Optimization in a Networked Economy

Ahmet Sekreter[1]

[1]Faculty of Administrative Sciences and Economics, Ishik University, Erbil, Iraq
Correspondence: Ahmet Sekreter, Ishik University, Erbil, Iraq. Email: ahmet.sekreter@ishik.edu.iq

Received: July 2, 2017 Accepted: August 17, 2017 Online Published: September 1, 2017

doi: 10.23918/ijsses.v4i1p115

Abstract: An age of network has been living for the last decades. The information technologies have been used by hundreds of millions of users. These technologies are enabling to connect businesses and economic activities. One of the characteristics of the networked economy is the amount of data that produced due to the interlinking of firms, individuals, processes by businesses, and economic activities. Another issue with the networked economy is the complexity of the data. Extraction of the knowledge from the networked economy has challenges by the traditional approach since data is large scale, second decentralized, and third they connect many heterogeneous agents. The challenges can be overcome by the new optimization methods including human element or the social interactions with technological infrastructure.

Keywords: Networked Economy, Big Data, Optimization

1. Introduction

Businesses, individuals, and even governments are dealing with others through online since communication is easier and cheaper. Transactions, processing bills, and payments can be done more quickly than the traditional ways. Furthermore networked economy has been started to produce new business models and radical changes in marketing structures.

Economic, social, and financial systems have been changing and they are moving away from the old industrial model that was hierarchical was top down it was built around commanding control and really about controlling in boarding knowledge to use probably heard that old saying knowledge is power. They are much more like network which interacts with the number of agents of autonomous market places where everyone interacts with everyone else. Today we're moving to this new hyper connected business that really came out of the new connectivity created by the internet and that connectivity to live that's to a place where we really now focus around knowledge sharing that's the new power getting the right information to the right person at the at the right time. So connecting people with that supporting information data content of the systems in context to the activity in real time is the new model for business.

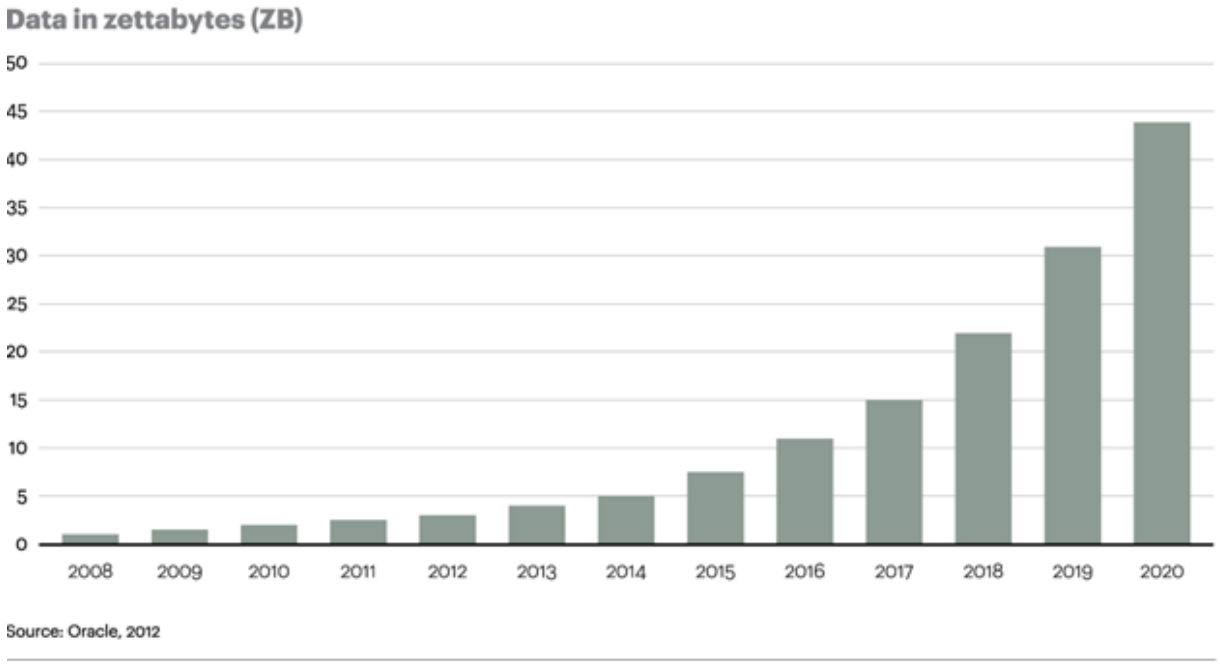

Figure 1: Growth of rate data

Although there is no definite definition of network economy, the network economy can be defined as the connected businesses and economic activity by the means of the internet or information technologies. The world that we are living people, companies, businesses transactions are all connected to each other. The size of network economy is big and getting bigger and bigger. Therefore the network economy produces enormous data which is commonly used 'big data'. Data can be defined as anything collected or recorded that have a potential value. Another definition of big data is the amount of data above the technological capability to store, manage, and analysis (Kaisler et al, 2013). Data Science is the extraction of the knowledge from the data.

Traditional approach assumes information is centralized, problem size is moderate to large, and there is a single well defined optimization and control object. However modern systems and applications cause new challenges. First, systems are very large scale, second decentralized, and third they connect many heterogeneous agents. So all these new considerations necessitate new optimization paradigm that involves development of the optimization algorithm that are fast, scalable to process huge dimensional data set that can operate under local distributive information and most important thing recognize the roll of human element or the social interactions with technological infrastructure.

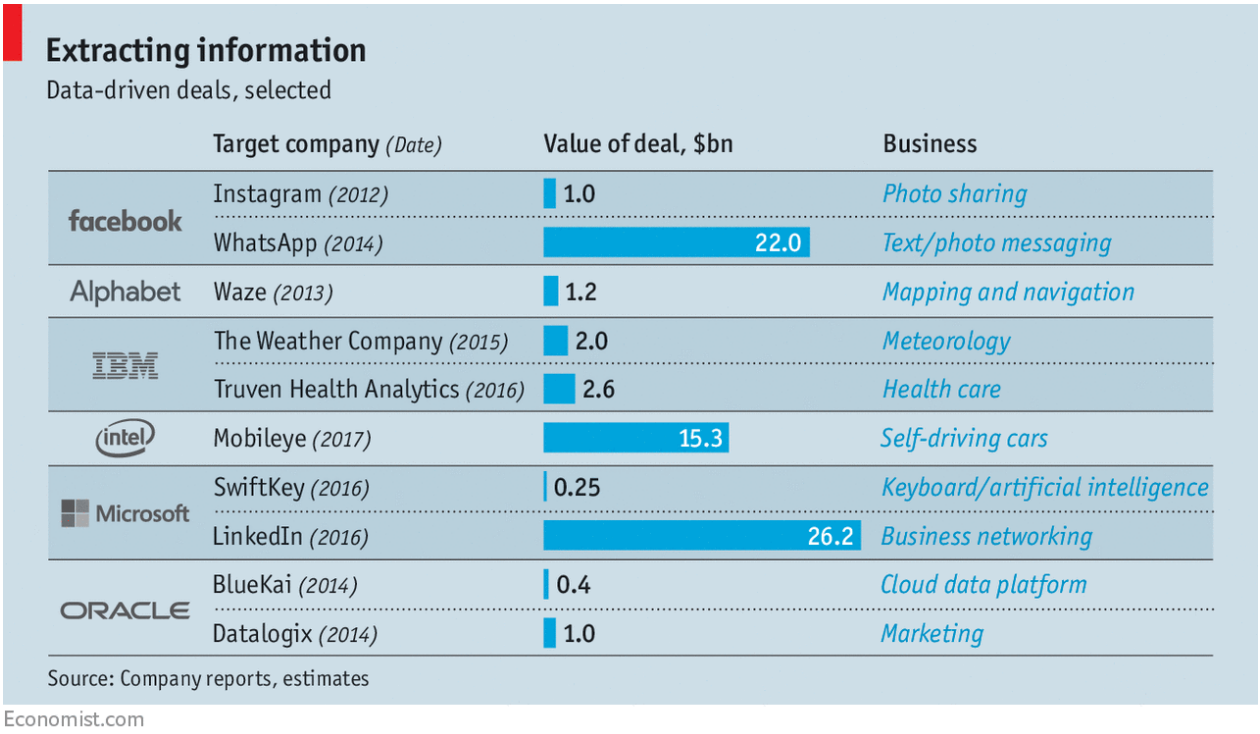

Figure 2: Extracting information

Machine learning is an application of artificial intelligence that allows receiving data and using some algorithms or statistical analysis predicting for unseen data. Machine learning is based on the idea that learning from the data without supervision of any human. Another trend technology is cloud computing. Hashem et al. (2015) states that it has been observed that huge amount of data has been generating by cloud computing.

2. Background

The network economy as a concept was first described by Kelly (1998), Shapiro and Varian (1999), and Shy (2001). After that this term has been used widely by economics world. Lu and Wang (2008) define network economy as *"a new economy pattern enabled by information technology and the globalization market".*

One of the characteristics of networked economy is data size and it is now called as big data. Villars, Olofson, and Eastwood (2011) say that it is digital will grow 44-fold to 35ZB per year between 2009 and 2020. Richtarik and Tarac (2016) argue that big data is a challenge in computational science. They also say that developing suitable optimization algorithms is the goal to overcome this challenge. Slavakis, Giannokis, and Mateos (2014) emphasize the importance of learning from big data. However they also emphasize the challenges learning from the large scale data. They argue that learning tools have to be re-examined to handle big data tasks. The problem to examine the big data is not only the size of the data.

Big data is also complex data. Another problem with the big data are its variety and velocity. Variety represents the type of the data. The type of the data depends on the usage, storage, and the way of analyzing. The data may also include coordinates, video file or source of data from browsers. The challenge comes after this point. Sorting all this data should be readable by analyzers. Another challenge is how to categorize data to produce not ambiguous results. Velocity refers the speed of data that transferred from A to B. It is another challenge for analyzers to handle the data. Tole (2013) argues that current technologies try to overcome all these challenges. The problem is the lack of capability of the traditional approach to handle with the size, speed, and variety of the data that generated by network economy. The extraction from data depends not only software processing but also human analysis skills.

3. Motivation and Conclusion

Networked economy will allow us to capture and analyze data to drive a decision and it will enable businesses to connect employees, suppliers and customers to collaborate however it will cause new challenges in completely new ways businesses that will optimize results in real time. On one hand, networked economy is holding the opportunities to figure out the population that includes large scale, de-centralized, and heterogeneous data. On the other hand, this characteristic of networked economy requires introducing advanced optimization paradigm that is untraditional, including cross-disciplinary studies and recognizing human effect. Extraction knowledge from the networked economy also requires a large computational infrastructure that captures time-demanding processes.

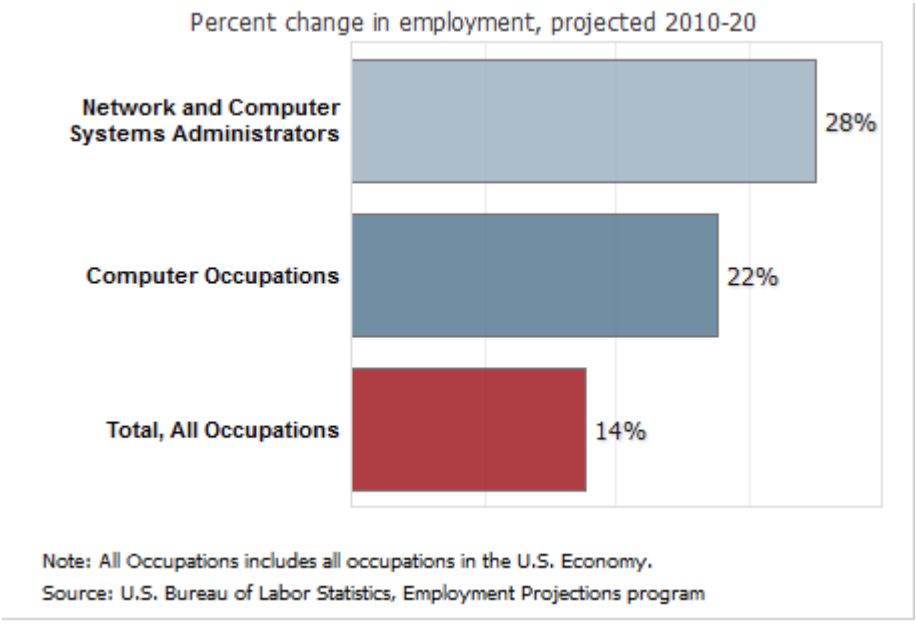

Figure 3: Percent Change in Employment, projected 2010-20

References

Hashem, I. A. T., Yaqoob, I., Anuar, N. B., Mokhtar, S., Gani, A., & Khan, S. U. (2015). The rise of "big data" on cloud computing: Review and open research issues. *Information Systems*, *47*, 98-115.

Kaisler, S., Armour, F., Espinosa, J. A., & Money, W. (2013). Big data: Issues and challenges moving forward. In *System Sciences (HICSS), 2013 46th Hawaii International Conference on* (pp. 995-1004). IEEE.

Kelly, K. (1998). *New Rules for the New Economy: 10 Radical Strategies for a Connected World*. New York: Penguin Group.

Lu, L., & Wang, G. (2008). A study on multi-agent supply chain framework based on network economy. *Computers & Industrial Engineering*, 54(2), 288-300.

Richtárik, P., & Takáč, M. (2016). Parallel coordinate descent methods for big data optimization. *Mathematical Programming*, 156(1-2), 433-484.

Shapiro, C. & Varian, H. (1999). *Information Rules: A Strategic Guide to the Network Economy*. Boston: Harvard Business School Press.

Shy, O. (2001). *The Economics of Network Industries*. Cambridge: Cambridge University Press.

Slavakis, K., Giannakis, G. B., & Mateos, G. (2014). Modeling and optimization for big data analytics:(statistical) learning tools for our era of data deluge. *IEEE Signal Processing Magazine*, 31(5), 18-31.

Tole, A. A. (2013). Big data challenges. *Database Systems Journal*, 4(3), 31-40.

Villars, R. L., Olofson, C. W., & Eastwood, M. (2011). Big data: What it is and why you should care. *White Paper*, IDC, 14.