Nisan Aryal

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Nepalese

Professional skills

Field of Expertise: Image classification, Segmentation, Object detection, Speech Enhancement, Acoustic Scene Classification, Computer Vision, Deep Learning
Libraries: Pytorch (preferred), Keras, Open CV, Pillow, Librosa, Numpy, Pandas
Programming Languages: Python, Java, Groovy and Grails, C/C++
Languages: Nepali (native), English (**IELTS-7.5, score from 2019**), Korean (**studied from 2014 to 2018, completed level 3**), Hindi
Others: Docker, Git, Slack, Trello, Anaconda

Current

AI Research Engineer
AI Research Engineer at Medical Media Technology Expert Group (MTEG Co., Ltd) (http://mteg.co.kr/en/)

Aug. 2021 – Present
Seoul, South Korea

- Responsible for researching, developing, and deploying deep learning models for **medical image and video** tasks, including **classification, detection, segmentation, and time series/sequential analysis.**
- Engaged in projects involving the segmentation of the human spine, **segmentation and detection of cancer and tumors** in the larynx, segmentation and **detection of diseases** in the eardrum, and segmentation of surgical tools and organs.
- Developed an AI model to segment the Airway, Epiglottis, Posterior lateral wall, and Tongue base. The model analyzed larynx videos, outlining the airway segmentation area. It then calculated the min and max points of this area to **classify the level of obstruction in the airway**.
- Researched the **classification of genetic diseases**, utilizing sequential genetic information with a bi-directional LSTM (long short-term memory) model achieving 98% accuracy.
- Researched, developed and deployed Multi model projects.
    * Developed a system for **identifying the optical view of Supraclavicular block for surgical anesthesia** using segmentation, followed by a time-series model.
    * Engineered a system to identify surgical tools in surgical videos, incorporating surgical phase estimation through a time-series model. Created a new phase estimation model with bi-LSTM **increasing the accuracy from 65% to 86%**
- Annotated data, trained, and deployed a model for **blurring faces in medical videos**, including surgical videos, emergency room footage, and ambulance videos.
- Developed a data annotation pipeline to optimize time and cost. **Established and maintained a CVAT server** integrated with a custom AI models for **auto annotation**.

Previous Experience

Research Assistant
Research assistant at PRML lab (http://pr.gachon.ac.kr/)

Aug. 2019 – Aug. 2021
Gyeonggi-do, South Korea

- Year 1:
    * Investigated **Acoustic Scene Classification** (ASC) with a focus on addressing the device mismatch problem arising from differences in recording devices.
    * Explored audio representation and architecture for ASC.
    * Studied technical reports and papers from the DCASE challenge.
    * **Proposed new architecture to mitigate device mismatch problem is ASC** achieving 75.99% in the TAU Urban Acoustic Scenes 2019 Mobile development dataset. (**state of the art at the time**)
- Year 2:
    * Explored **Speech Enhancement**, particularly examining approaches utilizing Short-Time Fourier Transform (STFT) and their limitations in handling noisy phases.
    * Investigated the application of deep complex networks for speech enhancement.
    * Reviewed papers related to the **Deep Noise Suppression (DNS) challenge**.
    * Explored the use of **Short Time Discrete Cosine Transform (STDCT) for speech enhancement**.

Software Engineer
Nuptse Technologies Pvt. Ltd

Oct. 2018 – July 2019
Kathmandu, Nepal

- Worked on backend for CRM software using Groovy and grails.
- Worked on web crawling using jsoup.

Mini Projects

Text To Speech(TTS)   Master's project

Studied about state of the art TTS models.

- Studied about Tacotron(1 and 2), Deep voice(1,2 and 3) and vocoders such as Wavenet, Mel-GAN, Waveflow, Waveglow etc.
- Trained TTS model and used the subtitle of a video to predict the speech and used the output to combine with action recognition and 3D modeling team to create a 3D avatar.

Image Deblurring   Master's project

Studied about state of the art image deblurring model.

- Studied about Scale Recurrent Network for Deep Image Deblurring, DeblurGAN and DeblurGAN-v2.
- Used the github code to train and test the results of each model.

Education

Master's in Software   Aug. 2019 – Aug. 2021

Gachon University   *Gyeonggi-do, South Korea*

Bachelor's in Electrical and Electronics Engineering (Specialized in Communication)   Aug. 2014 – Dec. 2018

Kathmandu University   *Dhulikhel, Nepal*

Publications

Optimal view detection for ultrasound-guided supraclavicular block using deep learning approaches, Scientific Reports, volume 13, 2023

Yumin Jo, Dongheon Lee, Donghyeon Baek, Bo Kyung Choi, **Nisan Aryal**, Jinsik Jung, Yong Sup Shin, Boohwi Hong

Frequency-Based CNN and Attention Module for Acoustic Scene Classification, Applied Acoustics, volume 210, pages 109411, 2023

Nisan Aryal, Sang-Woong Lee

Comparison of Attention Module for Acoustic Scene Classification, Proceedings of The 9th International Conference on Smart Media and Applications (SMA 2020), Jeju, Korea, September 2020

Nisan Aryal, Sang-Woong Lee