Ayan Sengupta

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Interests

Machine Learning, Deep Learning, Reinforcement Learning, NLP, Computer Vision

Work Experience

- **NEC Corporation** — Tokyo, Japan
  Machine Learning Researcher (Automated Negotiation Team, Central Research Laboratory) — *Oct'19 - Present*
  - Designed and implemented a novel **Reinforcement Learning** and **Deep Learning** based state-of-the-art automated negotiating agent framework with an average performance improvement of 25% and **submitted an international patent**.
  - Published our Bidding algorithm in a leading international AI conference **AAMAS 2021** (acceptance rate 25%).
  - Designed and implemented a NLP equivalent seq-to-seq automated negotiation agent with **Transfer Learning** capabilities with an overall 7% performance improvement. Filed an international patent and submitted a paper for **IJCAI 2022**.
  - Reviewed Business Requirement Specifications (BRS) and Implementation guidelines of eNegotiation project (Public) for The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) as an expert member.
- **Indian Institute of Technology Bombay** — Mumbai, India
  Research Assistant (Control and Computing Laboratory) — *Aug'16 - Jun'19*
  - Proposed and implemented a novel algebraic solver for solving boundary control problem of real world applications governed by partial differential equations; **published a paper** in an international conference (SIAM-PD19).
  - Implemented algorithms for checking potential solution spaces of PDEs using **Python** and **SageMath** for "Algebraic Solver of PDEs" project funded by Ministry of Science and Technology, India.

Education

- **Indian Institute of Technology Bombay** — Mumbai, India
  Master of Technology in Electrical Engineering; CGPA: 9.14 — *2016 – 2019*
- **Indian Institute of Engineering Science and Technology, Shibpur** — Howrah, India
  Bachelor of Engineering in Electrical Engineering; CGPA: 7.77 — *2011 – 2015*

Other Projects

- **Automatic Trading Bot:** Created a sophisticated cloud-based automated cryptocurrency trading bot as a hobby project which guarantees an increase of the initial holding coin using **Python** and Binance API. *Mar'21 - Present*
- **Fake News Detection:**Trained a NLP and deep learning based fake news generating model using **Tensorflow** and deployed using twitter API as a part of "Fake News Detection" project. *May'19 - Feb'21*
- **Inverse Image Captioning Model:** Trained a Deep Convolutional GAN based model in **Tensorflow** for generating realistic images from text descriptions as the course project of "Advanced Machine Learning" course. *Jan'18 - May'18*
- **Comment Moderation System:** Trained a Bidirectional LSTM based model and deployed on Heroku for automatic classification of abusive and toxic comments as apart of a PoC for "Comment Moderator System". *May'18 - Sept'18*
- **IIT Bombay Website:** Created the official website for "Control and Computing specialization" of Electrical Engineering Department using **Bootstrap** and enabled **Markdown** based effortless website updates for student administrators. *May'18*
- **Satellite Image based Water Resource Survey:** Trained a CNN based model for water body detection and survey from satellite images with an overall accuracy of 98% as the course project of "Foundations of Machine Learning". *July'17 - Nov'17*
- **Kaggle:** Created a model for predicting the time remaining for next laboratory earthquake from real-time seismic data in "LANL Earthquake Prediction challenge" and received a silver medal with MAE score of 2.48 (top score: 2.26).
- **Kaggle:** Predicted the capability of each applicant for repaying a loan using LightGBM based classifier for "Home Credit Default Risk Challenge" with a score of AUC-ROC 0.792 (top score: 0.805) on public leaderboards.
- **Kaggle:** Predicted the probability of a system being hit by a malware for "Microsoft Malware Prediction" with a AUC-ROC score of 0.634 (Top score: 0.676) on private leaderboards.

Technical Skills

- **Languages / Frameworks:** Python, SQL, TensorFlow (Google Certified), Keras, scikit-learn, Flask, NegMAS, Pandas.
- **Others:** Docker, AWS Sagemaker, Bootstrap, SageMath, LaTeX, Markdown, Git, Streamlit.
- **Domains:** Computer Vision, Natural Language Processing, Reinforcement Learning, Unsupervised Learning.

Awards

- **Automated Negotiating Agents Competition 2020:** Secured 2nd position by creating a novel autonomous negotiating agent that negotiates successfully on behalf of a factory manager in a simulated supply chain management. *Jan'21*
- **Kaggle: Silver medal in LANL Earthquake Prediction:** In this competition hosted by Los Alamos National Laboratory, I created a model to predict the time remaining before laboratory earthquakes occur from real-time seismic data and. *Jan'19*
- Secured 2nd position by designing an Autonomous Robot capable of Object Detection and Tracking by Image Processing *Apr'14*
- Secured 2nd position in Autonomous Robotics competition by designing an autonomous robot capable of traversing through a maze by detecting different signs like arrows and crosses and distinguishing colours like green and red. *Apr'14*