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
  - **Coursework**: Advanced Machine Learning, Data & Text Mining, Applied Artificial Intelligence, AI Applications: Innovation & Entrepreneurship
- **Amity University** — Delhi, India
  B.Tech. in Computer Science & Engineering; GPA: 3.32/4.0 — *Jul 2013 - May 2017*

Experience

- **Amazon.com** — Bellevue, WA
  Applied Scientist - II — *Apr 2022 - Present*
  - Prototyping large language models (LLMs) using parameter efficient fine-tuning (PEFT) for constrained clarifying question generation with return intent-product alignment, resulting in 10% increase in customer response specificity.
  - Leading research and development of a fast NLP pipeline to extract coherent and actionable customer insights using keyphrase extraction and hierarchical clustering from customer returns data to power product support and resolution recommendations resulting in 15% return rate reduction.
  - Authored and presented 5 technical, peer-reviewed manuscripts to internal Machine Learning (ML) conferences. Peer reviewed 25+ papers for internal ML conferences.

  Applied Scientist - I — *Jan 2020 - Apr 2022*
  - Designed, developed, and deployed novel multi-modal (X-ray image, product text, catalog attributes) framework ML models to ID and sideline customer returns fraud resulting in automating 1.2M+ fraud inspection touchpoints with 95%+ F-1 score.
  - Designed and developed a soft-labeling method using student ML models to label unlabeled samples reducing manual annotations by 70% and accelerating team's feature store development.
- **CCC Intelligent Solutions** — Chicago, IL
  Senior Data Scientist, Computer Vision — *Jun 2019 - Jan 2020*
  - Developed novel multi-spectral image representation using mask blending sourced from multiple image segmentation models to generate features for repair/replace operation decision classification resulting in 35% increase in recall at 90% precision.
  - Developed, scaled, and deployed multi-stage data generation, model training, testing, and deployment DAGs on Apache Airflow to automate model life-cycle development reducing manual effort by 50%.
  - Designed a custom, few-shot learning convolutional neural network (CNN) encoder for vehicle damage type classification resulting in 85% F-1 score compared to 25% manual baseline.

  R&D Intern, Computer Vision — *May 2018 - May 2019*
  - Designed, trained, and deployed an ensemble of CNN models for vehicle total-loss or repairable classification (10M+/year) with 92% F-1 score.
  - Designed and deployed a CNN to classify 21 angles from vehicle images (10M+/year) with 97% F-1 score. Further, worked on model quantization, testing framework, and metrics collection.
  - Developed a lightweight CNN to classify image vehicle orientation in absence of EXIF data with 99% F-1 score.

Projects

- **OCR using Conditional Random Fields**:
  - Implemented a CRF in $\mathcal{O}(mn^2)$ time complexity to achieve 84% letter-wise accuracy on Upenn OCR dataset benchmarking against SVM-MC and SVM-Struct with robustness to adversarial attacks.
  - Implemented OpenMPI CRF using PETSc and Tao to achieve 77.1% letter-wise accuracy with near linear speed-up.
- **ARYouThereYet**: Designed and developed an iOS ARKit application for navigation, search, and visualization of points of interest in augmented reality with support for navigation direction placement.

Awards

- Awarded **Outstanding Thesis Award** (out of all MS/PhD theses) at University of Illinois at Chicago (2019).
- Authored and presented poster on **Tiramisu Densenet Architecture for Precise Segmentation** for Intel AI at Conference on Computer Vision and Pattern (CVPR) (2018).
- Selected as **Intel AI Student Ambassador** (150 students annually) to research, publish, and share work on ML (Article, Profile) (2017-2018).
- Won **Best Microsoft Hack** (out of 220 teams) at HackHarvard for developing a CNN-LSTM model to detect drowning in swimming pools (2017).
- Won **Best Technical Innovation** award (out of 800 students) at Amity University Convocation (2017).

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).
- **Bhoi, Amlaan**. "Invariant Kernels for Few-shot Learning." University of Illinois at Chicago. Thesis. https://hdl.handle.net/10027/23714 (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).

Skills

- **Languages**: Python, C++, SQL
- **Technologies**: PyTorch, Scikit-Learn, NumPy, Pandas, OpenCV, Docker, Apache Airflow, AWS SageMaker, Athena, Quicksight, Amazon RDS