Familiar: PyTorch

### WORK EXPERIENCE

**Samsung Research Institute Bangalore** May 2022 – present | Bangalore, India  
*Research Intern*

- Working on **scalability and robustness** of **transformer-based** multi-label classification problem for predicting the action in an image. (Example: A dog is playing with a ball)

**The Advanced Data Analytics and Parallel Technologies Lab, BITS Pilani** Aug 2021 – present | Pilani, India  
*Research Assistant*

Project Supervisor: Dr. Poonam Goyal

- Conducting a **multivariate time series analysis** on the multi-spectral Sentinel data to **predict the crop yield** in different areas.
- Experimenting with different deep learning architectures (including **CNN** and **LSTMs**), trained on dimensionally reduced data (treating images as a histogram of pixel count).
- Incorporating a **Gaussian Process** to model the Spatio-temporal structure of the given data.

**Central Electronics Engineering Research Institute (CSIR-CEERI), Pilani** Jan 2022 – present | Pilani, India  
*Research Assistant*

Project Supervisor - Dr. Dhiraj Sangwan

- Developed an **instance segmentation framework** to recognize highly cluttered instances of contraband items during baggage security checks.
- Constructed an **unsupervised** anomaly detection framework using **encoder-decoder** architecture.
- Plan on improving the performance by deploying a more **adaptive attention mechanism** using a **3D object detection** approach.

**Economics Department, BITS Pilani** Jan 2021 – May 2021 | Pilani, India  
*Independent Researcher*

Mentor - Dr. N V M Rao

- Worked on top 50 stocks listed on Nifty to **effectively optimize asset allocation**, and compared performance with standard portfolio management algorithms.
- Achieved **12% returns** on portfolio even during the Covid-19 period.

**Kizora Software Private Limited** Jun 2020 – Jul 2020 | Nagpur, India  
*Summer Intern, Web Developer*

Designed a microservice (**Geo Solution Service Hub**) using **Flask** Framework (Python) with the following functionalities:

- Calculate the distance between any two locations on a map and get the fastest route according to the mode of travel using **Google Maps API**.
- Get the latitude/longitude of a location by placing a marker on the map.
- Maintaining **SQL database** of searched routes to save API calls.

## PROJECTS

### Wake-up Word Detection

Jul 2021

#### Independent Project

- Constructed a speech dataset from synthesized data and implemented a trigger word detection model with over **90% accuracy**.
- Trained a **GRU(Gated Recurrent Units)** to detect when someone has finished saying the word "activate"

### Car Detection with YOLO

Jun 2021

#### Independent Project

- Implemented object detection on a car dataset using the very powerful **YOLO model**.
- Used the pre-trained YOLO Model for image classification and stacked **non-max suppression** using **IOU Grid** analysis to accurately make bounding boxes around detected cars.

### Stock Price Simulator

Sep 2020

#### NIT Durgapur

- Developed a Machine Learning Model to predict real-time stock prices accurately using **KNN, SVR, CART**.
- Collected daily stock price data using **REST API** and analyzed the interdependence of different stock prices using **LSTM** (Long Short-Term Memory) networks.

### Art Generation with Neural Style Transfer

Jun 2021

#### Independent Project

- Used transfer learning on the VGG-19 network to generate new artistic images.
- Implemented a cost function that minimizes the content and style cost by running both the images through the pre-trained **VGG-19 model**.

## RELEVANT COURSES

- |   |   |                                      |
|---|---|--------------------------------------|
| • Computer Programming in C                                   | • Data Structures and Algorithms                    | • Object-Oriented Programming (Java) |
| • Database Systems  | • Discrete Mathematics in CS                        | • Probability and Statistics         |
| • Linear Algebra  | • Econometrics                                      | • Neural Networks and Fuzzy Logic    |
| • Machine Learning (Stanford University Online Certification) | • Deep Learning Specialization (by DeepLearning.AI) |                                      |

## POSITIONS OF RESPONSIBILITY

### Student-Faculty Council

Aug 2020 – May 2021

#### Member

- Part of a 5 team body who is responsible for all forms of communication between the Professors of Computer Science Department and the third year BE computer science students.
- Gave proposals to improve communication between students and teachers.

### National Service Scheme, Bits Pilani

Aug 2018 – May 2020 | Pilani, India

#### Executive Committee Member

- Volunteered in Health and Public Awareness Department.
- Volunteered in Blood Donation Camps, Eye Donation Camp, and various Health camps in Pilani. Delivered Lectures in Village Schools on various awareness topics.

### Friends of Tribal Society

Jun 2019

#### Volunteer

- Volunteered in spreading awareness among tribals regarding *Ekal Vidyalaya* (provision five years of free, non-formal education to tribal children from the age group 6–14 years) and also collected funds for the same.
- Gave lectures on health care education with an emphasis on hygiene, treatment of general diseases, maternal and child care.

## ACHIEVEMENTS

### Amazon ML Challenge 2021

- Placed in Top 50 among participating 3500 teams in creating ML model to accurately assign Product IDs to a large dataset of amazon products.

### Secured All India Rank 31 in Technothon'15

- An international school championship conducted by IIT Guwahati with the participation of over 12000 students. Secured 4th rank in Mains conducted at IIT Guwahati Campus among the top 50 teams that were invited.

### Received Zonal Gold Medal in 17th SOF National Science Olympiad

- SOF is an Educational Organization popularizing academic competition and assisting the development of competitive spirit among school children.

### National Level Science Talent Search Examination (NSTSE)

- **Received Medal and Certificate of Merit** in National Level Science Talent Search Examination (**NSTSE**) for being placed in the National Top 1000 out of 10,000,000 candidates enrolled.

## EXTRA-CURRICULARS

- Member of Quiz team in school representing my house in Science and Mathematics Quizzes.
- Conducted Annual Sports Day for students of secondary school in Pilani.
- Conducted and took part in school plays on various awareness topics like child labor and hunger.
- Player in School Junior Cricket Team.