Sushil Thapa

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Work Experience

- **Fusemachines (New York, USA)** — Kathmandu, Nepal
  Machine Learning Engineer — *Sep 2017 - Dec 2020*
  - Designed and built Pytorch based handwritten document extraction model with upto 2% CER using CRNN model with CTC; deployed it as a scalable ML SAAS product on AWS by collaborating with multidisciplinary teams.
  - Built end-to-end pipeline for custom object detection/tracking and deployed on a Jetson Nano edge device; achieved 82% mAP score with pre-training, customized SSD & loss function and upto 22 fps with quantization and pruning.
  - Investigated evolutions to Self-Critical Sequence Training for Image Captioning; explored Multimodal Machine Learning with Visual Self-Attention and applying Reinforcement Learning to optimize non-differentiable metrics.
- **New Mexico Tech (Los Alamos National Lab)** — New Mexico, USA
  Graduate Research Assistant — *Jan 2021 - Present*
  - Built large-scale extreme multi-label text classification system leveraging BERT and Hierarchical Attention Networks.
  - Extracted robust determinants of classification by applying interpretable Machine Learning with SHAP & LIME and self-supervised knowledge transfer with TabNet.
  - Ongoing Master's thesis on Knowledge Distillation and its impact on transferability, generalization and robustness.
- **Spark Tech Pvt. Ltd.** — Kathmandu, Nepal
  R&D Engineer — *Oct 2016 - Sep 2017*
  - Built audio segmentation and tagging with audio fingerprint hashing algorithm.

Experience

- **Researcher : Stanford AI Lab, Stanford University**
  Experimented with end-to-end multimodal data augmentation via gradient-free optimization. — *Jul 2021 - Nov 2021*
- **Robotics Engineer : Robotics and Automation Center, Thapathali Campus** — Kathmandu, Nepal
  Built theme-based robots, Represented Nepal & won runner-up in int'l robotics competition. — *Nov 2014 - Sep 2016*
- **Google DSC Lead : New Mexico Tech University Chapter** — New Mexico, US
  Established and leading Google-recognized student club to organize university tech events. — *Jun 2021 - Present*

Education

- **New Mexico Tech** — New Mexico, USA
  Master's in Computer Science — *Jan 2021 - May 2022(Expected)*
  Courses: *Machine Learning, Artificial Intelligence, Neural Networks, Data Science, Advanced Algorithms, Compiler Design*
- **Columbia University in the City of New York**
  Artificial Intelligence MicroMasters® — *2017 - 2018*
- **Tribhuvan University, Institute of Engineering** — Kathmandu, Nepal
  Electronics and Communication Engineering, Focus: Robotics&AI — *2012 - 2016(Attended)*

Skills

- **Languages** Python, C++
- **Tools** PyTorch, TensorFlow2(Keras), Numpy, Pandas, Matplotlib, OpenCV, Scikit-learn, Transformers

Publication

- "An Effective Baseline for Out-of-distribution detection and Robustness to Distributional Shift," 2021 20th IEEE International Conference on Machine Learning and Applications (ICMLA), 2021, pp. 278-285, doi: 10.1109/ICMLA52953.2021.00050
  - Currently state-of-the-art in paperswithcode.com leaderboard in some vision and NLP OOD benchmarks

Awards

- Fatima Al-Fihri International Predoctoral Fellowship 2021
- AI Fellowship 2017, Fusemachines Inc.
- Engineering Scholarship 2013, Ministry of General Affairs, Nepal

Projects

- **Opensource App: Posture Recognition System(rectif-ai):** Built a body keypoint tracking and bad posture detection system based on 'Posenet' and Neural Net for official Pytorch Hackathon 2019; App runs on background, tracks posture of user and notifies when bad posture is detected; Opensourced and published: *'pip install rectif-ai'*
- **Hawaiian Automatic Speech Recognition System(Hawaiian-ASR):** Built hawaiian language recognition system from the scratch by scraping data, automatic force alignment of text and speech for labels and training with DeepSpeech2. (2017)