PROFESSIONAL EDUCATION

SUMMER 2022

REINFORCEMENT LEARNING

DATES	DURATION	FORMAT	FEE	CEUS
July 25–27, 2022	3 Days	On Campus	$3,200	

Understand if RL can solve the big problems of your organization.

Join professionals from around the world to upgrade your machine learning (ML) toolkit in this three-day RL bootcamp. Through interactive lectures and hands-on exercises, you will:

- Understand the difference between supervised learning and RL
- Be able to gauge which problems in your organization can be solved using RL
- Gain a solid understanding of state-of-the-art Deep RL algorithms
- Ability to cast your favorite challenge into the RL framework and recognize the promise and limitations of RL through a hands-on-session and live RL clinic
- Be able to reason about which RL algorithm is most appropriate for the problem at hand

This program includes the unique opportunity to present your organization's specific technological challenges to MIT faculty during a live RL Clinic—a session designed to help you identify if RL can be used to solve your problems, determine which approach will be most effective, and design RL applications to resolve the issue. During this process, you will draw on the expertise of the course teaching team, which is comprised of recognized industry experts with experience working at 12 firms across multiple industries, from both startups and big tech.

EARN A PROFESSIONAL CERTIFICATE

This course may be taken individually or as part of the ***Professional Certificate Program in Machine Learning & Artificial Intelligence.***

WHO SHOULD ATTEND

This program is ideally suited for technical professionals who wish to understand cutting-edge trends and advances in reinforcement learning. Professionals who are not sure of when and how to apply RL in engineering and business settings will find this program especially useful. The curriculum is particularly appropriate for professionals with significant experience and demonstrated career progression, such as:

- **Engineers / Managers** who want to understand Deep RL and its implications
- **Research scientists** who want to improve their ability to utilize Deep RL algorithms
- **Machine learning engineers and software engineers** looking to use RL to enhance results derived from supervised learning systems
- **Data scientists** who want to incorporate RL strategies into their machine learning toolkit
- **Data analysts and business analysts** who are tasked with solving problems with limited quantities of data
- **Product managers and program managers** who need to be able to identify when it is appropriate and effective to apply RL
- **CTOs and other executives** who want to identify how RL can be implemented to address organization-wide challenges

professional.mit.edu/rl

LEARNING OUTCOMES

- Understand the basic principles of RL and learn when RL can be applied to your business problem and how to pose the problem for obtaining maximum gains from RL both through lectures and an interactive group session.
  - Learn when supervised learning is sufficient and when RL can provide a big advantage.
- Learn about Bandits, Contextual Bandits and the more general RL formulation.
- Understand the theory and the practical aspects of how to use popular Deep RL algorithms such as DQN, A3C, PPO, SAC, TD3, MCTS.
- Walk through application of RL algorithms and what made them work.
- Develop rules-of-thumb to reason about when to use which Deep RL Algorithm.
- Understand how to structure the observation, action space and the reward function for optimally training the RL agent.
- Learn about the limitations of Deep RL algorithm, how to tune hyperparameters and practical tricks.

LEAD INSTRUCTORS

Pulkit Agrawal

Pulkit Agrawal is the Steven and Renee Chair Assistant Professor of Electrical Engineering and Computer Science at MIT and leads the Improbable AI Lab, part of the Computer Science and Artificial Intelligence Lab at MIT and affiliated with the Laboratory for Information and Decision Systems. Dr. Agrawal co-founded SafelyYou, an organization that builds fall prevention technology, and the AI Foundry, an incubator for AI startups. He currently serves as an advisor for several startups and has research collaborations with companies such as IBM, Toyota, Sony, and Facebook AI Research (FAIR).

Cathy Wu

Cathy Wu is the Gilbert W. Winslow Career Development Assistant Professor of civil and environmental engineering at MIT and has worked across many fields and organizations, including Microsoft Research, OpenAI, the Google X Self-Driving Car Team, AT&T, Caltrans, Facebook, and Dropbox. Wu is also the founder and Chair of the Interdisciplinary Research Initiative at the ACM Future of Computing Academy.

Teaching Methodology

The certificate curriculum is grounded in the spirit of MIT's motto, "Mens et Manus," or "mind and hand," which combines theoretical instruction with hands-on methods of discovery.

INTERACTIVE LECTURES

HANDS-ON EXERCISES

GROUP PROJECTS

SUPPLEMENTAL RESOURCES

PROFESSIONAL EDUCATION

ABOUT MIT PROFESSIONAL EDUCATION

For 70 years, MIT Professional Education has been providing technical professionals worldwide a gateway to renowned MIT research, knowledge, and expertise, through advanced education programs designed specifically for them. In addition to industry-focused, two-to-five-day live virtual and on-campus courses through Short Programs, MIT Professional Education offers professionals the opportunity to take online and blended learning courses through Digital Plus Programs, attend courses abroad through International Programs, enroll in regular MIT academic courses through the Advanced Study Program, or attend Custom Programs designed specifically for their companies. For more information, please visit **professional.mit.edu**.