NILS MURRUGARRA

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EDUCATION

University of Pittsburgh, Pittsburgh, PA — 2012 - 2019
Doctorin Computer Science, Computer Vision — GPA: 3.8

University of São Paulo, São Carlos, SP, Brazil — 2009 - 2011
Master in Computer Science, Machine Learning — GPA: 4.0

NationalUniversity of Trujillo, Trujillo, Peru — 2004 - 2009
Bachelor in Computer Science — GPA: 3.6

TECHNICAL SKILLS

Programming languages: Python, R, Java, C/C++, Matlab, android SDK, Prolog, and Scheme

Technologies: deep learning, reinforcement learning, transfer learning, metric learning, PCA, LDA.

Tools:tensorflow, theano, keras, caffe, github, weka, liblinear, libsvm, scikit-learn library, slim, amazon mechanical turk

Scripts: HTML, PHP, JSP, JavaScript, linux shell

IDEs: NetBeans, PyCharm, Eclipse, Visual C++

Databases: SQL, MySQL, PostgreSQL

RELEVANT GRADUATE COURSES

- Machine learning
- Natural language processing
- Pattern recognition
- Advanced machine learning
- Advanced artificial intelligence (Computer vision)

PUBLICATIONS

1. **N. Murrugarra-Llerena** and A. Kovashka. *Image retrieval with mixed initiative and multimodal feedback.* In International Journal in Computer Vision (**IJCV**), 2020. **[Under review]**
2. **N. Murrugarra-Llerena** and A. Kovashka. *Involving humans to learn attributes.* In LatinX in AI research workshop. Thirty-third Conference on Neural Information Processing Systems (**NeurIPS**), Vancouver, Canada, 2019.
3. **N. Murrugarra-Llerena** and A. Kovashka. *Cross-modality personalization for retrieval.*InConference on Computer Vision and Pattern Recognition (**CVPR**), Long Beach, California, USA, 2019. IEEE.**(oral)**
4. **N. Murrugarra-Llerena** and A. Kovashka. *Asking friendly strangers: non-semantic attribute transfer.*In LatinX in AI research workshop. Thirty-sixInternational Conference on Machine Learning (**ICML**), Long beach, California, USA, 2019.
5. **N. Murrugarra-Llerena** and A. Kovashka. *Image retrieval with mixed initiative and multimodal feedback* .In LatinX in AI research workshop. Thirty-second Conference on Neural Information Processing Systems (**NeurIPS**), Montreal, Canada, 2018.
6. **N. Murrugarra-Llerena** and A. Kovashka. *Image retrieval with mixed initiative and multimodal feedback.* In British Machine Vision Conference (**BMVC**), Newcastle upon Tyne, United Kingdom, 2018. Springer. **(oral)**
7. **N. Murrugarra-Llerena** and A. Kovashka. *Asking friendly strangers: non-semantic attribute transfer.*In Thirty-Second AAAI Conference on Artificial Intelligence (**AAAI**), New Orleans, Lousiana, USA, 2018. AAAI.
8. **N. Murrugarra-Llerena** and A. Kovashka. *Learning attributes from human gaze.*In IEEE Winter Conference on Applications of Computer Vision (**WACV**), Santa Rosa, California, USA, 2017. IEEE.
9. C. González-Cadenillas and **N. Murrugarra-Llerena**. *Isolated words recognition using a low-cost microcontroller.*In III Brazilian Symposium on Computational Systems Engineering (**SBESC**), Niteroi, RJ, Brazil, 2013. IEEE.
10. **N. Murrugarra-Llerena**, L. Berton, and A. de Andrade Lopes. *Graph-based cross-validated committee ensembles.*In Fourth International Conference on Computational Aspects of Social Networks (**CASoN**), São Carlos, SP, Brazil, 2012. IEEE.
11. **N. Murrugarra-Llerena** and A. de Andrade Lopes. *An adaptive graph-based k-nearest neighbor.*In CoLISD: Collective Learning and Inference on Structured Data, Atenas, Greece, 2011. European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML-PKDD**).
12. **N. Murrugarra-Llerena** and A. de Andrade Lopes. *A graph-based bagging.*In CoLISD: Collective Learning and

Inference on Structured Data, Atenas, Greece, 2011. European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML-PKDD**).

13. **N. Murrugarra-Llerena**, F. Alva-Manchego, and S. Oliveira Rezende. *Comparison of computing curriculums using text hierarchical clustering.*In XXXI Congress of the Brazilian Computer Society (**CSBC**), Natal, RN, Brazil, 2011. Brazilian Computer Science Society.
14. **N. Murrugarra-Llerena**, O. Fernandez-Asunción, and L. Castañeda-León. *3D surface reconstruction applied to medical imaging.*In VII Peruvian Conference on Computing (**JPC**), Lima, Peru, 2008. Peruvian Computer Science Society.
15. F. Carranza-Athó and **N. Murrugarra-Llerena**. *Detection of fish eye disease in olives using graphics processing.*In VI Peruvian Conference on Computing (**JPC**), Trujillo, Peru, 2007. Peruvian Computer Science Society.

RESEARCH EXPERIENCE

Laboratory of Computer Vision, University of Pittsburgh, Pittsburgh, PA, USA.

Research assistant Jan 2015 - Current

- Conceived, developed and implemented new algorithms in computer vision. Currently, working with deep learning, and reinforcement learning.
- Published three articles and one under revision in highly ranked computer vision and machine learning conferences.

Laboratory of Computational Intelligence, University of São Paulo, São Carlos, SP, Brazil.

Research assistant Aug 2009 - Sep 2011

- Conceived, developed and implemented a new graph-based machine learning classifier
- Developed a platform for machine learning experiments using Java, weka and netkit
- Wrote and published four articles for conferences in Greece, Brazil,and Peru

TEACHING EXPERIENCE [teaching assistant positions]

University of Pittsburgh, Pittsburgh, Pennsylvania, USA.

Computer Vision	Jan- Apr 2018
Intermediate Programming using Java	Aug - Dec 2016
Introduction to Computer Vision	Aug - Dec 2015
Formal Methods in Computer Science	Jan - Apr 2015
Programming Languages for Web Applications	Jan - Apr 2014
Algorithm Implementation	Aug - Dec 2013 / Aug - Dec 2014/ Aug – Dec 2017
Programming Languages for Web Applications	May - Jul 2013 / Jan - Apr 2014
Data Structures in Java	Jan - Apr 2013

- Evaluated as 4.5 / 5.0 by students
- Taught computer science courses for freshmen and sophomore students ranging from 30 to 50 per class
- Encourage, motivate and stimulate students to have a better understanding of the course content
- Lead recitations. Specifically,I help, solve and explain practice and programming exercises
- Grade assignments and quizzes weekly
- Structured classes through an educational software system, COURSEWEB to maintain course assignments and activities

University of São Paulo, São Carlos, SP, Brazil.

Introduction to Programming	Feb - Jun 2011
Advanced Topics in Artificial Intelligence	Aug - Dec 2010
Introduction to Programming	Feb - Jun 2010

- Taught computer science courses for freshmen and sophomore students ranging from 30 to 50 per class
- Lead programming labs. Specifically elaborate, solve and explain practice and programming exercises
- Grade assignments weekly and exams
- Structured classes through an educational software system, TIDIA to maintain course assignments and activities. Also, used the BOCA system for automatic programming grading

National University of Trujillo, Trujillo, Peru.

Data Structures	Jan - Mar 2009

Theory of Computing May - Aug 2008

- Taught computer science courses for freshmen and sophomore students ranging from 20 to 30 per class
- Lead programming labs. Specifically elaborate, solve and explain practice and programming exercises

PROFESSIONAL EXPERIENCE

Snap Inc, Los Angeles, CA, USA.

Research scientist Nov 2019 - present

- Developed prototypes to find data insights using machine learning and computer vision.
- Worked on data collection, annotation, and model learning.

ASEA Brown Boveri (ABB), Raleigh, NC, USA.

Deep learning intern May - Jul 2017

- Automatized image industrial application from model training on a GPU server to deployment in a Raspberry PI.
- Improved accuracy from 80% to 90% on rusty hazard recognition via convolutional layers for local features.
- Worked on data collection, annotation, model training, evaluation,and deployment.
- Presented results to managers and stakeholders in the company.

Educational Testing Service (ETS), Princeton, NJ, USA.

Research intern Jun - Jul 2014

- Contributed new features to manage big data, reduce memory consumption and work with imbalance data for the open source machine learning SKLL platform, widely employed in ETS.
- Made possible the use of a big prepositional dataset (4 GB) for machine learning and natural language techniques.

Computer Science Student Society, Trujillo, Peru.

Project Manager Mar - Oct 2011

- Organized, monitored, tracked and coordinated new functionalities for a web platform for Automatic Programming Contests (codeSECC)
- Platform used for the II Peruvian Programming Contest

Software Developer Apr-Jun 2009 / Apr-Sep 2010

- Developed a web platform for Automatic Programming Contests (codeSECC) and a web platform for online exams with automatic grading
- All these projects were developed using PHP, javascript,andmysql
- Platform used for the I Peruvian Programming Contest

President Nov 2007 - Nov 2008

- Lead the meetings of the association
- Manage and organize different activities of the association. Some of the activities were: events, talks, seminars, recruitment of new members, marketing of the association
- Organized the Brazilian Graduate Exam POSCOMP for Computer Science in National University of Trujillo
- Organized different conferences with international presenters

Vice-President Nov 2006 - Nov 2007

- Managed and organized different activities of the association in coordination with the president

Magazine CompuScientia, Trujillo, Peru.

Director, fourth edition Jul - Dec 2014

Director, third edition Jul - Dec 2013

Director, second edition Jul - Dec 2012

Editor, first edition Jul - Dec 2011

- Organized, delegated, coordinated and monitored different administrative tasks. Some of these tasks were: find and invite possible sponsors and reviewers, elaborate and review any administrative documents
- Elaborated, rewrote, read and/or reviewed different articles of the magazine

VOLUNTEERING

- LatinX in AI research workshop (as part of NeurIPS), latinX in AI Coalition, Montreal, Canada (Dec 2018)
- Thirty-second Conference on Neural Information Processing Systems (NeurIPS), Montreal, Canada (Dec 2018)
- Thirty-Second AAAI Conference on Artificial Intelligence, AAAI, New Orleans, LA, USA (Feb 2018)
- International Science and Engineering Fair (ISEF), Pittsburgh, PA, USA (May 2015)

PROJECTS

Cross-modality personalization for retrieval (2018)

Existing captioning and gaze prediction approaches do not consider the multiple facets of personality that affect how a viewer extracts meaning from an image. We study how a person's way of looking at an image (gaze) affects the way they describe it (captioning). Thus, we propose a model for modeling cross-modality personalized retrieval. In addition to modeling gaze and captions, we also explicitly model the personality of the users providing these samples. This project was implemented with python, tensor-flow and slim.

Image retrieval with mixed initiative and multimodal feedback (2018)

Developed a mixed-initiative framework using reinforcement learning. Our reinforcement agent decides dynamically which interactions are beneficial: drawing a sketch, providing free-form attribute feedback, or answering attribute-based questions. Hence, our system allows faster image retrieval. We outperform three baselines on three datasets with simulated and live users.This project was implemented with python, keras, theano,andtensor-flow.

Non-semantic attribute transfer(2017)

Developed and evaluated a non-semantictransfer approach from attributes indifferent domains. We developed an attention-guidedtransfer architecture that improves accuracy among five baselines on 272 attributes from five different domains. Wealso analyze and interpret our model via attention weights and interpretable attribute relations.This project was implemented with python, keras, theano,andcaffe.

Learning attributes from human gaze (2016)

Developed and evaluated how to involve humans more directly in learning attribute models through gaze maps. Compared to six baselines, we improve prediction accuracies. We developed two applications: visualization of attribute models and learning "schools of thought" between users in terms of their understanding of attributes. This project was developed with matlab, python,andcaffe.

Face recognition using PCA, LDA and spectral clustering (2014)

Developed a face recognition system using the Labeled Face in the Wild dataset. It was applied different space transformation techniques as PCA, LDA and Spectral Clustering achieving a good evaluation on the test dataset. It was implemented in python with help of scikit-learn machine learning library.

Automatic grading system (2013)

Developed a student answer grading system that can give a suitable grade according to student answers with several natural language processing (NLP) techniques; included bag-of-word, latent semantic analysis (LSA) and textual entailment using Python and Java languages.

Automatic language identification using n-grams (2013)

Developed a language identification system (German, Spanish or English) using unigrams, bigrams,and trigrams with a perplexity measure. It was implemented in python language.

Semi-automatic comparison of collegiate computing curriculums (2011)

Developed a tool to compare different computing undergraduate curriculums based on their courses using bag-of-words a hierarchical clustering. It generated a dendrogram graph and needs a specialist to analyze and determine what careers are similar or not. It was implemented in R.

Automaticisolated words speech recognizer (2009)

Developed a tool for automatic speech recognition using ten spoken words for digits. It was implemented using Fourier transform, dynamic time wrapping, Mel cepstrum features, and others. In the experiments, we consider 10 different persons and the accuracy was higher than 95% using cross-validation procedure. It was implemented in Java.

Feature selection in stock market prediction (2012)

Developed a tool to explore feature selection in the problem of stock market prediction. It was used data from the yahoo finance site. Also, the predictor was selected with a tuning for the SVM classifier and then applied feature selection procedures. The results achieved was that using fewer features we achieved a similar performance that using all the features. Also, it was verified with a t-test procedure. It was implemented in R.

HONORS AND AWARDS

Doctoral consortium travel grant (mentoring program for senior PhD students). Computer Vision and Pattern Recognition (CVPR). Long Beach, California, USA (Jun 2019)

Art and science full merit fellowship (A&S). University of Pittsburgh, Pennsylvania, USA. (Sep - Dec 2012)

IMPA fellowship (Summer Course).National Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil. (Jan - Feb 2012)

Honorable mention. ACM - International Collegiate Programming Contest (ACM-ICPC) South America/South Regional Contest, Coach, ACM-ICPC. Lima, Peru. (Nov 2011)

PAE fellowship (Education Improvement Program).University of São Paulo, São Paulo, Brazil. (Feb - Jun 2011)

Master fellowship. University of São Paulo, CNPQ, São Paulo, Brazil. (Aug 2009 – Aug2011)

1st place in undergraduate studies in Computer Science. National University of Trujillo, Trujillo, Peru. (2004–2009)

1st place in the 3rd Computer Programming Marathon. National University of Trujillo, Trujillo, Peru (Sep 2005)

Travel award. Thirty-third Conference on Neural Information Processing Systems (NeurIPS). LatinX in AI research workshop, LatinX in AI Coalition, Vancouver, Canada (Dec 2019)

Travel award. Thirty-six International Conference on Machine Learning (ICML). LatinX in AI research workshop, latinX in AI Coalition, Long Beach, CA, USA (Jun 2019)

Travel award.Thirty-second Conference on Neural Information Processing Systems (NeurIPS). LatinX in AI research workshop, latinX in AI Coalition, Montreal, Canada (Dec 2018)

Travel award.Thirty-Second AAAI Conference on Artificial Intelligence, AAAI, New Orleans, LA, USA (Feb 2018)

Travel award. Latin American eScience Workshop (latam), FAPESP, São Paulo, SP, Brazil. (May 2013)

Travel award. São Paulo School of Advanced Science on e-Science for Bioenergy Research (SPAS-eScience), FAPESP, Campinas, SP, Brazil. (Oct 2012)

CONFERENCES/EVENTS

Committee/reviewer:

- Seventh International Conference on Information Management and Big Data (SIMBIG). Track on Social Network and Media Analysis and Mining. Lima, Peru. (Aug 2020)
- LatinX in AI research workshop. Thirty-seventth International Conference on Machine Learning (ICML). Vienna, Austria. (July 2020)
- Diagram Image Retrieval and Analysis (DIRA) workshop. Computer Vision and Pattern Recognition (CVPR). Seatle, WA, USA. (Jun 2020).
- LatinX in AI research workshop. Thirty-third International Conference on Neural Information Processing Systems (NeurIPS). Vancouver, Canada. (Dec 2019)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) journal. (Sep 2019)
- British Machine Vision Conference (BMVC). Cardiff, UK. (Sep 2019)
- LatinX in AI research workshop. Thirty-sixth International Conference on Machine Learning (ICML). Long beach, California. USA (June 2019)
- Neural Information Processing Systems (NIPS). Montreal, Canada. (Dec 2018)
- Fifth International Conference on Information Management and Big Data (SIMBIG). Lima, Peru. (Sep 2018)
- XXV International Conference on Electronics, Electrical Engineering and Computing (INTERCON). Lima, Peru. (Aug 2018)
- Computer Vision and Pattern Recognition (CVPR). Salt Lake City, UT, USA. (June 2018)
- Computer Vision and Pattern Recognition (CVPR). Las Vegas, NV, USA. (June 2016)
- Social Network and Media Analysis and Mining Track. Third Annual International Symposium on Information Management and Big Data. Cuzco, Peru. (Sep 2016)
- Artificial Intelligence Program Committee. IX Peruvian Conference on Computing (JPC). National University of Trujillo. Trujillo, Peru. (Oct 2010)
- Programming Contest Program Committee. XVII International Congress of Electrical, Electronic and Systems Engineering (INTERCON). National University of the Altiplano. Puno, Peru (Aug 2010)

Presenter:

- Cross-modality personalization for retrieval. Conference on Computer Vision and Pattern Recognition (CVPR), Long Beach, California, USA, (Jun 2019)
- Image retrieval with mixed initiative and multimodal feedback. British Machine Vision Conference (BMVC), Newcastle upon Tyne, United Kingdom.(Sep 2018)
- Asking friendly strangers: non-semantic attribute transfer. Thirty-Second AAAI Conference on Artificial Intelligence (AAAI), New Orleans, LA, USA. (Feb 2018)
- Learning attributes from human gaze. IEEE Winter Conference on Applications of Computer Vision, Santa Rosa,

CA, USA. (March 2017)

- Discussion of graduate studies abroad in computer science. San Pablo Catholic University, Arequipa, Peru. (Jun 2013)
- Data mining analysis of computer careers curriculum. I Computational Scientific Meeting, National University of San Marcos, Lima, Peru. (Apr 2012)
- Ensembles in relational classification. III Academic Business Meeting in Computer Science, National University of Trujillo. Trujillo, Peru. (Jan 2012)
- Graph-based bagging. I National International Congress of Systems Engineering, Computing and Information Technology, College of engineers of Peru. La Libertad. Trujillo, Peru. (Nov 2011)
- Graduate studies in Brazil. III Conference on Opportunities in Computer Science, National University of Trujillo, Peru. (Nov 2011)
- Computer Science: aprofession with potential. Cristo Rey School, Cajamarca, Peru. (Sep 2011)
- Opportunities for graduate studies in computer science in Brazil. Private University of the North, Cajamarca, Peru.(Jan 2011)
- Computing curriculum analysis using data mining. II Academic Business Meeting in Computer Science, National University of Trujillo. Trujillo, Peru. (Jan 2011)
- Research methodology for computer science. I Academic Business Meeting in Computer Science, Private University of the North. Trujillo, Peru. (Dec 2009)
- Computer study opportunities in Brazil. Conference on Opportunities in Computer Science, National University of San Marcos, Lima, Peru. (Dec 2009)
- Feature extraction of isolated words using MFCC and MFCC with weights. I Event in Speech Recognition: Algorithms and Applications, Private University of the North. Trujillo, Peru. (Jun 2009)
- Automatic annotation of images using SIFT. III Conference of research in mathematics and related sciences, National University of Trujillo. Trujillo, Peru. (Mar 2009)
- Imagereconstruction 2D - 3D. First Conference of Students of Computer Science, Computer Science Students Society. Guadalupe-La Libertad, Peru. (Sep 2008)
- A steganographic method using graph traversal in images.VI Peruvian Conference on Computing, Private University Antenor Orrego. Trujillo, Peru. (Sep 2007)
- Detection of fish Eye disease in olives using Graphics Processing. II Week of Computer Science, National University of Trujillo. Trujillo, Peru. (Sep 2007)
- Interpolation applied to determine the microbial growth. IV National Congress of Systems Engineering, César Vallejo University. Trujillo, Peru. (Jun 2007)

Organizer:

- LatinX in AI research workshop. Thirty-seventth International Conference on Machine Learning (ICML). Vienna, Austria. (July 2020)
- IV Peruvian Programming Contest. Private University Lord of Sipan, Chiclayo, Peru. (Sep 2013)
- III Academic Business Meeting in Computer Science. National University of Trujillo, Trujillo, Peru. (Jan 2012)
- X Congress of the Peruvian Computing Society. National University of Ucayali, Pucallpa, Peru. (Aug 2011)
- II Peruvian Programming Contest. National University of Ucayali, Pucallpa, Peru. (Aug 2011)
- I Programming Contest at the School of Mathematical Sciences. National University of San Marcos, Lima, Peru. (Jun 2011)
- II Academic Business Meeting in Computer Science. National University of Trujillo, Trujillo, Peru. (Jan 2011)
- I Peruvian Programming Contest. National University of Trujillo, Trujillo, Peru. (Oct 2010)
- I Academic Business Meeting in Computer Science. Private University of the North, Trujillo, Peru. (Dec 2009)
- I National Student Meeting in Computing, Information,and Systems. Continental University,Huancayo, Peru. (Oct 2009)
- I Speech Recognition Event: Algorithms and Applications. Private University of the North, Trujillo, Peru. (Jun 2009)
- I Computer Science Academic Day in Artificial Intelligence. National University of Trujillo, Trujillo, Peru. (Jan 2009)
- III Computer Science Week. National University of Trujillo, Trujillo, Peru. (Oct 2008)
- I Computer Science Student's Day. National University of Trujillo, Trujillo, Peru. (Sep 2008)
- II Computer Science Week. National University of Trujillo, Trujillo, Peru. (Sep 2007)