

# Dennis Hernando Núñez Fernández

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## EDUCATION

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- **‘Universidad Nacional de Ingeniería’, Lima, Peru.** (2010 Mar - 2015 Jul)  
Bachelor of Science in Electronic Engineering, graduated first in my class. GPA: 3.5/4.0. Relevant courses: Digital Systems, Signal Processing, Theory of Control. Participated in the student branch IEEE UNI, and robotics competitions.

## ADDITIONAL EDUCATION

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- **‘MITx MicroMasters in Statistics and Data Science’, USA.** (2020 Sep - Present)  
The program provided MIT’s rigorous, high-quality curricula. It lasts 18 months, with courses about data science, statistics and machine learning. Funded by Aporta as part of the Advanced Program in Data Science & Global Skills.
- **‘The Cornell, Maryland, Max Planck Pre-doctoral Research School’, Germany.** (2020 Aug)  
Rigorous selection on merit. The school lasted one week, with seminars by leading researchers (Cornell U., Maryland U. and Max Planck Instit.) on data analysis, security and privacy, machine learning, and the theory of deep learning.
- **‘10th Lisbon Machine Learning School’, Lisbon, Portugal.** (2020 Jul)  
Selection based on merit. The school lasted one week, with a series of classes, laboratory sessions and lectures by renowned researchers. It 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)  
Winner of a merit scholarship. It lasted 8 weeks, with seminars on AI, projects and mentoring. I worked on developing a summary generation system using BERT models, and giving a functional model for Entire Digital S.r.l. in record time.

## LANGUAGES

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- **Spanish** (*native*)    • **English [B2]** (*advanced*)    • **German [A1]** (*basic*)    • **French [A1]** (*basic*)

## ACHIEVEMENTS AND AWARDS

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- Winner of a scholarship for the ‘Advanced Program in Data Science’ & Global Skills, hosted by MIT. (2020)
- Selected to participate in the ‘Cornell, Maryland, Max Planck Pre-doctoral School’, Germany. (2020)
- Selected to participate in the ‘10th Lisbon Machine Learning School’, Portugal. (2020)
- Winner of a scholarship to participate in the School of Artificial Intelligence at Pi School. (2020)
- Selected to participate in the AI Latin American SumMIT, held at the MIT Media Lab. (2020)
- Winner of a scholarship 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)
- ICML and LXAI Travel Grants for the International Conference on Machine Learning ICML. (2019)
- Winner of a fellowship for the UNESCO/Poland Co-Sponsored Program at the AGH UST. (2016)
- First place in the graduating class of Electronic Engineering, Universidad Nacional de Ingeniería. (2015)
- Top 10 Electronic Engineering GPA of all the department in the periods 2014-I and 2014-II. (2014)

## PUBLICATIONS

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### Journal Articles

- [under review] D. Núñez-Fernández, F. Barrientos-Porras, R. H. Gilman, M. Vittet-Mondoñedo, P. Sheen, M. Zimic. ‘A Convolutional Neural Network for gaze preference detection: A potential tool for diagnostics of autism spectrum disorder in children’. arXiv preprint arXiv:2007.14432. (2021)

### Conference Proceedings

- D. Núñez-Fernández. ‘Development of a hand pose recognition system on an embedded computer using Artificial Intelligence’. XXVI International Conf. on Electronics, Electrical Eng. and Computing INTERCON. Lima, Peru. (2019)
- D. Núñez-Fernández. ‘Implementation of a WiFi-based indoor location system on a mobile device for a university area’. XXVI International Conf. on Electronics, Electrical Eng. and Computing INTERCON. Lima, Peru. (2019)
- D. Núñez-Fernández. ‘Multi-subject continuous emotional states monitoring by using Convolutional Neural Networks’. International Conference on Control of Dynamical and Aerospace Systems XPOTRON 2019. Arequipa, Peru. (2019)
- D. Núñez-Fernández, S. Hosseini. ‘Real-time handwritten letters recognition on an embedded computer using ConvNets’. Sciences and Humanities International Research Conference SHIRCON 2018. Lima, Peru. (2018)

- D. Núñez-Fernández. ‘A Real-Time Recognition System for User Characteristics Based on Deep Learning’. XXV International Conf. on Electronics, Electrical Eng. and Computing INTERCON 2018. Lima, Peru. (2018)

### Book chapters

- A. Aspilcueta Narvaez, D. Núñez-Fernández, S. Gamarra Quispe, D. Lazo Ochoa. ‘Smart Campus IoT guidance system for visitors based on Bayesian filters’. Brazilian Technology Symposium BTSym 2019. Lima, Peru. (2019)
- D. Núñez-Fernández. ‘Development of a hand gesture based control interface using Deep Learning’. International Conference on Information Management and Big Data SIMBig 2019. Lima, Peru. (2019)
- D. Núñez-Fernández. ‘Implementation of an indoor location system for mobile-based museum guidance’. International Conference on Information Management and Big Data SIMBig 2019. Lima, Peru. (2019)
- D. Núñez-Fernández, B. Kwolek. ‘Hand Posture Recognition Using Convolutional Neural Network’. 22nd Iberoamerican Congress on Pattern Recognition CIARP 2017. Valparaiso, Chile. (2017)

### Workshop papers

- 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’. Machine Learning for Global Health Workshop at ICML 2020. Vienna, Austria. (2020)
- 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’. Healthcare Systems, Population Health, and the Role of Health-Tech (HSYS) Workshop at ICML 2020. Vienna, Austria. (2020)
- D. Núñez-Fernández, F. Porras-Barrientos, M. Vittet-Mondoñedo, R. H. Gilman, M. Zimic-Peralta. ‘Prediction of gaze direction using Convolutional Neural Networks for Autism diagnosis’. LatinX in AI (LXAI) Research Workshop at NeurIPS 2019. Vancouver, Canada. (2019)
- B. Saldivar-Espinoza, D. Núñez-Fernández, F. Porras-Barrientos, A. Alva-Mantari, L. S. Leslie, M. Zimic-Peralta. ‘Portable system for the prediction of anemia based on the ocular conjunctiva using Artificial Intelligence’. LatinX in AI (LXAI) Research Workshop at NeurIPS 2019. Vancouver, Canada. (2019)
- D. Núñez-Fernández. ‘Development of a hand pose recognition system on an embedded computer using CNNs’. LatinX in AI (LXAI) Research Workshop at NeurIPS 2019. Vancouver, Canada. (2019)
- D. Núñez-Fernández, B. Kwolek. ‘Hand Posture Recognition Using Convolutional Neural Networks’. LatinX in AI (LXAI) Research Workshop at ICML 2019. Long Beach, USA. (2019)

## EXPERIENCE

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### • Research Assistant (2018 Jun - Present)

*Laboratory of Bioinformatics and Molecular Biology, Universidad Peruana Cayetano Heredia, Lima, Peru*

Applied deep learning techniques in order to facilitate early medical diagnosis, under the direction of Mirko Zimic, PhD.

- 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’.

### • Machine Learning Developer (2020 May - 2020 Jun)

*School of Artificial Intelligence, Pi School, Rome, Italy*

Implemented a system for Entire Digital S.r.l. in record time and under the supervision of Sébastien Bratières, PhD.

- Project: ‘Creation of an automatic summary generation system using BERT models’.

### • Research Fellow (2019 Dec - 2020 Mar)

*Visual Intelligence and Machine Perception Research Group, University of Padua, Padua, Italy*

Developed a deep learning system for healthcare under the advice of Lamberto Ballán, PhD. Funded by Fondecyt Peru.

- Project: ‘Implementation of a neural network for the diagnosis of tuberculosis using lens-less microscopy’.

### • Research Assistant (2019 Mar - 2019 Aug)

*Research Institute of the Faculty of Electrical and Electronic Engineering, Universidad Nacional de Ingeniería, Peru.*

Implemented a project on indoor location for Internet of Things, funding won in a competition for project proposals.

- Project: ‘Development of a IoT guidance system for the UNI-FIEE campus based on Bayesian Probability’.

### • Research Assistant (2016 Oct - 2017 Mar)

*Faculty of Computer Science and Telecommunications, AGH University of Science and Technology, Kraków, Poland.*

Developed a deep learning system under the guidance of Bogdan Kwolek, PhD. Part of the UNESCO Fellowship Program.

- Project: ‘Hand posture recognition using Convolutional Neural Network’.

- **Research and Development (2015 Jun - 2015 Sep)**

*Telecommunications Research Center INICTEL-UNI, Universidad Nacional de Ingeniería, Lima, Peru.*

Designed a FPGA system to read and optimize images from an analogue camera, supervised by Vanessa Gamero, MSc.

· Project: ‘Control of an analog camera with an FPGA for a custom satellite application’.

## ACADEMIC SERVICE

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- **Reviewer:** LXAI Workshop at NeurIPS (2019, 2020), LXAI Workshop at ICML (2020), IEEE INTERCON (2020), IEEE EIRCON (2020).

- **General:** Session chair at UNESCO UCTE (2016), volunteer at LXAI Workshop at ICML (2019, 2020), volunteer at LXAI Workshop at NeurIPS (2019, 2020), mentor at the Peruvian Deep Learning Symposium SPDL (2021).

## ADDITIONAL EVENTS AND TRAINING

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- **NeurIPS Meetup Peru 2020. Lima, Peru (2020 Dec).** Our three research projects, which I advised, were presented in the oral session of this event. The projects were: ‘Automatic Cataract Classification on Retinal Image using Bayesian Neural Networks’, ‘Detection of COVID-19 Disease using Deep Neural Networks with Ultrasound Imaging’, and ‘A Robustness Deep Learning Approach for Structure Characterization using XRD Pattern’.

- **Conference on Neural Information Processing Systems NeurIPS 2020. Vancouver, Canada (2020 Dec).** Selected as one of the winners of a registration grant by ‘LatinX in AI’ after a review process. This grant allowed me to participate in all the events and activities of this prestigious conference. Remote participation.

- **Advanced Program in Data Science & Global Skills. USA (2020 Sept - 2022 Feb).** Winner of a merit scholarship. The duration is 18 months, and is developed by Aporta in partnership with the Massachusetts Institute of Technology (MIT). Workshops, seminars and mentoring on technical and global skills were carried out. In addition to this, a project was developed. The program included the ‘MITx MicroMasters in Statistics and Data Science’.

- **ACM SIGKDD International Conference on Knowledge Discovery and Data Mining KDD 2020. San Diego, USA (2020 Aug).** Selected as one of the winners of the KDD Student Registration Award, which allowed me to attend and participate in all the activities of this prestigious conference. Remote participation.

- **International Conference on Machine Learning ICML 2020. Vienna, Austria (2020 Jun).** Our two papers were accepted. One was presented in the oral session at the ML for Global Health workshop: ‘Automatic semantic segmentation for prediction of tuberculosis using lens-free microscopy images’. The other was presented in the poster session at the HSYS workshop: ‘Using Capsule Neural Network to predict tuberculosis in lens-free microscopic images’.

- **The 58th Annual Meeting of the Association for Computational Linguistics ACL 2020. Seattle, USA (2020 Jun).** Selected after a review process as one of the winners of the ACL 2020 D&I financial grant, which allowed me to participate in all the activities related to this prestigious conference. Remote participation.

- **Robotics: Science and Systems RSS 2020. Oregon, USA (2020 Jun).** Accepted for the Inclusion@RSS program, which allowed me to participate of all the activities of this prestigious conference. Remote participation.

- **Conference on Neural Information Processing Systems NeurIPS 2019. Vancouver, Canada (2019 Dec).** Our three accepted abstract papers were presented in the poster session at the LatinX in AI workshop after a careful peer review process. The three accepted papers were: ‘Portable system for the prediction of anemia based on the ocular conjunctiva using Artificial Intelligence’, ‘Prediction of gaze direction using Convolutional Neural Networks for Autism diagnosis’, and ‘Development of a hand pose recognition system on an embedded computer using CNNs’.

- **Brazilian Technology Symposium BTSym 2019, satellite event Peru. Lima, Peru (2019 Nov).** Our paper, ‘Smart Campus IoT guidance system for visitors based on Bayesian filters’, which was developed at the Universidad Nacional de Ingeniería, was presented in the poster session and published in the conference proceedings.

- **International Conference on Machine Learning ICML 2019. Long Beach, California, USA (2019 Jun).** The work that was developed under the direction of Bogdan Kwolek, PhD, ‘Hand Posture Recognition Using Convolutional Neural Network’, was presented in the poster session at the LatinX in AI workshop.

- **International Conference on Information Management and Big Data SIMBig 2019. Lima, Peru (2019 Aug).** My two accepted papers were presented in the oral session at the main conference and also published in the conference proceedings. The two papers were: ‘Development of a hand gesture based control interface using Deep Learning’ and ‘Implementation of an indoor location system for mobile-based museum guidance’.

- **International Conference on Electronics, Electrical Engineering and Computing INTERCON 2019. Lima, Peru (2019 Aug).** My two accepted papers were presented in the oral session and published in the conference

proceedings. The papers were: ‘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’.

- **International Conference on Control of Dynamical and Aerospace Systems XPOTRON 2019. Arequipa, Peru (2019 Apr).** My accepted paper, ‘Multi-subject continuous emotional states monitoring by using convolutional neural networks’, was presented in the oral session and also published in the conference proceedings.
- **Sciences and Humanities International Research Conference SHIRCON 2018. Lima, Peru (2018 Nov).** My accepted paper, ‘Real-time handwritten letters recognition on an embedded computer using convnets’, was presented in the oral session at the main conference and also published in the conference proceedings.
- **International Conference on Electronics, Electrical Engineering and Computing INTERCON 2018. Lima, Peru (2018 Aug).** My accepted paper, ‘A real-time recognition system for user characteristics based on Deep Learning’, was presented in the oral session and also was published in the conference proceedings.
- **22nd Iberoamerican Congress on Pattern Recognition CIARP 2017. Valparaiso, Chile (2017 Nov).** The work that was developed under the direction of Bogdan Kwolek, PhD, ‘Hand Posture Recognition Using Convolutional Neural Network’, was presented in the poster session and was published in the conference proceedings.
- **UNESCO Interregional Engineering Conference in Technology and Education UCTE 2016. Kraków, Poland (2016 Dec).** Organized by UNESCO and the AGH University of Science and Technology. Chairman of one of the sessions, and oral presenter of ‘Implementation of a New Architecture for Hand Poses Recognition’.
- **Course ‘Soft Computing in Modelling and Control’. Kraków, Poland (2016 Oct - 2017 Mar).** Faculty of Mechanical Engineering and Robotics, AGH University of Science and Technology. Classes and laboratories on fuzzy logic, neural networks and evolutionary algorithms. Course of 5 ECTS credits. Given by Smoczek Jarosław, PhD.
- **Course ‘Computer Vision’. Kraków, Poland (2016 Oct - 2017 Mar).** Faculty of Computer Science, Electronics and Telecommunications, AGH University of Science and Technology. Classes and laboratories on computer vision, image processing and machine learning techniques. Course of 5 ECTS credits. Given by Bogdan Kwolek, PhD.

## INVITED TALKS

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- **‘Segmentation for prediction of tuberculosis using lens-free microscopy images’. Lima, Peru (2021 Jan).** Given in the III Peruvian Deep Learning Symposium (SPDL), which was organized by ML/DL Meetup AQP.
- **‘Artificial Intelligence: Research and Potential Applications’. Cesar, Colombia (2020 Dec).** Organized by the Universidad Popular del Cesar as part of the II Scientific Conference ‘Facing new challenges’.
- **‘UNI Experience - Electronic Engineering’. Lima, Peru (2020 Oct).** Given at the Universidad Nacional de Ingeniería (UNI) as part of a series of professional talks, which was organized by Inspírate UNI.
- **‘How to participate in Artificial Intelligence workshops, internships and more’. Lima, Peru (2020 Sep).** Given at the Universidad Nacional de Ingeniería, organized by the UNI’s Advanced Artificial Intelligence Group.
- **‘Diagnosis of Anemia through a Mobile Device and Artificial Intelligence’. Lima, Peru (2020 Sep).** Given at the ‘Semana de la Innovación 2020’, which was organized by CONCYTEC Peru.
- **‘Deep Learning: Fundamentals and Applications’. Lima, Peru (2020 Jul).** Given at the Faculty of Electrical and Electronic Engineering - FIEE UNI, organized by the Signal Processing Society of the IEEE UNI.
- **‘Research internship experiences abroad’. Lima, Peru (2020 Jul).** Given by the 117th anniversary of the Faculty of Electrical and Electronic Engineering of the Universidad Nacional de Ingeniería.
- **‘Development and Application of Artificial Intelligence in Health’. Lima, Peru (2019 Nov).** Given at the Faculty of Pharmacy and Biochemistry of the Universidad Nacional Mayor de San Marcos (UNMSM).
- **‘Research and Development in Artificial Intelligence’. Lima, Peru (2019 Sept).** Given in the ‘22do Meetup 2019 Dats Science Research Peru’, organized by Dats Science Research Peru (DSRP).
- **‘A portable system based on Artificial Intelligence for the diagnosis of anemia’. Lima, Peru (2019 May).** Given in the first edition of the event ‘Innova como ellos’, organized by Innóvate Perú.
- **‘Prediction of gaze direction based on CNN for diagnosis of Autism’. Lima, Peru (2019 May).** Given at the ‘Colloquium on Computer Science Applications’, organized by CEPRECYT Peru.

## TECHNICAL SKILLS

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- **Software:** Machine Learning Frameworks (Tensorflow, PyTorch, Caffe, Keras), Hardware Description Languages (VHDL, Verilog), OpenCL, CUDA, C/C++, Python, R, Java, OpenCV, Matlab, Git, Mercurial, L<sup>A</sup>T<sub>E</sub>X.
- **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.