Dennis Hernando Núñez Fernández

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EDUCATION

• **'The Cornell, Maryland, Max Planck Pre-doctoral Research School', Germany (2020 Aug)**
Accepted after rigorous merit-based selection to participate in the CMMRS 2020, a one week long school with one-on-one interaction with top researchers (from Cornell, Maryland and Max Planck Institute) and lectures/seminars given by them on databases & data analysis, security & privacy, large-scale machine learning and theory of deep learning.

• **'10th Lisbon Machine Learning School', Lisbon, Portugal (2020 Jul)**
Accepted after a careful selection process based on merit and background to participate in LxMLS 2020. Summer school lasted a week and consisted of a series of lectures, lab sessions and practical talks from top researchers. This summer school covered both basic (e.g. neural networks) and advanced topics (e.g. deep learning, reinforcement learning).

• **'Pi School of Artificial Intelligence', Rome, Italy (2020 May - 2020 Jun)**
Won a merit-based grant to attend the Pi School of AI, a 8 weeks long school with classes and seminars on Machine Learning and Deep Learning, hands-on projects, and mentoring by top researchers. I worked on creating a summary generation system using BERT models, and providing a working model for the Entire Digital S.r.l. in record time.

• **'Universidad Nacional de Ingeniería', Lima, Peru (2010 Mar - 2015 Jul)**
Bachelor in Science with mention in Electronic Engineering. Ranked 1st in graduating class. GPA: 3.5/4.0 (A). Taking major courses on Digital Systems, Signal Processing, Control Theory and Telecommunications. Active participation in the IEEE Student Branch at Circuits and Systems Society and participated in some national robotics competitions.

LANGUAGES

• **Spanish** *(native)*, **English** *(advanced)*, **German** *(basic)*

ACHIEVEMENTS AND AWARDS

• Selected to participate in the Cornell, Maryland, Max Planck Pre-doctoral School (2020)
• Winner of a full grant for the School of AI programme, Pi School (2020)
• Selected as a winner of the AI Latin American SumMIT, held at the MIT Media Lab (2020)
• Selected by Fondecyt Peru for a research stay at the University of Padua, Italy (2019)
• LXAI Travel Grant for the Conference on Neural Information Processing Systems NeurIPS (2019)
• Secure and Private AI Challenge Scholarship from Facebook AI (2019)
• ICML Travel Grant for the International Conference on Machine Learning ICML (2019)
• LXAI Travel Grant for the International Conference on Machine Learning ICML (2019)
• Awarded with an UNESCO/Poland Co-Sponsored Fellowship (2016)
• Ranked 1st in the graduating class of Electronic Engineering - UNI (2015)

PUBLICATIONS

• *Workshop paper:* D. Núñez-Fernández, L. Ballan, G. Jiménez-Avalos, J. Coronel-Herrera, M. Zimic-Peralta. 'Automatic semantic segmentation for prediction of tuberculosis using lens-free microscopy images'. ML for Global Health Workshop at ICML 2020. Vienna, Austria. (2020)
• *Workshop paper:* D. Núñez-Fernández, L. Ballan, G. Jiménez-Avalos, J. Coronel-Herrera, M. Zimic-Peralta. 'Using Capsule Neural Network to predict Tuberculosis in lens-free microscopic images'. HSYS Workshop at ICML 2020. Vienna, Austria. (2020)
• *Workshop paper:* D. Núñez-Fernández, F. Porras-Barrientos, M. Vittet-Mondoñedo, R. H. Gilman, M. Zimic. 'Prediction of gaze direction using Convolutional Neural Networks for Autism diagnosis'. LatinX in AI Research at NeurIPS 2019. Vancouver, Canada. (2019)
• *Workshop paper:* B. Saldivar-Espinoza, D. Núñez-Fernández, F. Porras-Barrientos, A. Alva-Mantari, L. S. Leslie, M. Zimic. 'Portable system for the prediction of anemia based on the ocular conjunctiva using Artificial Intelligence'. LatinX in AI Research at NeurIPS 2019. Vancouver, Canada. (2019)
• *Workshop paper:* D. Núñez Fernández. 'Development of a hand pose recognition system on an embedded computer using CNNs'. LatinX in AI Research at NeurIPS 2019. Vancouver, Canada. (2019)
• *Book chapter:* A. Aspilcueta Narvaez, D. Núñez Fernández, S. Gamarra Quispe, D. Lazo Ochoa. 'Smart Campus IoT guidance system for visitors based on Bayesian filters'. BTSym 2019. Lima, Peru. (2019)
• *Workshop paper:* D. Núñez Fernández, B. Kwolek. 'Hand Posture Recognition Using Convolutional Neural Networks'.

LatinX in AI Research at ICML 2019. California, USA. (2019)
• *Book chapter:* D. Núñez Fernández. 'Development of a hand gesture based control interface using Deep Learning'. SIMBig 2019. Lima, Peru. (2019)
• *Book chapter:* D. Núñez Fernández. 'Implementation of an indoor location system for mobile-based museum guidance'. SIMBig 2019. Lima, Peru. (2019)
• *Conference paper:* D. Núñez Fernández. 'Development of a hand pose recognition system on an embedded computer using Artificial Intelligence'. INTERCON 2019. Lima, Peru. (2019)
• *Conference paper:* D. Núñez Fernández. 'Implementation of a WiFi-based indoor location system on a mobile device for a university area'. INTERCON 2019. Lima, Peru. (2019)
• *Conference paper:* D. Núñez Fernández. 'Multi-subject continuous emotional states monitoring by using Convolutional Neural Networks'. XPOTRON 2019. Arequipa, Peru. (2019)
• *Conference paper:* D. Núñez Fernández, S. Hosseini. 'Real-time handwritten letters recognition on an embedded computer using ConvNets'. SHIRCON 2018. Lima, Peru. (2018)
• *Conference paper:* D. Núñez Fernández. 'A Real-Time Recognition System for User Characteristics Based on Deep Learning'. INTERCON 2018. Lima, Peru. (2018)
• *Book chapter:* D. Núñez Fernández, B. Kwolek. 'Hand Posture Recognition Using Convolutional Neural Network'. CIARP 2017. Valparaiso, Chile. (2017)

EXPERIENCE

• **Research Assistant (2018 Jun - Present)**
Universidad Peruana Cayetano Heredia. Lima, Peru
· Project: 'Detection of autism through emotion recognition and using Machine Learning'.
· Project: 'Diagnosing of tuberculosis using Deep Learning on lens-free microscopy images'.
· Project: 'Prediction of autism using gaze direction and convolutional neural networks'.
· Project: 'Detection of anemia using Machine Learning on images of the ocular conjunctiva'.

• **Fellow (2020 May - 2020 Jun)**
Pi School of Artificial Intelligence. Rome, Italy
· Project for Entire Digital S.r.l.: 'Creation of an automatic summary generation system using BERT models'.

• **Research Fellow (2019 Dec - 2020 Mar)**
University of Padova. Padova, Italy
· Project: 'Implementation of a neural network for the diagnosis of tuberculosis using lens-less microscopy'.

• **Researcher (2019 Mar - 2019 Aug)**
Universidad Nacional de Ingeniería. Lima, Peru.
· Project: 'Development of a IoT guidance system for the UNI-FIEE campus using Naive Bayes'.

• **Research Assistant (2016 Oct - 2017 Mar)**
AGH University of Science and Technology. Krakow, Poland.
· Project: 'Hand posture recognition using Convolutional Neural Network'.

• **Research and Development (2015 Jun - 2015 Sep)**
Telecommunications Research Center INICTEL UNI. Lima, Peru.
· Project: 'Control of an analog camera with an FPGA for a custom satellite application'.

ACADEMIC SERVICE

• *Reviewer:* LXAI Workshop at NeurIPS (2019), LXAI Workshop at ICML (2020), IEEE INTERCON (2020).
• *General and Operations:* Session chair at UNESCO UCTE (2016), Volunteer at LXAI Workshop at ICML (2019, 2020), Volunteer at LXAI Workshop at NeurIPS (2019).

RELEVANT RESEARCH PROJECTS

• **'Creation of an automatic summary generation system using BERT models' (2020)**. *Pi School of Artificial Intelligence, Italy.* Project developed by a partner and me for Entire Digital S.r.l. in record time. Several NLP techniques and BERT models were evaluated (on our collected dataset) for automatic biography generation.
• **'Diagnosing of tuberculosis using Deep Learning on lens-free microscopy images' (2020)**. *Universidad Peruana Cayetano Heredia, Peru.* Implementation of a CNN architecture to detect TB with high accuracy on images obtained from a lens-free microscope. The dataset was collected by our team. Training using Tensorflow.
• **'Prediction of autism using gaze direction and convolutional neural networks' (2019)**. *Universidad Peruana Cayetano Heredia, Peru.* Eye tracking system using CNNs in order to be appplied for Autism diagnosis. Training using

the captured dataset and Caffe. Implementation using OpenCV and Python.
• **'Development of a IoT guidance system for the UNI-FIEE campus using Naive Bayes' (2019)**. *Universidad Nacional de Ingeniería, Peru.* Implementation of a indoor location system for guidance using WiFi signals and a Bayesian estimator. The system was implemented on a Raspberry Pi 3. Offline analysis performed in Python.
• **'Detection of anemia using Machine Learning on images of the ocular conjunctiva' (2018)**. *Universidad Peruana Cayetano Heredia, Peru.* Development of a portable system on a smartphone for predicting the level of anemia based on images of the ocular conjunctiva. The dataset was collected. Training using Tensorflow.
• **'Hand posture recognition using Convolutional Neural Network' (2016)**. *AGH University of Science and Technology, Poland.* Development of a Gabor filter and a Deep Neural Network to recognize 10 hand postures with high accuracy on devices with low computing power. Training using Caffe and our collected dataset.
• **'Control of an analog camera with an FPGA for a custom satellite application' (2015)**. *Telecommunications Research Center (INICTEL UNI), Peru.* Development of an FPGA-based system on a Xilinx FPGA Spartan-3 using VHDL hardware description language. The system captures images from an analog camera using a decoder, clean the images, save them on a SRAM and send from the FPGA to a PIC32 microcontroller via SPI protocol.

RELEVANT EVENTS AND TRAINING

• **International Conference on Machine Learning ICML, Long Beach, Vienna, Austria (2020).** Oral presentation of 'Automatic semantic segmentation for prediction of tuberculosis using lens-free microscopy images' in the ML for Global Health Workshop, and poster presentation of 'Using Capsule Neural Network to predict Tuberculosis in lens-free microscopic images' in the HSYS Workshop.
• **The 58th Annual Meeting of the Association for Computational Linguistics ACL, Seattle, USA (2020).** Winner of the ACL 2020 D&I financial access subsidy, which allowed me to attend and participate of all the activities of this prestigious conference. Remote participation.
• **Robotics: Science and Systems RSS, Oregon, USA (2020).** Accepted for the Inclusion@RSS program, which allowed me to attend and participate of all the activities regarding this prestigious conference. Remote participation.
• **Conference on Neural Information Processing Systems NeurIPS, Vancouver, Canada (2019).** Poster presentation of 'Portable system for the prediction of anemia based on the ocular conjunctiva using Artificial Intelligence' in the LatinX in AI Workshop.
• **International Conference on Machine Learning ICML, Long Beach, California, USA (2019).** Poster presentation of 'Hand Posture Recognition Using Convolutional Neural Network' in the LatinX in AI Workshop.
• **International Conference on Information Management and Big Data SIMBig, Lima, Peru (2019).** Presenter of 'Development of a hand gesture based control interface using Deep Learning' and 'Implementation of an indoor location system for mobile-based museum guidance'.
• **International Conf. on Electronics, Electrical Engr. and Computing INTERCON, Lima, Peru (2019).** Presenter of 'Development of a hand pose recognition system on an embedded computer using Artificial Intelligence' and 'Implementation of a WiFi-based indoor location system on a mobile device for a university area'.
• **Int. Conference on Control of Dynamical and Aerospace Systems XPOTRON, Arequipa, Peru (2019).** Presenter of 'Multi-subject continuous emotional states monitoring by using convolutional neural networks'.
• **Sciences and Humanities International Research Conference SHIRCON, Lima, Peru (2018).** Presenter of 'Real-time handwritten letters recognition on an embedded computer using convnets'.
• **International Conf. on Electronics, Electrical Engr. and Computing INTERCON, Lima, Peru (2018).** Presenter of 'A real-time recognition system for user characteristics based on Deep Learning'.
• **UNESCO Interregional Engineering Conf. in Technology and Education UCTE, Kraków, Poland (2016).** Chair and presenter of 'Implementation of a New Architecture for Hand Poses Recognition'.

TECHNICAL SKILLS

• **Software:** Machine Learning Frameworks (Tensorflow, PyTorch, Caffe, Keras), Hardware Description Languages (VHDL, Verilog), OpenCL, CUDA, C/C++, Python, R, Java, OpenCV, Matlab, Git, Mercurial, LaTeX.
• **Hardware:** Parallella embedded platform (Xilinx Zynq SOC 7020 and 16 core Epiphany CPU), Raspberry Pi, FPGA Xilinx Spartan 3E, FPGA Altera Cyclone III and Cyclone II, ARM and Atmel microcontrollers, Arduino platform.