Sushil Thapa

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Work Experience

- **Fusemachines** — New York, US / Kathmandu, Nepal
  Machine Learning Engineer, Senior Machine Learning Enginner — *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 and tracking on a Jetson Nano edge device; Achieved 82% mAP score with pre-training, customized SSD & loss function and upto 22 fps with quantization, pruning and TensorRT optimization.
- **New Mexico Tech + Los Alamos National Lab** — New Mexico, US
  Graduate Research Assistant — *Jan 2021 - Present*
  - Built large-scale extreme multi-label text classification system leveraging BERT and Hierarchical Attention Networks.
  - Investigated 3D Mode-connectivity and analyzed loss landscapes of Deep Neural Networks for Fast Ensembling.
  - Extracted robust explainable features by applying interpretable Machine Learning with SHAP & LIME and self-supervised knowledge transfer with TabNet in Health/RNA-Seq.
- **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 : Sebastian Thrun Lab, SAIL Stanford University** — Remote
  Experimented with end-to-end multimodal data augmentation via gradient-free optimization. — *Jul 2021 - Nov 2021*
- **Mentee : Google Deepmind Mentorship (EEML 2021)** — Remote
  Exploring novel self-supervised sample efficient offline Reinforcement learning system. — *Jul 2021 - Present*
- **Google Developers Student Club Lead : New Mexico Tech University Chapter** — New Mexico, US
  Established and leading Google-recognized student club to organize different Google tech events. — *Jun 2021 - Present*
- **Robotics Engineer : Robotics and Automation Center, Thapathali Campus** — Kathmandu, Nepal
  Built theme-based robots, Represented Nepal & runner-up in int'l robotics competition. — *Nov 2014 - Sep 2016*

Education

- **New Mexico Tech** — New Mexico, USA
  Master's in Computer Science, Focus: Machine Learning — *Jan 2021 - May 2022 (Expected)*
  Courses: *Artificial Intelligence, Machine Learning, Neural Networks, Data Science, Advanced Algorithms, Compiler Design*
- **Tribhuvan University, Institute of Engineering** — Kathmandu, Nepal
  Electronics and Communication Engineering, Focus: Robotics&AI — *2012 - 2016(Attended)*
  Courses: *AI, Data Mining, Big Data Technologies, Probability and Statistics, Discrete Structures, Digital Signal Processing, C, C++*

Skills

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

Publication

- S. Thulasidasan, **Sushil Thapa**, S. Dhaubhadel, G. Chennupati, T. Bhattacharya and J. Bilmes, "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 i.e. rank #1 in paperswithcode.com leaderboard in vision and NLP out-of-distribution benchmarks

Awards

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

Additional Projects

- **Research: MSCOCO Image Captioning:** Investigated ways to improve image captioning models based on evolution of a recent state-of-the-art SCST paper (Rennie et. al, CVPR'16) with its first author. Tech: Reinforcement Learning(SCST), CNN, RNN, Self Attention, Beam Search (Oct'17 - Apr'18)
- **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'19; 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)