EXperimental Learning

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Big Data and Social Analytics certificate course

MODULE 7 UNIT 1
Big data applications in industry

MIT BDA Module 7 Unit 1 Video Resource

Learning outcome:

LO1: Investigate problem set examples that cover application of big data insights in Health, Finance, Corporate Innovations, and cities.

Title: Big data applications in industry

In Video 1, Arek Stopczynski discusses the potential for monitoring the spread of disease and, consequently, its impact on determining the best approach to vaccination.

Video 1: Arek Stopczynski – Big data applications in healthcare.
(To download the video, click here).

This paper, titled "Vaccination and Complex Social Dynamics", expands on the concept covered in Video 1 by analyzing disease spread within a population of 532 university students in a person-to-person network. The paper outlines how telecommunication and social network data are used to identify target groups for vaccination and monitoring, as well as the challenges and results that surfaced from the study.

Note:

Pages 26-41 of the paper provide supplementary information about the research conducted in the study, specifically regarding the dataset, model, monitoring, vaccination, and robustness of the data. This information – as well as the paper itself – will not be assessed and is only provided for those interested in a more detailed understanding of the research.

Based on their article "The Hidden Geometry of Complex, Network-Driven Contagion Phenomena" (Brockmann and Helbing 2013), Dirk Brockmann created an interactive tool that displays a view of the world based on effective distances. The tool is founded on a subset of the worldwide air transportation network (comprised of 1568 airports and the passenger traffic between them), and provides different perspectives of effective distance based on any given airport. This additional resource has been included for students interested in further exploration of the concept of effective distance, and will not form part of the assessments for this module.

In Video 2, Arek Stopczynski explains how big data may be applied in Human Resources (HR). He touches on sociometric badges, the importance of face-to-face contact, and privacy considerations.

Video 2: Arek Stopczynski – Big data applications in HR.
(To download this video, click here.)

In Video 3, Xiaowen Dong talks about applications of big data in the financial industry and marketing, specifically regarding leveraging large-scale behavioral data for assessing individual financial well-being and creditworthiness.

Video 3: Xiaowen Dong – Big data application in the financial industry and marketing I.
(To download the video, click here.)

In Video 4, Xiaowen Dong continues discussing applications of big data in the financial industry and marketing, this time focusing on the possibility of using data to forecast the future well-being of merchants.

Video 4: Xiaowen Dong – Big data application in the financial industry and marketing II.
(To download the video, click here.)

The videos in this module explain how big data insights can be applied in a number of industries including healthcare, human resources, the financial industry, and marketing. The following two resources elaborate on the research discussed by Xiaowen Dong in Videos 3 and 4. They explore how big data can be used to predict the financial well-being of individuals, and small and medium-sized enterprises (SMEs):

- Money Walks: Implicit Mobility Behavior and Financial Well-Being.
- Forecasting Financial Well-Being for Small and Medium Enterprises Using Network-Based Signals.

These additional readings have been included for enrichment purposes only, and will not form part of the assessments within this module.

You are now ready to apply your knowledge

Now that you've engaged with Videos 1, 2, 3, and 4, you are ready to apply your newly gained knowledge by completing the corresponding activities in the Apply unit. You can access these activities by navigating back to your module learning path, or click to access them directly from here:

7.2 Small Group Discussion Forum: When big data insights fail
7.3 Assessment Quiz: Applying big data across different sectors

Reference list

Video 1

Brockmann, Dirk, and Dirk Helbing. 2013. "The Hidden Geometry of Complex, Network-Driven Contagion Phenomena." *Science* 342:1337-1342. doi:10.1126/science.1245200.

Lazer, David, Ryan Kennedy, Gary King, and Alessandro Vespignani. 2014. "The Parable of Google Flu: Traps in Big Data Analysis." *Science* 343:1203-1205. http://gking.harvard.edu/files/gking/files/0314policyforumff.pdf.

Research on Complex Systems. 2013. "Effective Distance and Shortest Paths in Global Mobility." Last modified August 16. http://rocs.hu-berlin.de/interactive/page40/index.html.

Wesolowski, Amy, Nathan Eagle, Andrew J. Tatem, David L. Smith, Abdisalan M. Noor, Robert W. Snow, Caroline O. Buckee. 2012. "Quantifying the Impact of Human Mobility on Malaria." *Science* 338:267-270. doi:10.1126/science.1223467.

Video 2

Rocco, Elena. 1998. "Trust Breaks Down in Electronic Contexts but Can Be Repaired by Some Initial Face-to-Face Contact." *CHI 98* 496-502. http://social.cs.uiuc.edu/class/cs598kgk-04/papers/p496-rocco.pdf.

Waber, Benjamin N., Daniel Olguin Olguin, Taemie Kim, and Alex Pentland. 2010. "Productivity Through Coffee Breaks: Changing Social Networks by Changing Break Structure." Available at SSRN: http://dx.doi.org/10.2139/ssrn.1586375.

Woolley, Anita Williams, Christopher F. Chabris, Alex Pentland, Nada Hashmi, and Thomas W. Malone. 2010. "Evidence for a Collective Intelligence Factor in the Performance of Human Groups." *Science* 330:686-688. doi:10.1126/science.1193147.

Video 3

Board of Governors of the Federal Reserve System. 2014. "Federal Reserve Bulletin September 2014." Accessed August 10. http://www.federalreserve.gov/pubs/bulletin/2014/pdf/scf14.pdf .

Isaac, Mike. 2014. "U.S. Mobile Payments Market to Boom by 2019, Research Firm Says." *The New York Times Bits Blog*, November 17. http://bits.blogs.nytimes.com/2014/11/17/u-s-mobile-payments-market-to-boom-by-2019-research-firm-says/?_r=3.

The Nilson Report. 2013. "The Nilson Report 2013." Accessed August 10. https://www.nilsonreport.com/publication_chart_and_graphs_archive.php?1=1&year=2013.

Video 4

BME. 2014. “Annual Report on European SMEs 2013/2014 – A Partial and Fragile Recovery.” Accessed August 10. http://www.bme.de/fileadmin/_horusdam/859-annual-report-smes-2014_en.pdf.

Ntiamoah, Evans Brako, Beatrice Opoku, Eugene Abrokwah, Gideon Baah-Frimpong, Mark Agyei-Sakyi. 2014. “Assessing the Contributions of Small and Medium Sized Enterprises to Ghana’s Economic Growth.” *International Journal of Economics, Commerce and Management* 2:1-14. ISSN: 2348-0386.

Singh, Vivek Kumar, Burkin Bozkaya, and Alex Pentland. 2015. “Money Walks: Implicit Mobility Behavior and Financial Well-Being.” *PLoS ONE* 10(8): e0136628. doi:10.1371/journal.pone.0136628.