

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

GLOBAL BUSINESS OF ARTIFICIAL INTELLIGENCE AND ROBOTICS (GBAIR)

If you have any questions about this course please email Jonathan Ruane (jruane@mit.edu)

Course Summary

The objective of the Global Business of AI & Robotics (GBAIR) seminar is to analytically investigate where the opportunities and challenges lie for the commercialization of Artificial Intelligence (AI) and Robotics in the near term. This informal discussion-based course will be rooted in the business school but will be cross-disciplined; we openly welcome non-Sloan students. No technical background is necessary.

This will be the first course of its kind in the world and will be a chance for students to participate in a uniquely MIT experience. As with any course runs for the first time, we are depending on student involvement, flexibility, feedback and participation. There will be a balance of frameworks, external speakers and projects. But please keep in mind that this is a preliminary and informal course that will only succeed on the basis of strong student participation.

This outline is intended to illustrate our intentions. Precise content is still under development and may differ from some of the specifics listed here.

Why this course now and why at MIT?

AI has oscillated through many hype cycles over many years but it seems we are now at a tipping point, poised to touch or transform almost every sector in the coming decades. AI has the power to be a General Purpose Technology (GPT) with the economic and social impact of the steam engine or electricity. Engineers and computer scientists are figuring out how to build these technologies. Managers, leaders, entrepreneurs, policy makers and others are now needed to maximize the advantages and navigate the tradeoffs as these technologies take root. AI can be intimidating to many people outside the field, breaking down these barriers is vital to ensuring MIT graduates have a head start.

In a 2016 interview on the [Charlie Rose](#) MIT's Andrew McAfee was asked, *"What are the sectors that are going to suddenly see radical expansion of profitability and revenues?"* His response was *"the companies that figure out how to take these very recent advances in the field of artificial intelligence....they are going to transform many, many sectors of the economy, everything from driving a vehicle, to responding to a customer, to do troubleshooting, to doing equities research, to doing medical diagnosis, pathology, and radiology, this is going to happen. I think it's going to happen a lot quicker than most of us are anticipating right now."* This course is about preparing students for this massive shift. It is not just about those who end up working directly on AI after graduation but how the technology will change the competitive, economic and managerial landscape the way the internet did. How should students evaluate and think critically about these technologies?

Who will GBAIR appeal to?

- Sloan students who are interested in understanding the intricacies of this emerging area and want to prepare themselves to be better managers in companies that adopt AI. We aim to help them develop tools and confidence to approach the challenge in an informed and analytical way.

- Engineering and computer science students interested in understanding the AI commercial landscape.
- Law and policy students who are interested in the impact of AI. Cross registrants from other universities are welcome.
- Students interested in creating a startup with AI as an element.

Key Concepts explored in GBAIR

Humans & Machines

- How humans think and behave. Human biases. How we make decisions and process information. What makes humans 'smart'? Where do we get common sense and intuition?
- Understanding what machines are good at versus where humans excel.
- The economics history of automation and computerization. Electrification and other GPTs – what can we learn from before?
- Why the world might need AI e.g. aging population, climate change, urbanization, changing middle-classes.
- What is AI and how has the definition changed? The history of AI since its emergence in 1956. Understanding the boom bust cycles of AI and why that is relevant today.
- Key technological drivers of why is now different for A.I.

AI Technology

- The sector is inherently multi-disciplinary, what are the major sub-fields and why? How do they interact? Weak versus Strong AI.
- What new capabilities are likely/possible in the next 2-5 years?
- Key challenges in areas such as software, hardware and human interaction.
- What are the key research trends? Where is research within universities differing from industry and why? Introducing concepts such as machine learning, deep learning, reinforcement learning, computer vision, NPL, and more.
- What technology is developing at a rapid/exponential rate and what is developing in a slow/linear fashion? What are the hardest technological challenges that might have the biggest impact or alternatively might not be solved in the medium term?
- What emerging open/semi-open source capabilities are useful and why is this important?
- Deployment cycles; how quickly are we building and deploying new AI technologies today and how much has this changed. What key technologies are enabling this?
- Understanding the combinatorial impact of ancillary technology stacks.
- Where is AI already in use and what impact is it really having?
- Why are some organizations very effective at adopting technology and others are not? What behaviors are sufficient and/or necessary for success?

Augmentation & Automation

- Mind and machine together. Unbundling of jobs and identification of elements suitable for AI. What are the technical and organizational challenges that emerge?
- Reviewing human productivity and potential AI impact by industry and job type.
- Understanding automation as a substitute for labor and/or as a compliment for labor. Substituting for workers in routine, codifiable tasks, while amplifying the comparative advantage of workers in problem-solving skills, adaptability, and creativity.
- Understand the 'AI effect' and 'Clarke's third law'. What does this tell us about the way people will adopt AI and engage with it?
- Review more mature sectors/applications. Review sectors/applications set to grow rapidly

- What different approaches if any are evident by geographic region (U.S., China, South Korea, Japan, and Europe)?

Organizing for AI

- What challenges might managers face when organizing resources within their companies to build AI capability? How do we need to think about the research and deployment of AI within firms?
- What can we learn from the evolution of comparable technology shifts in the past
- What are organizations with substantial AI R&D budgets doing today in terms of structure and processes? What can other companies (with more limited capabilities) learn from this? How should companies without Amazon or Facebook scale think about AI?
- The importance of multi-disciplinary teams. What is this so crucial.
- What impact could AI have on the theory of firm.

AI Startups & Entrepreneurship

- What are the challenges that a startup might be better positioned to solve instead of a large company?
- Which areas are receiving VC funding and why? What can we learn from recent M&A activity?
- How to analyze a market to understand if it is commercially ready for AI or robotics innovation?
- Development cycles - what challenges are presented as we move from lab to production.
- What makes a good AI or robotics business model?

AI: Law, Policy and Ethics

- How can we develop the societal and regulatory frameworks in ways that promote, not hinder, quality of life, democratic rights, equality, freedom and transparency.
- What responsibility do people working in the field of AI have? This is not just for researchers but for commercial practitioners as well.
- How do companies think about the impact of this form of digitization on their employees? Especially if it means massive job losses. What should leaders think about?
- Dispelling fantastical predictions about A.I. as an imminent threat to humankind.
- How does Government accrue capabilities in AI given the competition for talent?
- What negative consequences should we be looking for as AI technologies become more prominent?
- Who should reap the gains of efficiencies enabled by AI technologies and what protections should be afforded to people whose skills are rendered obsolete?