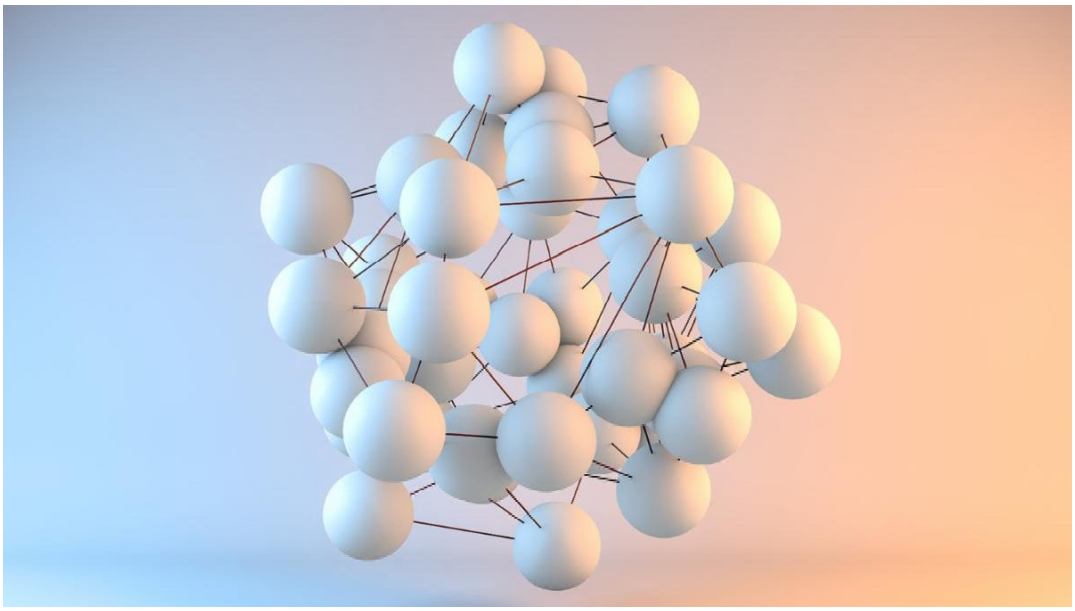
MIT-IBM Watson AI Lab

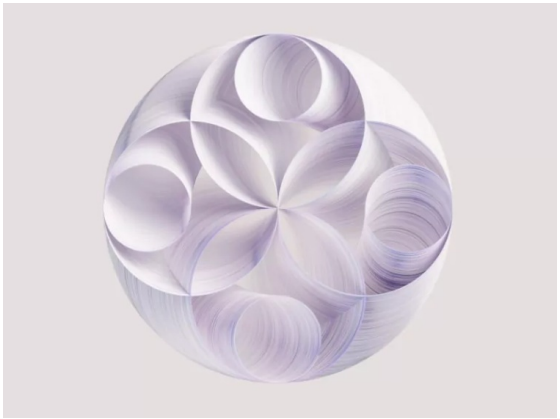


In the Lab

MIT postdocs working at the intersection of AI and life sciences

New MIT-Novo Nordisk Artificial Intelligence Postdoctoral Fellows Program

MIT's School of Engineering and global health care company Novo Nordisk announced the launch of a multi-year program to support postdoctoral fellows conducting research at the intersection of artificial intelligence and data science with life sciences.



IBM watsonx.ai

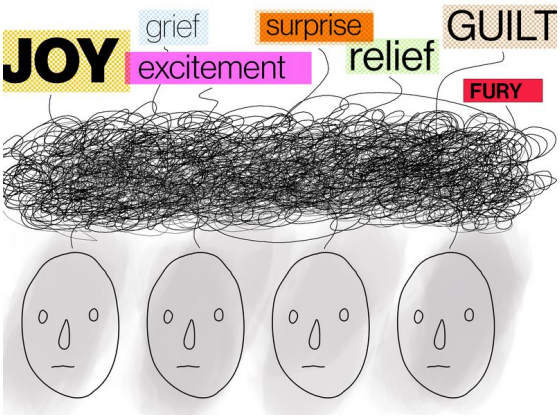
Open source, pre-trained foundation models make AI and automation easier than ever before.

Sometimes applying AI and automation in business applications is too labor intensive, writes David Cox, Lab co-director and IBM Research's VP for AI Models. Watsonx lowers the barrier to use with trustworthy foundation models, data curation, and methods for tuning the model and adjusting prompts.

When computer vision works more like a brain, it sees like people do

[Training artificial neural networks with data from real brains can make computer vision more robust.]

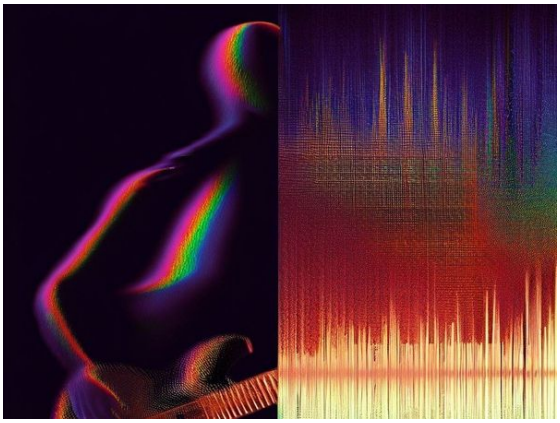
New work from the Lab teams of Jim DiCarlo and David Cox, Lab co-director and VP for AI Models at IBM Research, used neural activity patterns in the brain's inferior temporal cortex to train a neural network and found it was more robustly able to identify objects in images than a model that lacked that neural training.



Computational model mimics humans' ability to predict emotions

[Using insights into how people intuit others' emotions to approximate social intelligence]

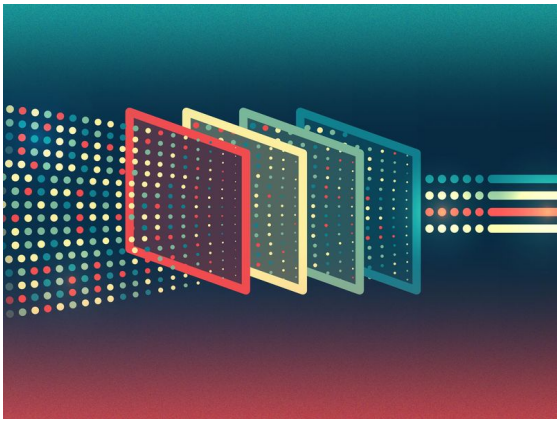
A computational model out of the Lab's Tenenbaum group can predict other people's emotions — including joy, gratitude, confusion, regret, and embarrassment — similarly to how humans can. It depends, not on inferring someone's emotional state based on their facial expression, but rather the ability to predict someone's emotional response to events before they occur.



Scaling audio-visual learning without labels

[A multimodal technique blends major self-supervised learning methods]

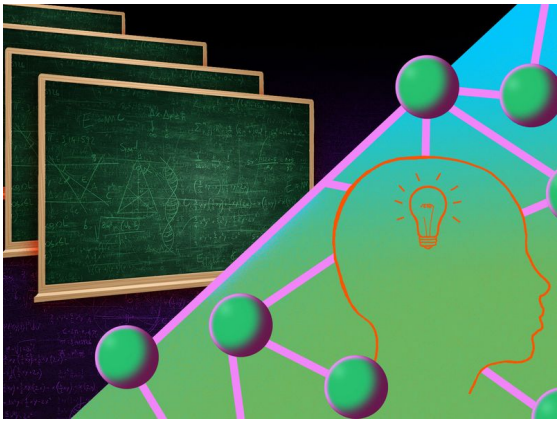
The Lab groups of Leonid Karlinsky, Hilde Kuehne, and Jim Glass have developed a method that combines contrastive learning and masked data modeling in order to improve tasks like event classification in single- and multimodal data without the need for annotation — like humans can.



New tool for choosing the right method for evaluating AI models

[A more accurate picture of how a model is behaving, so to correctly interpret its predictions]

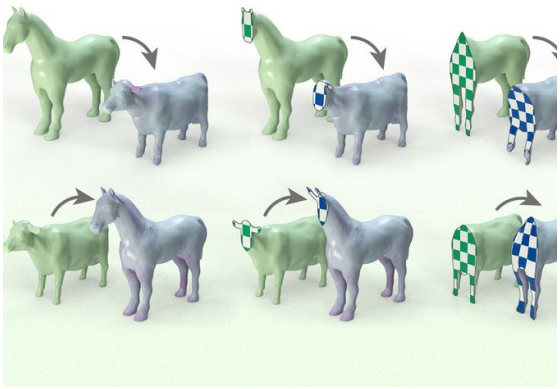
Saliency methods seek to explain model behavior for AI users, but it can be difficult to choose the best technique for a particular task. Addressing this, the Lab groups of Arvind Satyanarayan and Hendrik Strobelt have developed "saliency cards," which provide concise summaries of machine-learning saliency methods in terms of 10 user-focused attributes.



A more effective way to train machines for uncertain situations

[Deciding when a “student” machine should follow its teacher or learn on its own]

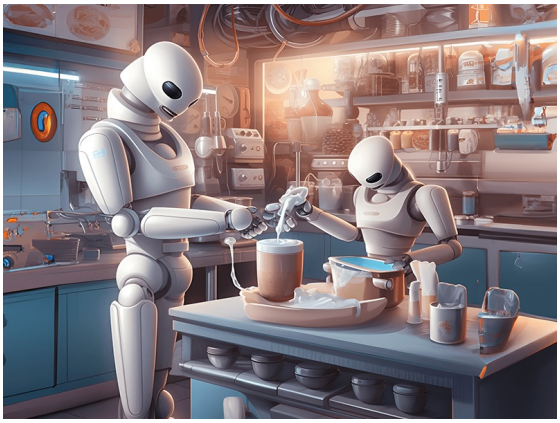
Researchers working with the Lab's Pulkit Agrawal group have developed an algorithm that automatically and dynamically determines whether a machine-learning system should use imitation learning or reinforcement learning to complete a task. This algorithm enabled simulated student machines to learn tasks faster and more effectively than other techniques.



A better way to match 3D volumes

[This technique could yield solutions to computer graphics problems in animation and CAD.]

In computer graphics and design, 3D objects are often represented by their outer surface contours, which might crumble when manipulated. Now, a technique from the Lab groups of Polina Golland and Justin Solomon aligns 3D shapes by mapping volumes to volumes for improved manipulation with less distortion.



Helping robots handle fluids

[A simulation tool for robots to manipulate complex fluids]

Robotic systems are coming closer to a human-like understanding of fluid behaviors. FluidLab, a simulation tool from the groups of Lab researchers Antonio Torralba and Chuang Gan, offers a versatile collection of intricate fluid handling challenges, involving both solids and liquids, and multiple fluids simultaneously. This brings them a step toward more effortlessly assisting with daily tasks.

Everything IBM Research showed off at Think 2023

[Innovations, like watsonx, to help tackle some of the biggest challenges in business and technology]

During last month's event, IBM unveiled a slew of new technologies, many of which had their genesis in IBM Research, including watsonx.ai, which leverages work out of the Lab.

Elevating human health through AI

MIT Schwarzman College of Computing researchers engage challenges across specialties

Lab researchers Connor Coley, Dina Katabi, and David Sontag are making new discoveries in machine learning, biology, chemistry, and clinical sciences and translating these discoveries into technologies that can improve people's lives.

Event Recordings

Symposium: Where Big Ideas Come From — and Why They Matter
During an all-MIT faculty panel — drawn from many different domains and backgrounds, including Lab researchers Dina Katabi and Lab MIT chair Anantha Chandrakasan — explored global challenges that demand humanity's best and broadest thinking now more than ever, in the context of sharing their exciting research in conjunction with their own experiences with creative breakthroughs. Read more.

Inaugural SERC Symposium 2023
Experts from multiple disciplines, including Lab researchers, explored the challenges and opportunities that arise with the broad applicability of computing in many aspects of society. Discussions ranged from ethics in computing education; policy; themes of beneficent and fair computing, equitable and personalized health, algorithms and humans, and more.

Lab Highlights

Lab researcher Pin-Yu Chen received the 2023 IJCAI Computers and Thought Award for his contributions to consolidating properties of trust, robustness and safety into rigorous algorithmic procedures and computable metrics for improving AI systems.

Lab researcher Bilge Yildiz was elected a Corresponding Member of the Division of Mathematics and the Natural Sciences of the Austrian Academy of Sciences.

Lab researchers Rafael Jaramillo, Benedetto Marelli, Tamara Broderick and Justin Solomon receive tenure at MIT, while Jacob Andreas, Kevin O'Brien, and Jonathan Ragan-Kelley have been promoted to associate professor.

Lab researcher Pulkit Agrawal and Lab co-director Aude Oliva were awarded Multidisciplinary University Research Initiative (MURI) funding from the U.S. Department of Defense (DoD) for neuro-inspired distributed deep learning.

Lab researcher Rafael Gomez-Bombarelli won the inaugural Common Ground Award for Excellence in Teaching, which is given by the MIT Stephen A. Schwarzmann College of Computing to faculty who have made exceptional contributions to teaching classes with substantial computing content.

The Lab has numerous papers accepted to top conferences this summer: 13 International Conference on Machine Learning (ICML) papers and 20 Conference on Computer Vision and Pattern Recognition (CVPR) papers.

Online Learning

Artificial Intelligence: Implications for Business Strategy
A joint MIT CSAIL and MIT Sloan School of Management Course begins
June 28 and August 16.

Designing Efficient Deep Learning Systems
An MIT Professional Course begins
July 17.

Machine Learning in Business
A joint MIT CSAIL and the MIT Sloan School of Management Course begins July 26.

Making AI Work: Machine Intelligence for Business and Society
A joint MIT Sloan & Schwarzman College of Computing Executive and Professional Course begins August 16.

Unsupervised Machine Learning: Unlocking the Potential of Data
A joint MIT Sloan & Schwarzman College of Computing Executive and Professional Course begins August 23.