Amlaan Bhoi

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Education

- **University of Illinois at Chicago** — Chicago, IL
  M.S. in Computer Science; GPA: 3.85/4.0 — *Aug 2017 - May 2019*
  - **Thesis**: Invariant Kernels for Few-shot Learning (Advisor: Xinhua Zhang)
  - **Focus**: Computer vision, machine learning, optimization
  - **Relevant Coursework**: Advanced Machine Learning, Data Mining & Text Mining, Applied Artificial Intelligence, AI Applications: Innovation & Entrepreneurship, Introduction to Data Science
- **Amity University** — Noida, India
  B.Tech. in Computer Science & Engineering; GPA: 3.32/4.0 (8.28/10.0) — *Jul 2013 - May 2017*

Experience

- **Amazon.com Inc.** — Seattle, WA
  Applied Scientist (L4) — *Jan 2020 - Present*
  - Working on computer vision and natural language processing systems in the WW Returns, ReCommerce & Sustainability org.
- **CCC Information Services** — Chicago, IL
  Senior Data Scientist, Computer Vision — *Jun 2019 - Jan 2020*
  - Developed novel multi-spectral image representation using mask blending resulting from multiple image segmentation models to generate features for repair/replace operation decision classification resulting in 35% increase in recall at 90% precision (in production).
  - Developed, scaled, and deployed multi-stage data generation, model training, testing, and deployment DAGs on Apache Airflow to automate model life-cycle development.
  - Implemented custom convolutional neural network encoder based few-shot learning algorithm in PyTorch for damage type categorization resulting in 85% F-1 score compared to 10% manual decision baseline.
  - Promoted code reviews, best code quality practices, and ML version control. Organized research seminars and TA-ed for internal Advanced Computer Vision class.

  R&D Intern, Computer Vision — *May 2018 - May 2019*
  - Implemented and trained convolutional neural network model in TensorFlow to classify views of automobile with 97% average F-1 score (in production). Also worked on freezing the model, writing production code, and writing framework for collecting metrics real-time.
  - Implemented and trained ensemble of convolutional neural network architectures in TensorFlow for total loss or repairable decision classification with 92% F-1 score (in production).
  - Designed a shallow convolutional neural network in TensorFlow to classify image orientation in absence of EXIF data with 99% F-1 score. In addition, changed the problem to a regression problem and trained a model to predict the angle of rotation.
- **Reliance Communications** — Navi Mumbai, India
  Software Engineer Intern — *May 2016 - Aug 2016*
  - Implemented scalable Dijkstra's algorithm in Java on 10K+ network nodes to find shortest path for signal propagation resulting in 25% reduction in repair costs.
- **OSSCube** — Noida, India
  Software Engineer Intern — *May 2015 - Aug 2015*
  - Designed, developed, and released iOS Twitter client using Fabric SDK to search, stream, and itemize tweets. Used Objective-C on XCode and Firebase for development.

Projects

- **OCR using Conditional Random Fields (Python, C++, NumPy)**:
  - Implemented a CRF in $\mathcal{O}(mn^2)$ time complexity to achieve 84% letter-wise accuracy on Upenn OCR dataset.
  - Implemented OpenMPI CRF using PETSc and Tao to achieve 77.1% letter-wise accuracy with near linear speed-up.
  - Benchmarked against SVM-MC and SVM-Struct with robustness to adversarial attacks.
- **ARYouThereYet (Swift)**: Designed and developed an iOS ARKit application for navigation, search, and visualization of POI.
- **Aspect-based Sentiment Analysis (Python, TensorFlow)**: Implemented Deep Memory Networks to achieve 77.66% accuracy and 69% F1-score on SemEval 2014 dataset.
- **Iris - Speech to Code (Python, Microsoft Azure)**: Trained an intent classification model to classify 15+ commands to translate natural speech commands to legible text.
- **AI Lifeguard (Python, Microsoft Azure)**: Trained a CNN-LSTM model on Microsoft Azure for classification of drowning people in swimming pools with 72% F1-score.

Awards & Scholarship

- Awarded **Outstanding Thesis Award** (out of all theses) at University of Illinois at Chicago during Spring 2019.
- Reviewer for **Computational Intelligence - Wiley**.
- Presented poster on **Tiramisu Densenet Architecture for Precise Segmentation** for Intel AI at CVPR 2018.
- Selected as **Intel AI Student Ambassador** (only 150 students) to research, publish, and share work on machine learning.
- Won **Best Microsoft Hack** (out of 220 teams) at HackHarvard 2017.
- Placed 16/50 teams at **Google Games: Campus Edition 2017** at UIC.
- Won **Best Technical Innovation** award (out of 800 students) at Amity University Convocation 2017.
- Elected as **Vice-Chair** for ACM Amity Student Chapter (out of 800 students) at Amity University.

Preprints

- **Bhoi, Amlaan**. "Monocular depth estimation: A survey." *arXiv preprint arXiv:1901.09402* (2019).
- **Bhoi, Amlaan**. "Spatio-temporal Action Recognition: A Survey." *arXiv preprint arXiv:1901.09403* (2019).
- Majumdar, Somshubra, **Amlaan Bhoi**, and Ganesh Jagadeesan. "A comprehensive comparison between neural style transfer and universal style transfer." *arXiv preprint arXiv:1806.00868* (2018).
- **Bhoi, Amlaan**, and Sandeep Joshi. "Various Approaches to Aspect-based Sentiment Analysis." *arXiv preprint arXiv:1805.01984* (2018).
- **Bhoi, Amlaan**. Invariant Kernels for Few-shot Learning. Diss. 2019.

Skills

- **Languages**: Python, C++, SQL, UNIX Scripting
- **Technologies**: PyTorch, TensorFlow, Scikit-Learn, NumPy, Pandas, OpenCV, Docker, Apache Airflow, AWS SageMaker
- **Databases**: Amazon Redshift, MySQL, MongoDB