

Hunar Batra

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Education

University of Oxford, MSc Advanced Computer Science Class of 2022

Coursework : Computational Learning Theory, Machine Learning, Quantum Processes & Computation, Advanced Machine Learning, Artificial Intelligence, Topics in Computational Biology, Probability & Computing

University of Delhi, B.Sc (Honours) Computer Science Class of 2020

C.G.P.A - **8.42 / 10**, First Division Honours Degree

Academic Achievements and Honours

- Student of the Year, Department of Computer Science, 2020 - *for all-rounder performance*
- Rank 3, Department of Computer Science, 2020
- Achieved the Highest Grade Point in the university in Data Structures, Machine Learning, Android Programming, Software Engineering, System Programming, PHP, Computer Graphics, Microprocessor subjects

Modern School Vasant Vihar, New Delhi Class of 2017

Grade 12th (CBSE) - 92%; Grade 10th (CBSE) - 9.6 CGPA

Research Publications

- Medbot: Conversational Artificial Intelligence powered Chatbot for delivering Telehealth after COVID-19, **IEEE 5th International Conference on Communications and Electronic Systems (ICCES 2020)**; Urmil Bharti, Deepali Bajaj, **Hunar Batra** et al., **IEEE Xplore**, Scopus Indexed - **57 citations** [Paper Link [↗](#)]
- Serverless Deployment of a Voice-Bot for Visually Impaired, **International Conference on Applied Soft Computing & Communication Networks (ACN 2020)**; Deepali Bajaj, Urmil Bharti, **Hunar Batra** et al., Book Chapter - **Springer Singapore** [Paper Link [↗](#)]
- CoVShorts: News Summarization application based on Deep NLP transformers for SARS-CoV-2, **IEEE 9th International Conference on Reliability, Infocom Technologies and Optimization (ICRITO 2021)**; **Hunar Batra**, Akansha Jain, Gargi Bisht et al., - IEEE - [Paper Link [↗](#)]
- MUCE - A Multilingual Use Case Model Extractor using GPT-3; Deepali Bajaj, **Hunar Batra** et. al, **International Journal of Information Technology, Spinger** [Paper Link [↗](#)]
- TiGen - Title Generator based on Deep NLP Transformer Model for Scholarly Literature; Hunar Batra, Eshika Gupta, Arupriya et. al, [To be published]
- CovFakeBot: A Machine Learning based ChatBot using Ensemble Learning Technique for Covid-19 Fake News Detection; **Hunar Batra**, Deepali Bajaj, Urmil Bharti et. al, [To be published]

Research Experience

Research Lead, Oxford Rhodes AI Lab 05/2022 – present

- Leveraging GNNs to model turbulence closures using symbolic regression in collaboration with CLiMA, CalTech, MIT and NASA

Chatbot Development Research, University of Oxford 02/2022 – present

- Developing a conversational agent consisting of intent matching and entity recognition for the Philosophy Dept to help in conveying their research work with users on their website/messenger.

EWADA Research Intern, Oxford Human Centred AI Lab 12/2021 – present

University of Oxford, Department of Computer Science

- Developing web apps using the SOLID framework enabling data autonomy and privacy preserving ML for the Ethical Web and Data Infrastructure in the Age of AI (EWADA) project under **Sir Tim Berners Lee**

NLP Researcher, Department of Computer Science 01/2021 – 07/2021

University of Delhi

- Spearheaded the development of four research projects on building an ensemble ML based WhatsApp bot to detect COVID-19 Fake News, web app for abstractive & extractive summarisation of COVID-19 News using transformer-based NLP Models (BERT, GPT-2, XLNet, BART, T5), fine-tuning GPT-2 to generate titles for Research Articles & web-based tool for extracting use case model from software case study using GPT-3.

Student Researcher, Department of Computer Science

03/2020 – 06/2020

University of Delhi & IIT Delhi

- Developed a serverless Voice-based personal assistant web application for visually impaired students
- Single-handedly built & trained the feedback collection NLP agent, tagged entities, added contextual input-output conversational flow & embedded voice interaction using WebSpeech API Speech Recognition & Speech Synthesis interfaces

Student Researcher, Artificial Intelligence Research Lab

06/2019 – 09/2019

University of Delhi

- Self-initiated research work under Dr. Amita Kapoor, wherein I built an Assistive System for Autonomous Vehicles for vehicles and lane detection, based on Deep Learning & Computer Vision
- Compiled Darknet, an open-source neural network & YOLOv3 with OpenCV for real-time predictions. Implemented a bash script to automate bulk testing & mean average precision calculation
- Achieved 99.07% accuracy for detecting vehicles and lanes using Histogram of Oriented Gradients (HOG) & a Linear Support Vector Machine Classifier on HSV colour space

Work Experience

Mobile Robotics Engineer, UVRobots

08/2020 – 09/2021 | London, UK

- Built a React Native mobile application integrated with ROS melodic nodes, to control the sanitisation Robot Lamp's navigation & lucidly developed the front-end of the application
- Developed Flask REST API for streaming live video from Raspberry Pi using the Motion-JPG technique. Processed the video, generated depth & disparity maps using OpenCV and merged images using KNN
- Generated room laser scan visualisations using LiDAR real-time data, roboviz & PyLidar libraries

Co-Founder, HushTech Solutions ☑

06/2019 – 07/2021 | New Delhi, India

- Self-taught Conversational AI developer, developing omni-channel messenger chatbots powered by Natural Language Processing (NLP) to help businesses automate their customer interactions, marketing & lead generation
- Built intelligent full-funnel integrated messaging chatbots with data analytics abilities
- Conducted extensive research into the conversational technology market, requirements of the clients & shipped chatbots for messaging platforms and Robotic Process Automation solutions

Internships

Machine Learning Engineer, Omdena AI

03/2020 – 06/2020 | Palo Alto, USA

- Selected as one of the 28 Global AI Experts to work on the AI Pandemics project in collaboration with AI for Peace
- Performed Latent Dirichlet Allocation (LDA) topic modelling over a dataset of scraped COVID-19 news articles to analyse the impact of government policies over the vulnerable population.
- Used time series analysis on OxGCRT & Mobility Datasets to find correlations between policy implementations & its impact on number of cases & mobility. Further, implemented moving averages & vector autoregression (VAR)
- Conducted exploratory data analysis, built categorical heat maps for analysis & a modified SEIR model. Results showcased at the United Nations AI for Good Summit 2020

Mobile Application Development Intern, Impute Inc.

04/2019 – 07/2019 | Tokyo, Japan

- Developed a Hybrid Voice-Assistant based on Natural Language Processing for the Fluent8 iOS Application, integrated with a corpora of daily-life topics to help users improve their conversational skills.
- Extensively trained the NLP agent & enabled contextual conversation using Dialogflow AI & Node.js client SDK
- Deployed webhooks on Cloud Function for Firebase for response retrieval. Designed the Conversational User Interface (CUI) & directed fallback user queries to external APIs to enhance the conversational experience

Chatbot Development Intern, Inverted Sense

12/2018 – 04/2019 | New Delhi, India

- Built messenger chatbots for real businesses using Twilio, Chatfuel, Janis.ai. Worked on designing, building, training, testing bots & integrated interactive UI with suggestion cards
- Proposed & successfully developed an in-built shopping cart, instant order email alert & up-selling feature which led to higher lead conversions & ROAS

Awards and Honours

- **First Indian** to receive **The Mars Generation 24 under 24** Award - Leader & Innovator in STEAM category, 2019
- **National Finalist**, Smart India Hackathon Software Edition (out of 5,000 teams), India's largest hackathon by MHRD Govt. of India, 2019
- **Young Inventor**, Tech Will Save Us, 2019
- Developer Student Clubs Lead, Google Developers, 2020
- **Paper Presentation** at 5th International Conference on Communication and Electronic Systems, ICCES'20, IEEE
- **Paper Presentation** at 5th International Conference on Applied Soft Computing and Communication Networks, ACN'20, Springer
- **Paper Presentation** at 9th International Conference on Reliability, Infocom Technologies and Optimization ICRITO 2021, IEEE
- Rank 7, G-Research Algorithmic Trading Oxbridge Challenge, 2021
- **Ideation Paper Presentation** on 'Ingestible Robots' at 15th WONCA World Rural Health Conference, 2018
- **National Winner**, Summer with Google (out of 20,000 participants), 2018
- World Rank **1642**, Google CodeJam 2020
- Winner, Smart City Challenge, IIT Delhi, 2018
- Winner, National Level B-Plan Competition, MSME, Govt. of India, 2019
- Rank **15**, All India Gen-Z Leadership Olympiad, 2018
- Gold Award, Digital Champions Program, Reliance JIO, 2018

Projects | github.com/hunarbatra

covid19variants.org [React.js, HTML, CSS, Python] - COVID-19 variants genomic surveillance open-tracker. Created data pipelines & built visualisations [Link [↗](#)]

COVID-19 Tweets Fake News Detection [Python, NLTK, Scikit] - WhatsApp bot to classify fake news using ensemble ML boosting approach

CoVShorts, COVID-19 News Summarizer [Python, Transformers, Flask] - GPT2, BERT, XLNet, T5, BART to perform abstractive/extractive text summarization web application

Research Article Title Generation [Python, GPT] - NLG fine-tuned GPT-2 trained over arXiv articles for title generation of research abstracts

MUCE, Multilingual Use Case Model Extractor [GPT-3, Flask] - An autoregressive transformer (GPT-3) based use case model extractor web app for software case studies

HunAI [Python, GPT] - A pre-trained response generation, DialoGPT DSTC model based Telegram Bot buddy, trained on Reddit discussions

Real Time Voice Cloning [Python, Synthesizer, TensorFlow] - Transfer Learning based voice cloning on the recorded input to generate Text-to-Speech (TTS)

Voixt [JS, HTML, CSS, Chrome TTS] - A Chrome Extension to read aloud the textual content on any browser tab, enabling TTS [Link [↗](#)]

Rekognition [Java, XML, ML Kit] - Native Android app for Text Recognition, Object Recognition & Facial Features Recognition

CoRelief [React.js, Kendo UI, API.AI] - Natural Language Processing based web chatbot to help fight COVID-19 related anxieties & support mental health [Link [↗](#)]

UAV Delivery Drone [ArduPilot Copter]

Unmanned Aerial Vehicle for delivering vaccinations and disaster relief material to remote areas. Awarded The Mars Generation 24 under 24 Award in recognition of this project

Skills

C++, C, Python, Javascript, Java, HTML, CSS, PHP, SQL, Application Development (Native, React Native)

Tools & Frameworks: Node.js, React.js, TensorFlow, PyTorch, PyTorch Geometric, Kubernetes, Flask, OpenCV, Dialogflow, git, bash, Firebase, Google Cloud Platform, ROS

Invited Talks

Protein Language Modelling to generate de novo SARS-CoV-2 mutations

Oxbridge Women in Computer Science Conference, 2022, University of Oxford

Process Automation with Chatbots

Think Outside the Valley, The DMZ (Ryerson University), World's leading accelerator for Tech Startups [Link] [↗](#)

Ok, Google! Let's build an Action for Google Assistant

HackOn, A Pan-India Virtual Hackathon [Link] [↗](#)

Chatbot Development for Marketing

Youngest Guest Speaker at Shri Ram College of Commerce, University of Delhi

The Power of Technology - Developer Student Clubs

Google Developer Groups DevFest 2019, India's Largest Developer Conference

Positions of Responsibility & Volunteering

IT Officer, Oxford Women in Computer Science

IT Officer, Oxford Women in Business

University of Oxford MSc Academic Supervisory Representative

Solutions Challenge Lead, Google Developer Students Club Oxford

Mathematics Admission Test Marker, University of Oxford

Founder & Lead – Google Developer Student Clubs

01/2019 – 07/2020

One of the few students selected globally by Google

- Conducted 10+ workshops, trained 300+ students, delivered talks on Cloud, Machine Learning, Data Science, Web & Mobile Application Development.
- Facilitated Google Cloud Platform Crash Course, Explore ML & hackathons to foster a strong technical developer community. Supervised & led live projects

Teaching Assistant - Computer Literacy Program

07/2019 – 03/2020

University of Delhi

- Served as a Teaching Assistant in Computer Literacy Program, which aims to teach women foundational basics of Computer Science in order to help them restart their career.
- Undertook weekly classes, elucidated core basics & hands-on over general-purpose industry tools

Mentor – Google Code-in at TensorFlow

12/2019 – 01/2020

- Mentored students to get started with open source developments for TensorFlow.
- Developed problem statements on BERT model, beginner friendly resources, reviewed submissions, provided constructive feedback & guidance