Shrey Bansal

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Education

- **Indian Institute of Technology Delhi** — New Delhi, India
  B.Tech, Computer Science & Engineering; ***GPA: 3.79 (9.45/10.0)*** — *July 2018 – Present*
- **Lancers Army School** — Surat, India
  CBSE All India Senior School Certificate Examination 2018; ***Percentage: 94.4/100*** — *April 2002 – April 2018*

Scholastic Achievements

- **Joint Entrance Examination (JEE) Advanced 2018**: Secured **All India Rank 72** among millions of candidates
- **Joint Entrance Examination (JEE) Mains 2018**: Secured **All India Rank 175** among millions of candidates
- **IIT Delhi Merit Prize**: Awarded for 2 consecutive semesters in 2018-19 for being in top 7 percentile in the institute.
- **National Standard Examination 2018**: In top 10 position in the Merit List for Physics and Chemistry.

Publications & Patents

- **Multi-Objective Genetic Algorithm Based Deep Learning Model for Automated COVID-19 Detection using Medical Image Data**: *Under Review at IEEE Transactions on Industrial Informatics, 2020*
  - **Vision**: A new feature learning technique is proposed for screening COVID-19 patients using chest CT Scans.
  - **MOGA**: The model proposed in the study uses a three-step architecture, consisting of a Convolutional Autoencoder based unsupervised feature extractor, a Multi-Objective Genetic Algorithm based feature selector and a Bagging Ensemble of Support Vector Machines based classifier.
- **Transfer learning based ensemble support vector machine model for automated COVID-19 detection using lung computerized tomography scan data**: *Under Review at MBEC - Springer Journals, 2020*
  - **COVID-19**: Designed a robust binary classification deep learning model to diagnose COVID-19 using CT scan.
  - **Vision**: Used techniques like Transfer Learning, Extreme Learning Machines, Ensemble to train the model.
- **An RNN-LSTM based Remaining Battery Capacity Prediction Model**: *Under Review at Applied Soft Computing - Elsevier Journals, 2020*
  - **ML**: Developed a novel feature selection and engineering scheme for battery capacity prediction using properties.
  - **RNNs**: The proposed design uses a recurrent neural network (RNN) variant Long term short memory (LSTM).

Experience

- **University of California, San Diego** — Remote, India
  Research and Development Assistant — *Dec 2020 - Present*
  - **Machine Learning**: Working on integrating machine learning solutions to the OpenROAD project - an autonomous, 24-hour, open-source layout generation flow (RTL-to-GDS).
  - **Reinforcement Learning**: Building state-of-the-art placement solutions using popular deep reinforcement techniques like Deep Q Networks, Policy Gradients in the Electronic Design Automation domain.
- **Stanford School of Business, USA & Indian Institute of Management Ahmedabad** — Remote, India
  Research Assistant — *Aug 2020 - Dec 2020*
  - **Data Science**: Understanding the Profiles and Motives of Repeat Offenders using Survey Data and DS Tools.
  - **Machine Learning**: Analyze profile of repeat offenders and recommend strategies for rehabilitation using ML.
- **Anasakta Labs** — Noida, India
  Machine Learning Intern — *May 2020 - July 2020*
  - **EDA**: Designed solution for Electronic Design Automation Cell Placement problem using Graph Neural Network.
  - **GNNs**: Studied various Graph Neural Networks (GNNs) including Graph Attention Networks, Hypergraph Convolutional Attention Networks, Graph Convolutional Networks Position-aware Graph Neural Networks.
  - **Pytorch Geometric**: Trained the model using custom loss function designed to balance the wirelength and congestion simultaneously using Pytorch Geometric.

- **Robert Bosch** Bangalore, India
  Research Intern *Dec 2019 - Jan 2020*
  - **NLP**: Built a Question Answering Google BERT model trained on SqUAD 2.0 Dataset. Fine tuned the model parameters with the given corpus.
  - **Chatbot**: Designed a chatbot GUI for QA using libraries like Spacy, Nltk, Pytorch.

Projects

- **Smart Building Energy Management System**: Working on an IoT and Cloud based automated system to monitor and optimize energy efficiency and performance. ***(Prof. Bijaya Panigrahi)*** *April 2020 - Present*
- **Respiratory Disease Identification using Respiratory Sound**: Worked on Lung Diseases Diagnosis using CNN by extracting MFCC coefficients from the Respiratory Sound Data. ***(Prof. SD Joshi)*** *March 2020 - May 2020*
- **Plagiarism Detector**: Designed a plaglarism detector which finds similarity in documents using N-Grams and TF-IDF in C. Modified jaccad similarity was used as a measure of similarity. ***(Prof. Kolin Paul)*** *Aug 2020 - Sep 2020*
- **Toy Prolog Interpreter**: Implemented REPL interpreter which takes the generated AST and queries to generate the solution space using backtracking and unification in Ocaml. ***(Prof. Sanjiva Prasad)*** *March 2020 - April 2020*
- **Surface Roughness Prediction in Micro Milling**: Developed a robust Machine Learning model using Extreme Learning Machine Regression to predict surface finish using SFD. ***(Prof. Sunil Jha)*** *Oct 2019 - Dec 2019*
- **Real Time Vehicle License Plate Recognition** : Designed the system, working at 40 fps, using CNN and connected-component analysis on a specialized hardware. ***(Prof. Anshul Kumar)*** *Aug 2019 - Feb 2020*
- **VGA Graphics Display with FPGA Basys-3 Board**: Designed a VGA Display Controller in VHDL for the timing circuit for VGA Display along with a Ping Pong game controller. ***(Prof. Anshul Kumar)*** *Oct 2019 - Nov 2019*

Technical Skills

- **Languages**: C++, C, Java, Python, VHDL, SML, OCaml, HTML5, JavaScript, CSS
- **Libraries**: NumPy, Pandas, Scikit, TensorFlow, MatPlotLib, OpenCV, Pytorch, Pytorch Geometric, Keras
- **Technologies**: AWS, MATLAB, Xilinx ISE and Vivado, AutoDesk, Latex, Git, Android Studio

Relevant Courses

- **Computer Science**: Artificial Intelligence, Machine Learning, Data Structures and Algorithms, Computer Architecture, Programming Languages, Design Practices, Computer Networks, Algorithmic Design, Digital Logic and System Design
- **Others**: Algebra, Discrete Mathematics, Probability and Stochastic Process, Signal and Systems, Macroeconomics
- **Self**: Deep Learning, Computer Vision, Natural Language Processing, Data Analysis in Python

Extra Curricular Activities

- **Winner of TVS Credit E.P.I.C. IT Challenge**: Won a cash prize of Rs 1,00,000 (USD 1500) and represented IIT DELHI in the national hackathon. *Feb 2020*
- **Merit Prize in International Cyber Security Hackathon**: Secured 10th Rank Overall in HCL Hack IITK among thousands of participants from 37 countries. *Aug 2020*
- **Reviewer at International Journal of Infectious Diseases**: Junior Member. *Sep 2020 - Present*
- **Executive at ACES-ACM**: Executive in the society for Computer Science Engineering. *Oct 2018 - Present*