Elena Corina Grigore

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Interests

Robotics, autonomous driving, machine learning, deep learning, artificial intelligence, adaptive systems.

Work Experience

- **Senior Research Scientist at Latitude AI / Argo AI, Palo Alto, CA** September, 2021 – present
  (Latitude AI became a successor-in-interest of Argo AI in 2023)
  Prediction, Deep Forecasting team

  Model the behavior of relevant actors present in the enivornment of a self-driving vehicle (e.g., other vehicles, bicyclists, pedestrians, etc.):
  - Develop and extend deep learning models to predict the future trajectories and other useful intentions of relevant agents (e.g., yielding / non-yielding behavior).
  - Lead project for full model development, including dataset creation, model prototyping, evaluation, and model deployment.
  - Utilize my Python and PyTorch knowledge for model prototyping, implementation, and evaluation.
  - Build up my C++ skills by writing production-level code to deploy models on the self-driving car.
  - Work on a dynamic and fast-paced team on different components of the prediction module, collaborating with various team members, and mentoring a summer intern.

- **Senior Research Scientist at Motional, Boston, MA** September, 2020 – September, 2021
  Research Scientist at Motional, Boston, MA October, 2018 – September, 2020

  Prediction and Behavior Modeling team

  Applied deep learning techniques to model and predict the trajectories and intentions of the agents of interest in the environment of a self-driving vehicle:
  - Utilized and expanded my research skills to develop models of how agents behave on the road, and to publish state-of-the-art solutions to top machine learning conferences [18].
  - Applied large-scale deep learning models to real-world, large datasets involving temporal data.
  - Utilized my knowledge of Python and PyTorch, being part of the full process of creating and deploying deep learning models.
  - Worked on a fast-paced team with strong collaboration practices, mentored summer interns, and worked with other teams to understand data constraints and establish interfacing between modules.

- **Research Intern at Uber Advanced Technologies Group** June, 2017 – August, 2017
  San Francisco, CA
  Deep learning for self-driving car perception team

  Worked on the perception module of the self-driving pipeline, where the aim was to detect all targets of interest in the environment of the autonomous vehicle. Researched introducing temporal context into deep learning networks, including the use of multi-frames and recurrent neural networks.

Education

- **Doctor of Philosophy, Computer Science, Yale University** 2018
  Advisor: Brian Scassellati
  Ph.D. Thesis: Learning Supportive Behaviors for Adaptive Robots in Human-Robot Collaboration
  Available at: https://scazlab.yale.edu/sites/default/files/files/corina_dissertation.pdf

- **Master of Philosophy, Computer Science, Yale University** 2015

- **Master of Science, Computer Science, Yale University**   2015

- **Master of Engineering with Study Abroad**
  Computer Science, University of Bristol, UK   2012
  Advisors: Kerstin Eder (University of Bristol, UK)
            Anthony G. Pipe (Bristol Robotics Laboratory, UK)
            Christopher Melhuish (Bristol Robotics Laboratory, UK)
  Master's Thesis: *"I Robot, I Think"*
  Applied machine learning techniques to model users' intentions for object handovers in human- robot interaction scenarios [2].

  4-year program encompassing my Bachelor's degree
  Study Abroad at University of California, San Diego (2010/2011)
  Master of Engineering with First Class Honors

- **Coventry University, UK**   2009
  Completed first year of Computing Honors Degree
  Highest scoring student in my cohort
  Transfer to University of Bristol at the end of my first undergraduate year

Publications

[18] T. Phan-Minh, **E. C. Grigore**, F. A. Boulton, O. Beijbom, and E. M. Wolff, "Covernet: Multimodal behavior prediction using trajectory sets", in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Virtual, 2020, June 1419, pp. 14 074–14 083.

[17] F. A. Boulton, **E. C. Grigore**, and E. M. Wolff, "Motion prediction using trajectory sets and self-driving domain knowledge", Available at: arXiv preprint arXiv:2006.04767, 2020.

[16] **E. C. Grigore**, A. Roncone, O. Mangin, and B. Scassellati, "Preference-based assistance prediction for human-robot collaboration tasks", in *Proceedings of the 31st IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018, October 1–5.

[15] **E. C. Grigore**, O. Mangin, A. Roncone, and B. Scassellati, "Predicting supportive behaviors for human-robot collaboration", in *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Extended Abstract, Stockholm, Sweden, 2018, July 10–15.

[14] **E. C. Grigore** and B. Scassellati, "Discovering action primitive granularity from human motion for human-robot collaboration", in *Robotics: Science and Systems (RSS)*, Boston, USA, 2017, July 12–16.

[13] **E. C. Grigore** and B. Scassellati, "Hierarchical multi-agent reinforcement learning through communicative actions for human-robot collaboration", in *Proceedings of the Future of Interactive Learning Machines (FILM) Workshop at the 30th Annual Conference on Neural Information Processing Systems (NIPS)*, Full paper, Barcelona, Spain, 2016, December 5–10.

[12] **E. C. Grigore**, A. Pereira, I. Zhou, D. Wang, and B. Scassellati, "Talk to me: verbal communication improves perceptions of friendship and social presence in human-robot interaction", in *Proceedings of the 16th International Conferences on Intelligent Virtual Agents (IVA)*, Los Angeles, USA: Springer, 51–63. **Best paper finalist.**

[11] **E. C. Grigore**, A. Pereira, J. J. Yang, I. Zhou, D. Wang, and B. Scassellati, "Comparing ways to trigger migration between a robot and a virtually embodied character", in *Proceedings of the 8th International Conference on Social Robotics (ICSR)*, Kansas City, USA: Springer, 2016, November 1–3, 839–849. **Best student paper finalist.**

[10] A. Suman, R. Marvin, **E. C. Grigore**, H. Admoni, and B. Scassellati, "Prior behavior impacts human mimicry of robots", in *Proceedings of the 25th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, New York, USA, 2016, August 26–31, pp. 1057–1062.

[9] **E. C. Grigore** and B. Scassellati, "Constructing policies for supportive behaviors and communicative actions in human-robot teaming", in *Proceedings of the HRI Pioneers Workshop at the 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Christchurch, New Zealand, 2016, March 7–10, pp. 615–616.

[8] **E. C. Grigore**, A. Pereira, and B. Scassellati, "Modeling motivational states in adaptive robot companions", in *2015 AAAI Fall Symposium Series*, 2015, November 12–14.

[7] **E. C. Grigore**, "Modeling motivational states through interpreting physical activity data for adaptive robot companions", in *Proceedings of the 23rd International Conference on User Modelling, Adaptation and Personalization (UMAP)*, Dublin, Ireland: Springer, 2015, June 29–July 3, pp. 379–384.

[6] **E. C. Grigore** and B. Scassellati, "Maintaining engagement in shared goals with a personal robot companion through motivational state modeling", in *Proceedings of the Human-Robot Teaming Workshop at the 10th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Portland, OR, 2015, March 2–5.

[5] B. Hayes, **E. C. Grigore**, A. Litoiu, A. Ramachandran, and B. Scassellati, "A developmentally inspired transfer learning approach for predicting skill durations", in *Proceedings of the 4th Joint IEEE International Conferences on Development and Learning and Epigenetic Robotics (ICDL-Epirob)*, IEEE, 2014, October 13–16, pp. 181–186.

[4] E. Short, K. Swift-Spong, J. Greczek, A. Ramachandran, A. Litoiu, **E. C. Grigore**, D. Feil-Seifer, S. Shuster, J. J. Lee, S. Huang, *et al.*, "How to train your dragonbot: socially assistive robots for teaching children about nutrition through play", in *Proceedings of the 23rd IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, IEEE, 2014, August 25–29, pp. 924–929.

[3] **E. C. Grigore** and B. Scassellati, "Feasibility of sar approaches – helping children with learning tasks", in *Proceedings of International Workshop on Developmental Social Robotics (DevSor): Reasoning about Human, Perspective, Affordances and Effort for Socially Situated Robots at the 26th IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Tokyo, Japan, 2013, November 3–7, pp. 22–24.

[2] **E. C. Grigore**, K. Eder, A. G. Pipe, C. Melhuish, and U. Leonards, "Joint action understanding improves robot-to-human object handover", in *Proceedings of the 26th IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2013, November 3–7, pp. 4622–4629.

[1] **E. C. Grigore**, K. Eder, A. Lenz, S. Skachek, A. G. Pipe, and C. Melhuish, "Towards safe human-robot interaction", in *Proceedings of the 12th Annual Towards Autonomous Robotic Systems (TAROS)*, Springer, 2011, August 31–September 2, pp. 323–335.

Honors and Awards

- **Best Paper Finalist, Intelligent Virtual Agents (IVA)**   2016
  "Verbal Communication Improves Perceptions of Friendship and Social Presence
  in Human-Robot Interaction"

- **Best Student Paper Finalist, International Conference on Social Robotics (ICSR)**   2016
  "Comparing Ways to Trigger Migration between a Robot
  and a Virtually Embodied Character"

- **Human-Robot Interaction (HRI) Pioneer**   2016
  Highly selective workshop that seeks to foster creativity and collaboration across HRI

- **Tocher Fellowship, Yale University, USA**   2015

- **Tocher Fellowship, Yale University, USA**   2014

- **EPSRC (Engineering and Physical Sciences Research Council) Fellowship, UK**   2011
  Summer Research Project at the Bristol Robotics Lab, Bristol, UK

- **EPSRC Fellowship, UK**   2010
  Summer Research Project at the Bristol Robotics Lab, Bristol, UK

- **Head of Promotion Honorary Prize (Valedictorian),**
  Piatra Neamț Computer Science High School, Romania   2008

Invited Talks

- IEEE International Conference on Robotics and Automation (ICRA)
  Long-term Human Motion Prediction Workshop, Xi'an, China
  Motion Forecasting for Autonomous Driving Applications   2021

- Virtual Assistant Summit, San Francisco, CA, USA
  Can You Lend Me a Hand? Helpers of the Future   2017

- STEM Coffee Hour Facilitator, Cheshire, CT, USA
  How is AI Shaping Robotics?   2017

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  International Workshop on Developmental Social Robotics (DevSor), Tokyo, Japan
  Feasibility of SAR Approaches? Helping Children with Learning Tasks   2013

Theses

[Ph.D. Thesis] **E. C. Grigore**, "Learning Supportive Behaviors for Adaptive Robots in Human-Robot Collaboration", Yale University, USA, 2018, Available at: `https://scazlab.yale.edu/sites/default/files/files/corina_dissertation.pdf`.

[Master's Thesis] **E. C. Grigore**, "I Robot, I Think", University of Bristol, UK (work performed at the Bristol Robotics Lab, Bristol, UK), 2012.

Research Experience

- **Yale University, Social Robotics Laboratory, New Haven, CT, USA**

  - *Learning Supportive Behaviors for Adaptive Robots in Human-Robot Collaboration*   2014 – 2018
    Applying machine learning techniques to endow robots with learning capabilities needed when placed in new environments or faced with new tasks. This includes learning about the structure and progression of a physical task, as well as about the actions human workers perform during this task. Investigating techniques including Hidden Markov Models and reinforcement learning in single- and multi-agent settings, where the robot's aim is to provide supportive behaviors in human-robot collaboration scenarios.

  - *User modeling for motivational states within a reinforcement learning framework*   2013 – 2015
    Designed a system for long-term robot companions that employs a model of users' daily motivational states within a reinforcement learning framework.

  - *Developed a robot for interaction with children in an educational setting*   2012 – 2014
    Built, assembled, and programmed research robot platform DragonBot for interaction with children. Performed human-robot interaction study at local schools.

- **University of Bristol and the Bristol Robotics Laboratory, Bristol, UK**

  - *Master of Engineering "I Robot, I Think" Thesis Project*   2011 – 2012
    Applied machine learning techniques to model users' intentions for object handovers in human-robot interaction scenarios [2].

  - *"I Robot... I Learn" Summer Research Project*   2011
    Implemented a machine learning algorithm for estimating the state of object handovers in human-robot interaction scenarios.

- ○ *"I Robot... and Beyond" Summer Research Project* 2010
  Investigated safety and liveness properties rooted in design verification principles for a human-robot interaction system [1].

Skills

- Programming languages: Python, C++, Matlab, HTML, LaTeX

- Libraries: PyTorch, NumPy

- Software/IDEs: Git, PyCharm, Visual Studio

- Robotics/hardware platforms: Baxter, Keepon, Nao, ROS, PhaseSpace Motion Capture System

Teaching Experience and Mentorship

- Supervising research internship projects at Motional, USA   2018 – present
- Mentoring high-school and undergraduate students on research projects
  at Yale University, USA   2013 – 2018
- Teaching Fellow at Yale University, USA

  - ○ Natural Language Processing (CPSC 577)   2017
  - ○ Mathematical Tools for Computer Science (CPSC 202A)   2014 – 2015
  - ○ Intelligent Robotics (CPSC 473)   2013 – 2015
  - ○ Intelligent Robotics Lab (CPSC 472)   2013

- Point of contact for incoming Romanian students, University of Bristol, UK   2009 – 2012
- Mathematics student-teacher at Sydney Stringer School, Coventry, UK
  Students Associates Scheme   2009
- Course Representative, Coventry University, Coventry, UK
  Speaking on behalf of the student body   2008 – 2009

Academic Service and Membership

- Conference and Workshop Committee Leadership

  - ○ AAAI Conference on Artificial Intelligence (AAAI)
    Program Committee Member   2020 – 2021
  - ○ International Conference on Intelligent Virtual Agents (IVA)
    Program Committee Member   2017 – 2020
  - ○ ACM/IEEE International Conference on Human-Robot Interaction (HRI)
    Program Committee Member and Pioneers Workshop Panel Chair   2017
  - ○ IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
    Synergies Between Learning and Interaction (SBLI) Workshop
    Program Committee Member   2017

- Conference Refereeing service

  - ○ International Conference on Machine Learning (ICML)   2019
  - ○ ACM/IEEE International Conference on Human-Robot Interaction (HRI)   2015 – 2019
  - ○ IEEE/RSJ International Conference on Robotics and Automation (ICRA)   2018
  - ○ Springer International Journal of Social Robotics   2018

- ○ IEEE/RSJ International Conference on
  Intelligent Robots and Systems (IROS)   2014, 2017 – 2018
- ○ ACM/IEEE Interaction Design and Children Conference (IDC)   2018
- ○ EEE-RAS International Conference on Humanoid Robots (Humanoids)   2017
- ○ IEEE Transactions on Automation Science and Engineering   2017
- ○ International Conference on Social Robotics (ICSR)   2016
- ○ IEEE International Symposium on
  Robot and Human Interactive Communication (RO-MAN)   2016
- ○ Elsevier Cognitive Systems Research Journal   2016
- ○ Affective Computing and Intelligent Interaction   2015

- Membership in Professional Societies

  - ○ Association for the Advancement of Artificial Intelligence   2014 – present
  - ○ IEEE   2014 – present
  - ○ Cognitive Science Society   2014 – present

- Outreach

  - ○ World Science Festival, New York City   2014
  - ○ Routine lab tours and open houses, Yale Social Robotics Lab, CT   2012 – 2017
  - ○ Routine outreach activities involving robot demos at local schools, CT   2012 – 2017

- Book Reviewing

  - ○ *Visual Analysis of Behaviour – From Pixels to Semantics*, by Gong S, Xiang T   2012

Conferences and Summer Schools Attended

- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)
  Attended conference for accepted paper   2020

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  Presented talk for accepted paper   2018
  Presented talk for accepted paper and invited talk for the DevSor Workshop   2013

- International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
  Presented talk for accepted papers   2018

- Robotics: Science and Systems
  Presented talk for accepted paper (RSS)   2017

- ACM/IEEE International Conference on Human-Robot Interaction (HRI)
  Organized and moderated the Pioneers Workshop Panel   2016
  Presented talk for accepted paper   2015

- Annual Conference on Neural Information Processing Systems (NeurIPS)
  Presented talk for workshop full paper   2016

- International Conference on Intelligent Virtual Agents (IVA)
  Presented paper for best paper finalist category   2016

- International Conference on Social Robotics (ICSR)
  Presented paper for best student paper finalist category   2016

- International Conference on Machine Learning (ICML)   2016

- International Joint Conference on Artificial Intelligence (IJCAI)   2016

- AAAI Fall Symposium Series
  Presented talk for accepted paper   2015

- Max Planck Institute for Intelligent Systems Machine Learning Summer School, Germany
  (**20% acceptance rate**)   2015

- International Conference on User Modelling, Adaptation and Personalization (UMAP)
  Presented talk for accepted paper   2015

- AAAI Conference on Artificial Intelligence (AAAI)
  Presented robot demo   2014

- Cognitive Science Society Annual Conference (CogSci)
  Presented robot demo   2014

- The First Summer School on Social Human-Robot Interaction, UK   2013

- Conference Towards Autonomous Robotic Systems (TAROS)
  Presented talk for accepted paper   2011

Languages

- Romanian – native language

- English – fluent: written and spoken

- Spanish – conversational: spoken

- French – basic: written and spoken