X Machine

4.s28
X Machine
Tuesday 9a– 10:30p
Credit hours: 3-0-6 G/U
Location: 1-135

Instructors
Norhan Bayomi
Norbert Chang
Svafa Grönfeldt
John E. Fernandez

Course Description

AI technology is being developed, deployed, and used in a growing number of domains to perform complex tasks such as driving cars and speech recognition; actions that could only have been performed in the past by humans. A recent study by McKinsey Global Institute estimates that about 70% of companies will have adopted at least one type of AI technology by 2030, and that 60% of current occupations can be automated in the next 10 years. Therefore, AI could potentially become the most disruptive technology in human history and will have profound impacts on every aspect of our lives, especially on the technology design and labor market.

Recognizing the critical role that AI will play in defining the future not only of technology, but also geopolitical interactions, many countries now regard AI as a national priority. The United States launched the American Artificial Intelligence Initiative in 2019 with the mission to promote its leadership in AI research, development, and application. One of the eight national strategies identified in this initiative is to "provide education and training opportunities to prepare the American workforce for the new era of AI".

X Machine is a mini accelerator workshop course designed to unite computer science and design/architecture together to create innovative and impactful technological solutions to problems in the built and human environment. This half semester course promotes the development of strategic thinking and technical exploration in the realm of AI, with a focus on problem framing and early-stage ideation. The course will provide students with an opportunity to extend a foundational knowledge of AI within an interdisciplinary context. Working in small teams, students will incorporate design thinking approaches that put the user at the center of the creative process as they develop AI-empowered technological solutions. Teams will work on the ideation and conceptualization of either a product, process, or service-based solution that solves real world problems. Students will learn how to design and create a prototype, learn how to maximize their engage with their users/customers, and learn how to determine the value proposition that will make the startup successful.

Prerequisites/Co-requisites
- Interest in AI applications and the development of real-world solutions

Course Objectives
There are five main objectives / steps in the course.

XPLORE - Understand the drivers that power successful AI startups including the concepts of first-to-market, scale and unfair advantages.

IDEATE- How to brainstorm and ideate AI-based solutions using a design thinking approach.

CREATE – Understand the benefits of prototyping .

ENVISION – Learn how to test your idea so that valuable time and money are not spent chasing ideas that are not viable; Understand the fundamentals of business models and funding mechanisms.

VALIDATE - Learn how to test and communicate your ideas.

Course Schedule
Session (1): Course Introduction
Introduction to the course and the teaching team. Students will submit information and detailed description of their interest in joining the class and their ideas.

PHASE 1: XPLORE
Topic 1: AI-Based Entrepreneurship
What is AI? What can AI do / not do? How to apply AI to problems.

In the first part of this session we will discuss the latest state-of-the-art AI technologies and their application within organizations, advances in computing technology that contributed to the evolution of AI, the core technologies associated with AI and the types of data these technologies use.

Topic 2: Opportunities in AI
The second part of the session will provide an overview of AI opportunities in the design space. Using a number of case studies on successful startups working in the AI space, students will learn about how these technologies are used in real-world applications to solve problems.

PHASE 2: IDEATE
Topic 1: Understand
What is the need/problem we aim to solve and who will benefit from the solution?
This session will focus on identifying the need/problem for which an AI solution will be developed. Material will include needs analysis, market segmentation and stakeholder mapping.

Topic 2: How to Build an AI Solution
This session will investigate untapped opportunities in AI and how to come up with an idea. We will also discuss the importance of 'big data', 'cloud computing' and the 'internet of things', along with legal, moral and ethical implications that may arisen.

PHASE 3: CREATE
Topic 1: Building and Developing Core AI Technology
In this session, students will learn how to de-risk their ideas using scientific formulation and testing of business hypotheses. We will cover topics such as what data sets you need to develop your solution, how to acquire that data and who "owns" it.

Topic 2: Solve
What is our solution and why is it beneficial to stakeholders?
In the second part of this session, we look at problem-solution fit, value proposition, prototyping and solution specification.

PHASE 4: ENVISION
Topic 1: Does the AI solution work?
In the first half of this session, students will learn how to develop a viable business model for their proposed solution. We will examine a variety of operational concerns including ethics, stakeholder implications, long-term costs, and business impact versus technical feasibility.

Topic 2: Pitch Preparation
In the second half of the session we will discuss pitch preparations and slide decks to communicate your ideas.

PHASE 5: VALIDATE

The main goal of this session is to conclude the 4 previous steps and give feedback to students as they develop their AI enabled solutions. Presentations will be given to external reviewers with experience in AI and an understanding of entrepreneurship. Students will be in a good position to apply to accelerators and support programs across MIT such as DesignX, Sandbox, Creative Arts, etc.

Date	Topic
Tuesday September 10th (9-10:30 am)	**First Meeting (Info session)** Course introduction, structure, outline Prepare your initial proposals for the class
Tuesday September 17th (9-10:30 am)	**PHASE 1- XPLORE** **Topic 1: AI-Based Entrepreneurship & Opportunities in AI** **Topic 2: Problem Framing and Customer insights** Pitch your Idea (10 to 10:30 pm) and form teams
Tuesday September 24th (9-10:30 am)	**PHASE 2- IDEATE** **Topic 1: How to Build an AI Solution** **Topic 2: Market Analysis & Customer insights** What is the need/problem we aim to solve and who will benefit from the solution?
Tuesday October 1st (9-10:30 am)	**PHASE 3 – CREATE** **Topic 1: Building and developing core AI technology** **Topic 2: Product & Service Design** What is our solution and why is it beneficial to stakeholders?
Tuesday October 8th (9-10:30 am)	**PHASE 3 – CREATE** **Topic 1: Business Model** **AI Startups Panel -** AirWorks, Hosta, Mediate
Tuesday October 15th	**Holiday – No Class**
Tuesday October 22nd (9-10:30 am)	**PHASE 4 – ENVISION** **Topic 1: Does the AI solution work?** **Topic 2: Pitch Preparation**
Tuesday October 28th (9-10:30 am)	**PHASE 5 – VALIDATE** Demo Day

Inclusivity Statement

MIT values an inclusive environment. Our intent for this class is that students from all backgrounds and perspectives to be equally-served by this course. We hope in this course to develop a supportive learning community that will foster rich discussions that are respectful for diversity, gender, identity, sexuality, religion, and culture. Any student who has difficulty in the class environment and believes this may affect their performance in the course is urged to contact us directly.

Special Accommodations and Disability Support Services

If you need disability-related accommodations, I encourage you to meet with me early in the semester. If you have not yet been approved for accommodations, please contact Student Disability Services at sds-all@mit.edu.
I look forward to working with you to assist you with your approved accommodations.

Mental Health

As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may impact your ability to attend class, concentrate, complete work, take an exam, or participate in daily activities.

Undergraduates: Please discuss this with Student Support Services (S3). You may consult with Student Support Services in 5-104 or at 617-253-4861.

Graduate Students: Please reach out to the deans for personal support in the Office of Graduate Education.

For urgent or after-hours concerns, please contact MIT Police.