Manfred Diaz

Contact Information

Montreal Institute for Learning Algorithms
Département d'Informatique et de Recherche Opérationnelle
Université de Montréal
2920 Chemin de la Tour, Room AA2333
Montréal, Québec, Canada H3T 1N8

(514)248-8457
diazcabm@iro.umontreal.ca

Research Interests

I am interested in expanding Imitation Learning from theories grounded in neuroscience and psychology. See a draft proposal I am working on here: (`https://github.com/takeitallsource/manuscripts/raw/master/Proposal-Manfred.pdf`). Another problem I am interested is on training policies in simulation and their transferability to reality by efficiently applying domain randomization techniques (manuscript in preparation).

Education

Montreal Institute for Learning Algorithms, Unversité de Montréal

Ph.D. in Computer Science (Machine Learning and Robotics), Fall 2018 - Summer 2021*

- Advisor: Prof. Liam Paull
- Research Areas: imitation learning, continual learning, behaviour modelling, uncertainty estimation, learning for robotics, transfer learning, simulation to reality transfer

Concordia University - Montréal, Canada

M.Sc. in Computer Science, August 2018

- Dissertation: Interactive and Uncertainty-Aware Imitation Learning: Theory and Applications (`https://github.com/takeitallsource/manuscripts/blob/master/thesis_msc.pdf`).
- Advisors: Prof. Thomas Fevens (Concordia) and Prof. Liam Paull (MILA).
- GPA: 3.93/4.30

Universidad de las Ciencias Informáticas - Havana, Cuba

B.Eng. in Software Engineering, July 2010

- Dissertation Topic: Integration Environment for Dynamic Software Solutions (Spanish Version: `https://github.com/takeitallsource/manuscripts/blob/master/thesis_und.pdf`).
- Advisor: Eng. Eddy Sanchez (SekureId Corporation, USA)
- GPA: 5.19/5.00, Summa Cum Laude.

Manuscripts Under Review

Diaz, Manfred, Liam Paull and Thomas Fevens. *Uncertainty-Aware Policy Sampling and Mixing for Safe Interactive Imitation Learning.* Submitted to the International Conference on Robotics and Automation (ICRA 2019) (`https://github.com/takeitallsource/manuscripts/blob/master/icra2019.pdf`).

Peer-Reviewed Publications

Diaz, Manfred, Roger Girgis, Thomas Fevens, and Jeremy Cooperstock. *To Veer or Not to Veer: Learning from Experts How to Stay Within the Crosswalk.* In 2017 IEEE International Conference on Computer Vision Workshop (ICCVW), pp. 1470-1479. IEEE, 2017. (`https://github.com/takeitallsource/manuscripts/blob/master/acvr-iccvw-2017.pdf`)

Diaz, Manfred. *Integración de sistemas de gestión de emergencias con tecnologías móviles.* in Ninth LACCEI Latin American and Caribbean Conference (LACCEI 2011), Engineering for a Smart Planet, Innovation, Information Technology and Computational Tools for Sustainable Development, 2011, Aug 2011. (`https://github.com/takeitallsource/manuscripts/blob/master/lacce2011_diaz.pdf`)

Conference Talks

To Veer or Not to Veer: Learning from Experts How to Stay Within the Crosswalk., Fifth International Workshop on Assistive Computer Vision and Robotics at ICCV 2017 (October 2017).

Other Talks

Duckietown: a Platform for Teaching, Robotics and Machine Learning Research, Montreal AI Symposium (August 2018).

Interactive and Uncertainty-Aware Imitation Learning: Theory and Applications., Concordia University, Master's Thesis Defense (August 2018).

Editorial Services

2018 Robotics and Automation Letters
2019 International Conference on Robotics and Automation (ICRA)

Teaching Experience

Fall	2018	Teaching Assistant, Autonomous Vehicles, IFT 6757 (UdeM)
Fall	2016	Teaching Assistant, Emerging Technologies in HCI (Concordia)
Fall	2006	Teaching Assistant, Introduction to Programming (UCI, Havana)
Spring	2007	Teaching Assistant, Programming I (UCI, Havana)

Honors and Awards

2017	Conference and Exposition Award, Concordia University
2017	NSERC Create Travel Award, McGill University
2010	Dean's List, Universidad de las Ciencias Informáticas (UCI)
2006	Bronze Medal, Cuban Inter-college Informatics Contest
2004	Bronze Medal, Cuban National Informatics Contest
2003	Bronze Medal, Cuban National Informatics Contest

Graduate Coursework

- ❑ Autonomous Vehicles.
- ❑ Distributed Systems Design.
- ❑ Machine Learning.
- ❑ Representation Learning.

Scientific Research Experience

2017–2018 Interactive Imitation Learning via Uncertainty Estimation.
Advisor: Liam Paull, Robotics Group,
MILA, Université de Montréal.

2016–2017 Imitation Learning for Visually Impaired Navigation.
Advisor: Jeremy R. Cooperstock, Shared Reality Lab,
Centre for Intelligent Machines, McGill University.

Relevant Skills

Languages:	python, C++, Java, C#
Libraries:	Tensorflow, Tensorflow Mobile, numpy, pandas, opencv, scikit-learn, Keras
Operating systems:	Unix/Linux, Windows, ROS
Version control:	git, subversion

Relevant Professional Experience

MILA, Unversité de Montréal
Deep Learning Research Intern **June 2018-August 2018**

- Coded functionalities for the AI Driving Olympics for the Duckietown platform (challenge submission infrastructure).

- Designed and implemented the imitation learning baselines for the competition using Duckietown Open-AI Gym Environments.
- Researched, design and implemented sim2real transfer baselines for the competition using Duckietown OpenAI Gym Environment simulation and the Duckietown Platform. The results were selected for presentation at the Montreal AI Symposium, 2018 (`https://www.facebook.com/lauren.stasio/videos/10156488302486000/`).

Manu3Lab, Anatomi Metrix
Research Intern **June 2017-August 2017**

- Created, designed and implemented a remote camera calibration tool
- Improved the image segmentation algorithm using different techniques: background subtraction, contours, convex hulls, Bezier's curves.
- Real-time video streaming between a master Raspberry Pi *raspivid* tool.
- Real-time analysis of focus, lighting, and other images properties for calibration of streamed video.
- Designed and implemented a DHCP leases extraction parser using *antlr4*.

H3ALTH TECHNOLOGIES INC.
Lead Software Developer **July 2015-January 2016**

- Architected, led and developed a 3D Body Scanning Software. This IRAP funded project was focused on the research of body measurements and metrics for fitness purposes
- Designed and implemented depth sensors acquisition routines using Depthsense SDK and ported it to python using cpython.
- Designed, implemented and integrated a heterogenous publish/subscribe architecture using ZeroMQ (node.js and python).
- Design and implemented OOP APIs for a legacy 3D reconstruction routine using C++, pcl (Point Cloud Library) and boost.

Gomentr Inc.
Lead Software Developer **October 2014-April 2017**

- Led as Senior Full-stack Software Developer the team that implements the core of GOmentr, a Private Online Mentoring platform for alumni to connect and engage with schools by mentoring students.
- Implemented core platform features from front-end interactions (jQuery, knockouts.js, mustache) to back-end functionalities (Grails, Groovy, GORM, PostgreSQL).
- Designed and implemented the refactoring of legacy parts of the system using design patterns and implementation best practices (notification, user messaging).
- Developed and maintains the indexing engine configuration (Apache Solr).
- Maintained puppet-based Continuous Deployment tasks. (puppet)
- Defined technical specifications, best practices and workflows for the development team (git workflows, continuous integration, continuous deployment, technological stack, collaboration tools).

Centro de Seguridad Ciudadana, UCI.CU
Software Architect **September 2010-August 2013**

- Worked as Software Architect in the Public Safety Management Solution for 171 Emergency Services in Venezuela. A complete distributed desktop-based system that covered all processes of first-responders management. This project took place as a collaboration between Universidad de las Ciencias Informáticas (UCI) and the Ministry of Justice of Venezuela.
- Refactored and implemented the Call Center Operator Module, using .NET WinForms, NHibernate and related technologies.
- Refined and developed features at the core application framework that supported

the system (communication, threading, UI components).
- Researched, designed and implemented deployment configuration and management tools based on P2P protocols (bittorrent), WIX, and MSI technologies.
- Maintained seven core subsystems.

Centro de Seguridad Ciudadana, UCI.CU
Software Engineer Intern **June 2010-August 2010**

- Worked as part-time Software Developer Intern in the Public Safety Management Solution for 171 Emergency Services in Venezuela. A complete distributed desktop-based system that covered all processes of first-responders management. This project was executed as a collaboration between Universidad de las Ciencias Informáticas and the Ministry of Justice of Venezuela.
- Designed and developed the Call Center Supervisor Module.
- Refined and refactored Call Center Operator, Configuration Management, and General Supervisor modules.
- Developed WinForm-based UI components for searching, selection and representation of real-time application state.
- Conducted in-site deployment as part of the Deployment and Support team.

Academic References

Liam Paull, Assistant Professor, Département d'Informatique et de Recherche Opérationnelle, Université de Montréal, `paulll@iro.umontreal.ca`
Thomas Fevens, Associate Professor (and Associate Chair), Department of Computer Science and Software Engineering, Faculty of Engineering and Computer Science, Concordia University, `fevens@cs.concordia.ca`

Professional References

MAY BE PROVIDED UPON REQUEST