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 - June 2022(Expected)*

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
  - Currently state-of-the-art in paperswithcode.com leaderboard in some vision and NLP OOD benchmarks
- "Highlighted Reviewer of ICLR 2022"

AWARDS

- Fatima Al-Fihri International Predoctoral Fellowship 2021
- Outstanding annual contribution award, Fusemachines (2018, 2019)
- Artificial Intelligence 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)