Notat

Kursus: Tackling the Challenges of Big Data	Ansvarlig	JPH
	Oprettet	12-2015
Projekt: 5863, Maksimal dataudnyttelse på landbrugsbedriften	Side	1 af 1

Tackling the Challenges of Big Data

Dette notat er udarbejdet som led i arbejdet med Arbejdspakke 1: Integration og dataanalyse i en Big Data kontekst i projektet Maksimal dataudnyttelse på landbrugsbedriften. Notatet præsenterer online kurset Tackling the Challenges of Big Data udbudt af MIT Professional Program og blev gennemført af Jens Peter Hansen som ked i vidensopbygning i relation til projektets opgaver.

Herunder præsenteres flyer for kurset Tackling the Challenges of Big Data samt udstedt bevis for bestået kursus.
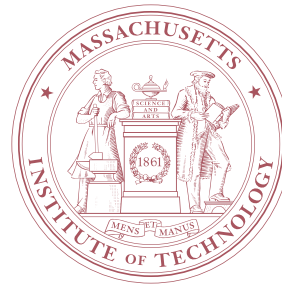
PROFESSIONAL EDUCATION

Digital Programs

Massachusetts Institute of Technology

This is to certify that

Jens Peter Hansen

has successfully completed

Tackling the Challenges of Big Data

October 6 – November 17, 2015
(20 hours)

An online program developed by the faculty of the MIT Computer Science and Artificial Intelligence Laboratory
in collaboration with MIT Professional Education and edX.

Bhaskar Pant
Executive Director
MIT Professional Education

Daniela Rus
Professor & Director
MIT Computer Science and
Artificial Intelligence Laboratory

Sam Madden
Professor & Director, Big Data Initiative,
MIT Computer Science and
Artificial Intelligence Laboratory

TACKLING THE CHALLENGES OF BIG DATA

COURSE TITLE: Tackling the Challenges of Big Data

COURSE DATES: ► October 6 - November 17, 2015 ► November 17 - December 29, 2015

FEE: $545	LOCATION: Online
CEUs: 2.0	CONTACT: ✉ mitprofessionalx@mit.edu

COURSE INFORMATION ONLINE: https://mitprofessionalx.mit.edu

COURSE DESCRIPTION

This Digital course will survey state-of-the-art topics in Big Data, looking at data collection (smartphones, sensors, the Web), data storage and processing (scalable relational databases, Hadoop, Spark, etc.), extracting structured data from unstructured data, systems issues (exploiting multicore, security), analytics (machine learning, data compression, efficient algorithms), visualization, and a range of applications.

Each module will introduce broad concepts as well as provide the most recent developments in research.

The course will be taught by a team of world experts in each of these areas from the MIT Computer Science and Artificial Intelligence Laboratory (CSAIL).

With backgrounds in data, programming finance, multicore technology, database systems, robotics, transportation, hardware, and operating systems, each MIT Tackling the Challenges of Big Data professor brings their own unique experience and expertise to the course.

MIT PROFESSIONAL EDUCATION

For 65 years MIT Professional Education has been providing a gateway to renowned MIT research, knowledge, and expertise for those engaged in science and technology worldwide, through advanced education courses designed for working professionals.

COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE LABORATORY (CSAIL)

The Computer Science and Artificial Intelligence Laboratory is the largest research laboratory at MIT and one of the world's most important centers of information technology research.

edX

Open edX is the opensource educational platform developed by edX and its open source partners, including leading institutions. It powers the edX.org destination site and research initiatives.

EARN A CERTIFICATE OF COMPLETION AND CEUS

Participants who successfully complete all course requirements are eligible to receive a Certificate of Completion and 2.0 CEUs.

COURSE VISION

MIT wants to help solve the world's biggest and most important problems such as Big Data. Tackling the Challenges of Big Data is an online course developed by the faculty of the MIT Computer Science and Artificial Intelligence Laboratory in collaboration with MIT Professional Education, and edX.

COURSE OVERVIEW

The course is held over six weeks and will provide the following:

► Five modules covering 18 topic areas with 20 hours of video
► Five assessments to reinforce key learning concepts of each module
► Case studies
► Discussion Forums for participants to discuss thought provoking questions in medicine, social media, finance, and transportation posed by the MIT faculty teaching the course; share, engage, and ideate with other participants
► Community Wiki for sharing additional resources, suggested readings, and related links

Participants will also take away:

► Course materials from all presentations
► 90 day access to the archived course (includes videos, discussion boards, content, and Wiki)

CUSTOM PROGRAMS

We can also offer this online course for large groups of employees from the same organization. Please contact MIT Professional Education (customprograms@mit.edu) to discuss your training and education needs.

LEARNING OBJECTIVES

Participants will learn the state-of-the-art in Big Data. The course aims to reduce the time from research to industry dissemination and expose participants to some of the most recent ideas and techniques in Big Data. After taking this course, participants will:

▶ Distinguish what is Big Data (volume, velocity, variety), and learn where it comes from, and what are the key challenges

▶ Determine how and where Big Data challenges arise in a number of domains, including social media, transportation, finance, and medicine

▶ Investigate multicore challenges and how to engineer around them

▶ Explore the relational model, SQL, and capabilities of new relational systems in terms of scalability and performance

▶ Understand the capabilities of NoSQL systems, their capabilities and pitfalls, and how the NewSQL movement addresses these issues

▶ Learn how to maximize the MapReduce programming model: What are its benefits, how it compares to relational systems, and new developments that improve its performance and robustness

▶ Learn why building secure Big Data systems is so hard and survey recent techniques that help; including learning direct processing on encrypted data, information flow control, auditing, and replay

▶ Discover user interfaces for Big Data and what makes building them difficult

> " At CSAIL, we think of Big Data as a big opportunity to develop the next generation of technologies to store, manage, analyze, share, and understand the huge quantities of data we are now collecting. Based on interactions with our industry partners, we've gained a unique perspective on the issues posed by large amounts of complex, digital data. "
>
> SAM MADDEN │ Director, Big Data Initiative, MIT Computer Science and Artificial Intelligence Laboratory Professor, Electrical Engineering and Computer Science

KEY BENEFITS

▶ Position yourself in your organization as a vital subject matter expert regarding major technologies and applications in your industry that are driving the Big Data revolution, and position your company to propel forward and stay competitive

▶ Engage confidently with management on opportunities and Big Data challenges faced by your industry; analyze emerging technologies and how those technologies can be applied effectively to address real business problems while unlocking the value of data and its potential use for company growth

▶ Learn and assess the issues of scalability – make your work more productive - to save time and money

▶ Gain valuable insights from world-renowned MIT Faculty and access to CSAIL research that will differentiate how you and your company break down Big Data to save time and money, while making work more efficient

▶ Convenient, flexible schedule with access 24 hours a day

▶ MIT Professional Education Alumni Benefits:

After completing the course, participants will become alumni of MIT Professional Education and will receive:

▶ Exclusive discounts on all future Short Courses and Digital Courses

▶ Access to our restricted alumni group on LinkedIn, and more

WHO SHOULD PARTICIPATE?

Prerequisite(s): This course is designed to be suitable for anyone with a bachelor's level education in computer science or equivalent work experience, such as working hands-on with IT / technology systems (programming, database administration, data analysis, actuarial work, etc.) No programming experience or knowledge of programming languages is required.

Tackling the Challenges of Big Data is designed to be valuable to both individuals and companies because it provides a platform for discussion from numerous technical perspectives. The concepts delivered through this course can spark idea generation among team members, and the knowledge gained can be applied to their company's approach to Big Data problems and shape the way business operates today.

The application of the course is broad and can apply to both early career professionals as well as senior technical managers.

Participants will benefit the most from the concepts taught in this course if they have at least three years of work experience.

Participants may include:

▶ Engineers who need to understand the new Big Data technologies and concepts to apply in their work

▶ Technical managers who want to familiarize themselves with these emerging technologies

▶ Entrepreneurs who would like to gain perspective on trends and future capabilities of Big Data technology

MODULES, TOPICS, AND FACULTY

Module One: Introduction and Use Cases

The introductory module aims to give a broad survey of Big Data challenges and opportunities and highlights applications as case studies.

▶ Introduction: Big Data Challenges (Sam Madden)
▶ Case Study: Transportation (Daniela Rus)
▶ Case Study: Visualizing Twitter (Sam Madden)

Module Two: Big Data Collection

The data capture module surveys approaches to data collection, cleaning, and integration.

▶ Data Cleaning and Integration (Mike Stonebraker)
▶ Hosted Data Platforms and the Cloud (Matei Zaharia)

Module Three: Big Data Storage

The module on Big Data storage describes modern approaches to databases and computing platforms.

▶ Modern Databases (Mike Stonebraker)
▶ Distributed Computing Platforms (Matei Zaharia)
▶ NoSQL, NewSQL (Sam Madden)

Module Four: Big Data Systems

The systems module discusses solutions to creating and deploying working Big Data systems and applications.

▶ Multicore Scalability (Nickolai Zeldovich)
▶ Security (Nickolai Zeldovich)
▶ User Interfaces for Data (David Karger)

Module Five: Big Data Analytics

The analytics module covers state-of-the-art algorithms for very large data sets and streaming computation.

▶ Machine Learning Tools (Tommi Jaakkola)
▶ Fast Algorithms I (Ronitt Rubinfeld)
▶ Fast Algorithms II (Piotr Indyk)
▶ Data Compression (Daniela Rus)
▶ Case Study: Information Summarization (Regina Barzilay)
▶ Applications: Medicine (John Guttag)
▶ Applications: Finance (Andrew Lo)

Note: Schedule and faculty are subject to change without notice.

" Thanks to our dedication to developing the technologies of the future, conducting fundamental, long-term research in computer science and information technology, solving significant societal problems, and inspiring the future workforce of innovators and big thinkers, we can provide a one-of-a-kind learning experience for participants looking to learn about the tools and skills they need to solve their Big Data problems. "
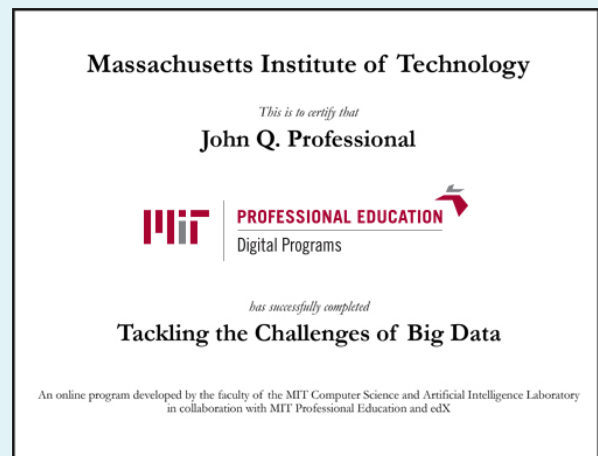
DANIELA RUS │ Director, MIT Computer Science and Artificial Intelligence Laboratory
Professor, Electrical Engineering and Computer Science

EARN A CERTIFICATE OF COMPLETION

Upon successful completion of the course and all assessments a Certificate of Completion will be awarded by MIT Professional Education.

To earn a Certificate of Completion in this course, participants should watch all the videos, and complete all assessments by the course end date with an average of 80 percent success rate.

Note: On the right, this is a Sample Certificate of Completion

Massachusetts Institute of Technology

This is to certify that

John Q. Professional

PROFESSIONAL EDUCATION
Digital Programs

has successfully completed

Tackling the Challenges of Big Data

An online program developed by the faculty of the MIT Computer Science and Artificial Intelligence Laboratory in collaboration with MIT Professional Education and edX

FACULTY CO-DIRECTORS

DANIELA RUS | Professor, Electrical Engineering and Computer Science

Rus is Professor of Electrical Engineering and Computer Science and Director of the Computer Science and Artificial Intelligence Laboratory (CSAIL) at MIT. Rus' research interests include distributed robotics, mobile computing, and programmable matter. At CSAIL, she has led numerous groundbreaking research projects in the areas of transportation, security, environmental modeling and monitoring, underwater exploration, and agriculture. Her research group, the Distributed Robotics Lab, has developed modular and self-reconfiguring robots, systems of self-organizing robots, networks of robots and sensors for first responders, mobile sensor networks, techniques for cooperative underwater robotics, and new technology for desktop robotics. They have built robots that can tend a garden, bake cookies from scratch, cut birthday cake, fly in swarms without human aid to perform surveillance functions, and dance with humans.
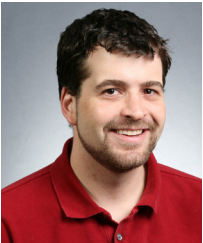
SAM MADDEN | Professor, Electrical Engineering and Computer Science

Madden is a computer scientist specializing in database management systems. He is the faculty director of MIT's Big Data Initiative at CSAIL and co-director of the Intel Science and Technology Center (ISTC) in Big Data at CSAIL. Recent projects include CarTel, a distributed wireless platform that monitors traffic and onboard diagnostic conditions in order to generate road surface reports, and Relational Cloud, a project investigating research issues in building a database as a service. In 2005, Madden was named one of Technology Review magazine's "Top 35 Under 35." He is also cofounder of Vertica (acquired by HP).

ADDITIONAL FACULTY INSTRUCTORS

Regina Barzilay

Associate Professor
Electrical Engineering and Computer Science

Andrew Lo

Professor
MIT Sloan School of Management

John Guttag

Professor
Electrical Engineering and Computer Science

Ronitt Rubinfeld

Professor
Electrical Engineering and Computer Science

Piotr Indyk

Professor
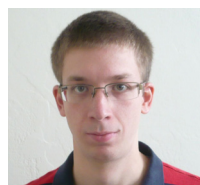Electrical Engineering and Computer Science

Michael Stonebraker

Adjunct Professor
Electrical Engineering and Computer Science

Tommi Jaakkola

Professor
Electrical Engineering and Computer Science

Matei Zaharia

Assistant Professor
Electrical Engineering and Computer Science

David Karger

Professor
Electrical Engineering and Computer Science

Nickolai Zeldovich

Associate Professor
Electrical Engineering and Computer Science

PARTICIPANTS' COMMENTS

"This course was an eye-opener for me. It helped me understand what Big Data actually is and what it is not. It also helped me realize that at the core of Big Data there are two important technologies: distributed storage & processing, and machine learning algorithms. Because of this course, I am now focusing on machine learning algorithms."
Sunny Shah, Consultant, Robert Bosch, INDIA

"This course provided a comprehensive overview of what Big Data really represents, and how the analysis of large data sources may improve operating efficiencies, result in new business opportunities, and improve profit margins. This knowledge will allow me to lead efforts to utilize resources more efficiently."
Norman Yale, Professional Technical Architect, AT&T Corporation, UNITED STATES

"I learned the latest technologies and financial models from both the course content and the discussion forum where I communicated with participants from across the continents. I could apply the knowledge I gained from this course to my projects right away."
Satoshi Hashimoto, Account Manager, Coca-Cola Business Services Company, Ltd., JAPAN

"The course was a great survey of topics directly relevant to challenges we face daily, and served as a fantastic launching point for further learning."
Jairo Lozano, Chief Implementation and Production Director, Senseta, COLOMBIA

"MIT offers up a very relevant course that exposes the myths, challenges, and right approaches to solving Big Data problems."
Sanjeev Katariya, Director of Engineering, Microsoft Corporation, UNITED STATES

"The course improved my understanding of how Big Data can boost a company's performance. As a management consultant in an IT firm, I'm now far better positioned to help my clients understand how to leverage Big Data to their benefit."
Felipe A. Bustos, Business Manager, Everis Business Consulting, CHILE

"The course material/lectures were very useful, and covered a wide array of related topics to explore. I enjoyed doing the course and found the course material/lectures way beyond my expectation in a positive way."
Srinivas Veereshwara, Technical Leader Leader, Cisco Systems Inc., UNITED STATES

"Participants provided so many valuable resources throughout the class. Their comments, knowledge, and contributions were extraordinary. I connected with some of them offline to exchange practical experiences about various methods and software. We continue to do so, via our FB group page and LinkedIn Group."
Alina Tousain, Senior Management Consultant, Plante Moran, UNITED STATES

"This course helped me to obtain a better and wider vision of the issues related to the world of Big Data. Now, thanks to this acquired knowledge, I have a whole new perspective on the steps that should be applied to Big Data projects, and I can make better decisions in all my business tasks."
Adrià López, Project Manager, e-laCaixa, SPAIN

PROFESSIONAL EDUCATION
Digital Programs

PARTICIPANTS' COMMENTS

"The course provides an end-to-end view of what disciplines and specialties are involved in Big Data solutions, and stimulates participants to explore the most recent research on the subject."
Alexandre Lima, Technical Delivery Manager, Hewlett Packard, BRAZIL

"As a CTO, I really appreciated being brought up to speed on the many aspects of a fast-moving tech area. The in-depth discussions of the typical use cases, differentiators, and pros & cons of each technology were very valuable and more objective and insightful than all the buzzy, best-foot-forward marketing hype that seems to surround every product."
Mark Paquette, CTO, thedatabank, inc., UNITED STATES

"The MIT course on Big Data has proven to be a very complete course. It offers not only the opportunity to delve into the different components of the Big Data ecosystem, but also to gain significant insights through exchanges with fellow students. A must do!"
Jurgen Jannssens, Senior Consultant, TETRADE Consulting, BELGIUM

"I left the course with a big toolbox to handle data strategies which have made a huge impact on our small startup company. The knowledge I gained from this course has saved us hundreds of hours of work."
Tommy Otzen, CEO, Networker.net, DENMARK

"I have taken many technical courses, and this course has given me a much broader view of the possibilities for projects with Big Data."
Cesar Siqueira, Advisory IT Specialist, IBM of Brazil, BRAZIL
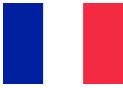
"The course takes you through the vastness of Big Data technologies, processes, algorithms, and architectural approaches and provides you with the building blocks of a Big Data strategy for your project/company. The greatest professors of MIT join their forces in order to demystify what Big Data really is, from advanced GPU clusters to data cleaning processes. The course is bold, straight to the point, detailed, and lives up to the reputation of what is probably the greatest engineering university in the world."
Vlad Marin, Big Data Architect, Airbus S.A.S., FRANCE

"I thought the course positively impacted me. Having the information condensed and delivered in a comprehensive and intelligent way was a huge asset. It helped me understand the power and complexities in the world of Big Data."
Mimi Slaughter, COO, Tower 3 Ventures, UNITED STATES

"I was working with Big Data previously, testing Big Data use cases with my team of graduate interns, but I was missing some new developments and structured information since I left university 9 years back. Having attended this course, I am now able to remove the gaps, become aware of what is going on in research and academics, and I have better insight into the problems with Big Data. With this certificate, people across departments now recognize me as an SME."
Hemant Kumar, Associate Architect in Advance Analytics and Big Data, IBM Global Services, SINGAPORE

"The course gave us very useful, state-of-the-art knowledge about the subject. It helped us steer our research project about online social network analysis in the right direction, which saved us a lot of time!"
Thijs Waardenburg, MSc, Researcher/lecturer, University of Applied Sciences Utrecht, THE NETHERLANDS