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Anthony Francis

About

Dr. Anthony G. Francis, Jr. is a Senior Software Engineer at Google Brain Robotics specializing in reinforcement learning for robot navigation. Previously, he worked on emotional long-term memory for robot pets at Georgia Tech's PEPE robot pet project, on models of human memory for information retrieval at Enkia Corporation, and on large-scale metadata search and 3D object visualization at Google. He earned his B.S. (1991), M.S. (1996) and Ph.D. (2000) in Computer Science from Georgia Tech, along with a Certificate in Cognitive Science (1999). He and his colleagues won the ICRA 2018 Best Paper Award for Service Robotics for their paper "PRM-RL: Long-range Robotic Navigation Tasks by Combining Reinforcement Learning and Sampling-based Planning". He's the author of over a dozen peer-reviewed publications and is an inventor on over a half-dozen patents. He's published over a dozen short stories and four novels, including the EPIC eBook Award-winning *Frost Moon*; his popular writing on robotics includes articles in the books *Star Trek Psychology* and *Westworld Psychology*, as well as a Google AI blog article titled [Maybe your computer just needs a hug](#). He lives in San Jose with his wife and cats, but his heart will always belong in Atlanta. You can find out more about his writing at his website [dresan.com](#).

Research Areas

Machine Intelligence

Robotics

Authored publications

Google publications

Other publications

Filters

Year

A Protocol for Validating Social Navigation Policies

Alexander Toshkov Toshev, [Anthony G. Francis](#), Edward Lee, Leila Takayama, Soeren Pirk, Xuesu Xiao

Submission to SEANavBench 2022 Workshop (2022)

Google Scanned Objects: A High-Quality Dataset of 3D Scanned Household Items

[Anthony G. Francis](#), Brandon Kinman, [Krista Ann Reymann](#), [Laura Downs](#), Nathan Koenig, Ryan M. Hickman, Thomas B. McHugh, [Vincent Olivier Vanhoucke](#)

(2022)

Learning Model Predictive Controllers with Real-Time Attention for Real-World Navigation

Conference on Robot Learning (2022) (to appear)

Template Tricks for Behavior Trees

[Anthony G. Francis](#)

Game AI Pro – Online Edition 2021, CRC Press

Graph Neural Networks for Motion Planning

Alejandro Ribeiro, Arbaaz Khan, Vijay Kumar, [Anthony G. Francis](#)

ArXiv (2020)

Long-Range Indoor Navigation with PRM-RL

[Anthony Francis](#), [Aleksandra Faust](#), [Lewis Chiang](#), [Jasmine Hsu](#), [Chase Kew](#), Marek Fiser,
Tsang-Wei Lee

IEEE Transactions on Robotics (T-RO) (2020), pp. 19

Evolving Rewards to Automate Reinforcement Learning

[Aleksandra Faust](#), [Anthony Francis](#), Dar Mehta

6th ICML Workshop on Automated Machine Learning (2019)

Learning Navigation Behaviors End-to-End with AutoRL

[Lewis Chiang](#), [Aleksandra Faust](#), Marek Fiser, [Anthony Francis](#)

IEEE Robotics and Automation Letters (RA-L), vol. 4 (2019), pp. 2007-2014

PRM-RL: Long-range Robotic Navigation Tasks by Combining Reinforcement Learning and Sampling-based Planning

[Aleksandra Faust](#), [Oscar Ramirez](#), Marek Fiser, Ken Oslund, [Anthony Francis](#), James Davidson, Lydia Tapia

IEEE International Conference on Robotics and Automation (ICRA), Brisbane, Australia (2018), pp. 5113-5120

Game AI Pro 3: Collected Wisdom of Game AI Professionals, A K Peters/CRC Press (2017), pp. 115-126

Emotional Memory and Adaptive Personalities

[Anthony Francis](#), Manish Mehta, Ashwin Ram

Handbook of Synthetic Emotions and Sociable Robotics, Information Science Reference, an imprint of IGI Global, www.info-sci-ref.com (2009), pp. 391-412

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