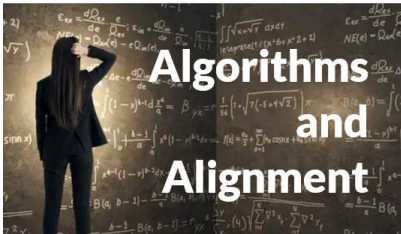




Beyond Big Data - Fundamentals of Information Technology & Artificial Intelligence
NYU Steinhardt EDCT-UE 1041 Undergraduate 4 Credits-- Online
Professor W. Russell Neuman

Course Description: The capacities for communication and for computation have expanded exponentially as a result of the digital revolution. This has resulted in massive changes in social interaction, cultural creation, education and



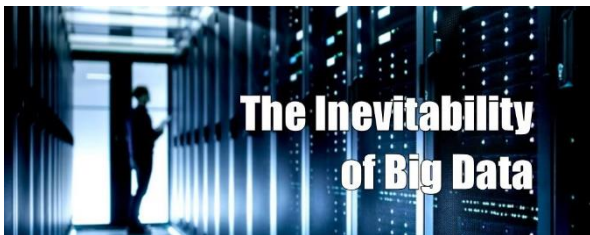
how commerce is conducted. Every aspiring professional starting out in the modern world will not actually need to write code expertly or have a doctorate in computer science. But it will be important that they have a basic familiarity with how computers and digital networks work – their amazing capacities and their important limitations. Each digital communication and transaction among humans and among human agents leaves digital footprints which accumulate into massive data structures typically referred to as big data. This course reviews how these architectures evolved, how they are currently organized and how

technical advancements will lead to entirely new models of digital architecture. Key topics include: cyber security, artificial intelligence, machine learning, neural network architectures, natural language processing, viral information dynamics, block chain technologies, data mining and data analytics. No prerequisites.



Course Rationale

Young women and men entering professional life in education, health, media and performance find themselves in a digital world. This course, a companion to “Being Digital,” is designed to prepare them for professional achievement in that dynamic, global, networked environment with an advanced understanding of digital networks and computational intelligence. It is not a course in programming or electrical engineering. It is not a skills course in utilizing digital technologies. The course has five central elements: 1) network theory, 2) artificial intelligence, 3) data science, 4) social, cultural and economic impacts of IT, and, 5) next generation technologies. There are no scientific, technical or mathematical prerequisites. The curriculum is designed to go into greater depth than “Being Digital” but the course may be taken independently. The course concludes with a review of current assessments of the impact of IT and AI technologies on social, economic and cultural dynamics. Exercises include students experimenting with online AI analytic algorithm tools such as GPT-3 (for text) and image recognition tools. These hands on exercises give students a sense of the limitations and the promise of current stage AI. Other exercises include critiquing analytic inference structures of actual big data systems such as programmatic marketing models and browser “finger printing.” Online tools will permit students to test what of their own personal information is being utilized by these platforms. Other participatory exercises include the classic Turing test, the Chinese Room scenario and non-technical programming exercises.



FITAI Course Overview

Weeks One, Two and Three: Network Architectures

The five defining elements of internet architecture (path independence, best effort carriage, common packet structure, intelligence at system edge, universal addressing system). The dynamic challenges of cyber security including denial-of-service, direct-access, packet-sniffing, phishing social engineering, and privilege escalation dynamics. Introduction to network theory and complexity theory.

Weeks Four, Five and Six: Artificial Intelligence

The history of AI from Turing and McCarthy through the AI winters to modern AI systems. Topics include knowledge representation, machine learning, natural language processing, perception, motion and manipulation, social intelligence, general intelligence, search and optimization, probabilistic methods, classifiers and statistical learning methods including artificial neural networks. Emphasis on human-centered AI.



Weeks Seven, Eight and Nine: Big Data

Each digital communication and transaction among humans and among human agents leaves digital footprints which accumulate into massive data structures typically referred to as big data. Introduction to data mining, data analytics, understanding noisy data, six fundamentals of applied statistics.



Weeks Ten, Eleven and Twelve: Social & Economic Impacts

Just as the automobile changed the structure of modern urban centers, ubiquitous computing and communication have restructured modern institutions and transactional processes. Case studies of management information systems in complex organizations, communication systems and organizational boundaries, viral dynamics of information diffusion, the productivity paradox, cyber-currencies and block chain technologies, programmatic marketing case study.

Weeks Thirteen and Fourteen: Next Generation Information Technology

What's next? Immersive displays and the metaverse, quantum computing and the future of human computer interaction.

