80

Deep Learning – Exploring the Limits Beyond Low Hanging Fruit

Philip Galanter, Nima Kalantari, Jeff Morris

Philip Galanter (Visualization)

With the explosive growth in the realm of artificial intelligence has come a body of ethical concerns regarding human impact. However, my work explores our actions towards AI systems. The concept of machine patiency is the notion that humans may have moral obligations towards AI systems as they become sentient. Five bodies of knowledge are inspected to set the landscape for future machine patiency research. These are (1) the history of human encounters with sentient others, (2) topics from the philosophy of mind, (3) topics from moral philosophy, (4) niche specialists who study AI and ethics, and (5) the nascent field of complexism. In the talk presented at the College Art Association, with sponsorship by the Leonardo Art and Science organization, and the related Artnodes journal article, there is a focus on question as to when computers should be credited as true authors. The noted xCoAx paper adds further development steering the conversation on the general problem of machine patiency. That paper closes with a provisional affirmation of machine patiency as plausible on the basis of both natural charity and rational non-contradiction.

Galanter P. College Art Association 2020, New York, NY Leonardo Session Speaker - Towards Ethical Relationships with Machines That Make Art.
Galanter P. Towards Ethical Relationships with Machines That Make Art. Artnodes: e-journal on art, science, and technology. 2020;26:9.
Galanter P: Machine Patiency and the Ethical Treatment of Artificial Intelligence Entities. in xCoAx: the Conference on Computation, Communication, Aesthetics and X. Edited by Carvalhais M, Verdicchio M. Graz, Austria, Universidade do Porto Praça Gomes Teixeira; 2020.

Nima Kalantari (CSCE)

Three applications of deep learning have been pursued:

In the High Dynamic Range project we present a deep-learning approach for single image HDR reconstruction. Our method can hallucinate visually pleasing textures in the saturated regions through specifically designed network architecture and training.
M. S. Santos, T. I. Ren, and N. K. Kalantari, "Single image HDR reconstruction using a CNN with masked features and perceptual loss," ACM Trans. Graph., vol. 39, no. 4, Article 80 (July 2020), 10 pages.

In the Light Field project we propose an approach to synthesize novel view images of a scene from a single image. In addition to producing images from novel views, our approach can be used to generate refocused images.
Q. Li and N. K. Kalantari, " Synthesizing Light Field From a Single Image with Variable MPI and Two Network Fusion," ACM Trans. Graph., vol. 39, no. 6, Article 229 (December 2020), 10 pages.

In the Video Interpolation project, given a high resolution low frame rate video and a low resolution high frame rate video, our approach is able to reconstruct a high resolution high frame rate video.
Paliwal and N. K. Kalantari, "Deep Slow Motion Video Reconstruction With Hybrid Imaging System," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 42, no. 7, pp. 1557-1569, 1 July 2020.

Jeff Morris (Performance Studies - Music)

In contrast to research that seeks to use machines to faithfully replicate human performance in familiar tasks, this research project explores the native character of deep learning systems by using their errors and artifacts to create and shape content in artworks, in order to facilitate understanding the nature and creative potential of these systems more deeply and intuitively, and to develop a sensitivity to the ways they unintentionally they shape our thinking. Two musical compositions demonstrate useful techniques: In one, a self-cancelling crib sheet structure proved useful wherever a computerized guess and definite correct answer can be compared, and wherever audiovisual processes can be put in place that would cancel each other out when the system is correct while giving a rich voice to any errors that occur. In the other composition, the notion of breaking the physical metaphor of the original premise has emerged as helpful for keeping focus on the voice of the system itself rather than the fiction that has been fabricated around it.

Morris, Jeff. Close Reeding: A Digital Look from the Inside Out [Audio CD]. Ravello Recordings RR8041, September 11, 2020, 65 minutes.
Morris, Jeff. "Divining Rod" [Audiovisual Performance]. Generative Art international conference, Rome, Italy, December 19–21, 2019.
Morris, Jeff. Hearing Voices: Human Sounds, Digital Ears [Audio CD]. Ravello Recordings RR8033, May 8, 2020, 50 minutes.
Morris, Jeff. "Native Composition: Metaprocess as a Unifying Factor in a Diverse Body of Artwork" [Artist Talk Video]. International Symposium on Electronic Art, Montreal, Canada, October 13–18, In Press 2020.

Unpublished Work Completed

Morris, Jeff and Elisabeth Blair. "The Chances" [Surround-sound Music Composition], 7:21.
Morris, Jeffrey M. "The Music of Machine Misreading: Machine Learning Artifacts as Sources for Artistic Content and Control." In Where Art Meets Technology: Integrating Tangible and Intelligent Tools in Creative Processes [ACM CHI Workshop], Honolulu, Hawaii.