NGUYEN MAU DUNG

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EDUCATION

Nanodegree — ***Udacity*** — ***Self-Driving Car Engineer*** — ***Apr 2020 – May 2020***

Master's — ***Korea Institute of Science and Technology (KIST)*** — ***Mar 2018 – Aug 2020 (Expected)***

- *Major:* Human-Computer Interaction & Robotics — *CPA:* **4.25/4.50**
- *Thesis:* Image-based 3D Human Joint Angle Estimation for Daily Activities

Bachelor — ***Hanoi University of Science and Technology (HUST), Vietnam*** — ***Sep 2011 – Jun 2016***

- *Major:* Electronics and Telecommunications — Honor Program for Talented Engineers
- CPA: **3.58/4.00** — *Grade:* Very good *Rank:* 07/428 ***(top 2%)***

High School — ***Hatinh High School for Gifted Students (***Specializing in mathematics***)*** — ***Sep 2008 – Jun 2016***

SKILLS

Programming languages: Python, C++, C, ROS, Cuda, JavaScript; **Languages**: Native Vietnamese, Proficient English, Basic Korean;

Deep learning frameworks: Pytorch, Tensorflow, Keras; **Version control systems**: Git; **Operating systems**: Linux, Windows, MacOS.

PROJECTS

The AI-based athletic performance analysis system — ***Nov 2018 - Present***

- 3D Human joint angle and joint position estimation based on multi-view images/videos;

IMU-based spectrograms with deep CNN for the gait analysis system — ***Jan 2019 - Present***

- Classified three kinds of foot groups (Normal, abnormal, and athletes)
- Early detected senile disorders (Sarcopenia, cognition, depression, frailty, and falling experience).

EXPERIENCE

Artificial Intelligence Researcher — ***KIST, Seoul, Korea*** — ***Mar 2018 – Present***

- Estimated 3D human joint angles from multi-view images/videos. We built a new dataset that includes the images captured by 28 digital cameras and the ground truth of 3D human joint angles extracted from the Motion Capture System. The hip joint angles, knee joint angles, and ankle joint angles could be estimated with a small range of errors from 2.34 degrees to 8.26 degrees.
- Classified three kinds of foot groups (normal, abnormal, and athlete) by using spectrograms transformed from raw IMU sensor data as the input of deep CNN networks. Seven IMU sensors were attached to the lower human body while 29 semi-professional athletes, 19 normal participants, and 21 participants with foot abnormalities walked on a 20-m straight path. The three-foot groups could be classified with accuracies of 97.58%, 98.19%, and 99.40% when using 1 sensor (only Pelvis sensor), 3 sensors (the combination of Pelvis and 2 feet), and all 7 sensors respectively;
- Early detected senile disorders (Sarcopenia, cognition, depression, and frailty) by using spectrograms transformed from raw IMU sensor data and deep learning technology. Totally, 60 elderly people wearing seven IMU sensors were asked to walk on a straight corridor;
- Estimate 2D and 3D human pose from images and videos;
- Detected dangerous situations of elderly people in the bedroom based on 2D human body key points in images extracted by using the OpenPose algorithm. The system could raise a warning bell and send messages to their family members within 2-3 seconds;

Embedded Software Engineer — ***HUMAX VINA, Hanoi, Vietnam*** — ***Jul 2016 – Apr 2017***

- Developed automotive software;
- Developed set-top-box products. I was a member of the middleware team.

Research Assistant — ***ESRC Lab/HUST, Hanoi, Vietnam*** — ***Sep 2013 – Jun 2016***

- Developed algorithms to effectively fetch videos from servers via the HTTP protocol in order to improve users' experience;
- Monitored the Lab with 50 people in 6 research groups.

AWARDS

- The best paper award at 2020 IEEE International Conference on Consumer Electronics (Las Vegas, USA) (2020);
- Excellent student from the Dean of Hanoi University of Science and Technology (Vietnam) (2013, 2014);
- Third prizes in Vietnam Physics Olympiad (2010, 2011).

PUBLICATIONS

[1] *"Multiple Classification of Gait Using Time-Frequency Representations and Deep Convolutional Neural Networks"*, in IEEE Transactions on Neural Systems and Rehabilitation Engineering, doi: 10.1109/TNSRE.2020.2977049;
[2] *"IMU-based Spectrogram Approach with Deep Convolutional Neural Networks for Gait Classification",* 2020 ICCE (Las Vegas, USA);
[3] *"Walking-in-Place Characteristics-Based Geriatric Health Assessment Using Deep Convolutional Neural Networks"*, 2020 EMBC (Canada);
[4] *"Deep Neural Network-based gait classification using wearable inertial sensor data"*, 2019 EMBC, in Berlin, Germany;
[5] *"An evaluation of segment duration effects in HTTP adaptive streaming over mobile networks"*, 2015 NICS (Vietnam);
[6] *"Quality-delay tradeoff optimization in multi-bitrate adaptive streaming"*, 2015 ICCE (Las Vegas, USA).

PATENTS

[1] *"Smart Walk Simulator for Elderly Healthcare"*, Patent Registration No. 2019-0145553, South Korea;
[2] *"Method and system for evaluating elderly health status using stepping characteristics"*, Patent Registration No. 2019-0128445, South Korea;
[3] "*3D human body joint angle prediction method and system through the image recognition"*, Patent Registration No. 2019-0060025, South Korea.

PERSONAL TRAINING CERTIFICATES

Machine Learning
Standford Online (Coursera - Andrew Ng), 2018

- The course covered *(i)* Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks); (ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning); *(iii)* Best practices in machine learning (bias/variance theory, innovation process in machine learning and AI).

Deep Learning
Deeplearning.ai (Coursera Specialization – Andrew Ng), 2018

- The five courses in the specialization are Neural networks and deep learning; Improving deep neural networks: hyper-parameter tuning, regularization and optimization; Structuring machine learning projects; Convolutional neural networks; and Sequence models.

Self-driving Car Engineer
Udacity (Nanodegree – Sebastian Thrun), 2020

- The Nanodegree has two parts: Computer Vision, Deep Learning, and Sensor Fusion; and Localization, Path Planning, Control, and System Integration. During the course, I did the end-to-end self-driving car projects, such as finding lane lines; traffic signs classification; behavior cloning; extended Kalman filters; kidnapped vehicle using particle filters; path planning on the highway; PID controller; and programming a real self-driving car using ROS.

AI for Medicine
Deeplearning.ai (Coursera Specialization – Pranav Rajpurkar & Andrew Ng), 2020

- The specialization has 3 courses: AI for Medical Diagnosis, AI for Medical Prognosis, and AI for Medical Treatment. These courses covered how to diagnose chest x-rays and brain scans, evaluate models, handle missing data, estimate the effect of treatments, and efficiently automate the task of labeling medical datasets using natural language entity extraction and question-answering methods.