



Big Data for Smart Cities

Course Information

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Course Presenter's Biography

Yannis Velegrakis



Yannis Velegrakis is a faculty member of the Department of Information Engineering and Computer Science at the University of Trento and the director of the Data Management Group. He is also the coordinator of the Data and Knowledge Management Research Program at the University of Trento. His research area of expertise includes Social Data Analysis, Knowledge Discovery, Big Data Management & Analytics, Information Integration & Data Exchange, and Keyword Searching. He holds a PhD degree from the University of Toronto and a MSc. and BSc. degree from the University of Crete, all in Computer Science. Before joining the University of Trento, he was a researcher at the AT&T Research Labs. He has spent time as a visitor at the IBM Almaden Research Center, the Center of Advanced Studies of the IBM Toronto Lab, and the University of California, Santa-Cruz. He has served in program committees of many national and international conferences and has been a reviewer for numerous international journals. In 2013, he served as the general chair of VLDB.

Sabeur Aridhi



Sabeur Aridhi is a postdoctoral researcher at the department of computer science at Aalto University in Finland. Before joining Aalto University he was postdoctoral researcher and member of the Database and Information Management Group (dbTrento) at the University of Trento in Italy. He received his Ph.D. in Computer Science from the Laboratory of Informatics, Modeling and Optimization of Systems (LIMOS) at the Blaise Pascal University, France in 2013. Sabeur's research interests include Big Data Management and Analytics, Cloud Computing, Data Mining, machine learning and Bioinformatics. Sabeur has published a book on Big Data (in French) and several peer-reviewed papers in top quality journals and venues.

About this course

The course will offer the reader the fundamental concepts of Big Data and how they have changed the traditional Data Management approaches. The course will also present various other aspects of Big Data like visualisation, in order to offer a complete view of the topic. An idea on what Big Data Systems like Apache Hadoop and NoSQL can offer, what the Map-Reduce programming model is, and what hardware configurations are expected will be provided. Last but not least, there will be explanations and discussions on various Big Data applications that can be deployed in Smart Cities, with the aim to explain how Big Data can actually make a difference in a city.

Prerequisites

None, however knowledge of fundamental principles in computer science, programming, operating systems and databases is recommended.

Time Commitment

Approximately 8-12 hours total, self-paced

Deadlines

All coursework, assignments, and tests must be complete by 19 July 2016, 23:30 UTC

What you'll learn

- The fundamental concepts of Big Data and how they have changed the traditional Data Management approaches
- How Big Data is different from traditional disciplines and how it can serve as a foundation for building Smart City applications on top of it
- Applications of Big Data to different sectors or domains of a modern city, and how they can improve the life of its citizens
- Big Data Technologies and Techniques for developing applications that deal with Big Data.
- Commercial tools that have been built for big data management: how they work, when they can be applied and how
- What is the role of Big Data in the years to come

Grading

Assignment Type	# of Assignments	# Droppable	# of Attempts Allowed	% of Overall Grade
Knowledge Check	11	--	∞	--
End of Module Quiz	3	0	2	30%
Final Exam	1	0	1	70%

Course outline

Module 1: Introduction to Big Data

- Introduction
- Volume, Velocity, Variety
- Big Data

Module 2: MapReduce Fundamentals

- Distributed File System
- MapReduce programming model
- Module 2 Quiz

Module 3: Big Data Frameworks

- Hadoop
- Spark
- NoSQL Systems
- Other frameworks
- Module 3 Quiz

Module 4: Analytics and Applications for Smart Cities

- Data mining and machine learning
- Graph analytics
- Applications domains in Smart cities
- Module 4 Quiz

Graded evaluation

- Final Exam

Discussion Guidelines

We ask you to build community and share, in your own words, your thoughts about the course content.

We ask that you use the discussion space as:

- A forum for discussing topics raised in the course and demonstrate your understanding or application of the course material
- A medium for collaboration and the exchange of ideas.
- An online meeting place for social interaction among peers.

Discussion boards are moderated by the course instructional team.

For more information on discussion boards, please see below and refer to the discussion board details <https://www.edx.org/blog/getting-most-out-edx-discussion-forums>.

In order for discussion boards to run smoothly, please refer to the guidelines below for basic discussion board etiquette. How you phrase your posts is important. Please remember that the participants in the course come from all over the world, representing a variety of cultures and speaking many different languages. Be respectful of others and be aware of the tone of your posts. Think through and re-read your posts before posting! A few guidelines are outlined below.

- Please limit your posts/responses to 200 words or less (by request of EdX). In other words, be concise in your posts/responses.
- Reflect on and respond to Discussion Board questions and post your contribution, in your own words.
- Before posting, read what others have previously posted to avoid repeating comments. You can always upvote good posts. Click on the green “plus” button so that good posts and/or responses can be found more easily. You can search by votes to find the most interesting posts.
- Never use derogatory language or make insensitive comments. (You should flag inappropriate posts!)
- Do not personally attack people. It’s fine to disagree, but use facts and reasons to back up an argument, not personal attacks.
- Stick to the topic of the discussion board.
- Remember that humor is often difficult to convey in text – avoid it if people might not understand what you are trying to say.
- Avoid slang and use appropriate spelling – given the diversity in the class, what might mean something to you will not mean the same thing to someone else. Correct spelling and grammar will help others to understand you and provide useful responses. Avoid using ALL CAPS, abbrev of wrds (abbreviation of words), and excessive punctuation!!!!!!!!!!
- Use correct grammar.
- If you reference something, provide everyone with the link or reference.
- Notify the course staff of bugs. Include [STAFF] at the beginning of your post’s title – this will help us identify your question or problem and respond to it.