Chapter 74

Social Implications of Big Data and Fog Computing

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ABSTRACT

In the last half century, we have gone from storing data on 5¼ inch floppy diskettes to the cloud and now use fog computing. But one should ask why so much data is being collected. Part of the answer is simple in light of scientific projects, but why is there so much data on us? Then, we ask about its "interface" through fog computing. Such questions prompt this article on the philosophy of big data and fog computing. After some background on definitions, origins and contemporary applications, the main discussion begins with thinking about modern data collection, management, and applications from a complexity standpoint. Big data is turned into knowledge, but knowledge is extrapolated from the past and used to manage the future. Yet it is questionable whether humans have the capacity to manage contemporary technological and social complexity evidenced by our world in crisis and possibly on the brink of extinction. Such calls for a new way of studying societies from a scientific point of view. We are at the center of the observation from which big data emerge and are manipulated, the overall human project being not only to create an artificial brain with an attendant mind, but a society that might be able to survive what "natural" humans cannot.

INTRODUCTION

Fog computing is another link in the chain of information storage extending back from storing data in a handwritten manner to adding machines, vacuum tubes, and floppy diskettes. One creates the information, stores it, and then distributes it. It is easy to confabulate the motivation for its instrumentation, the "why" of the foundation (big data) with how we get it (storage and distribution methods). Two aspects characterize information: its growth and centralization. Fog computing has enabled its distribution not only to computers to billions of devices in a network we know of as the "Internet of things" (IoT), ranging from printers and phones to "smart appliances", like refrigerators and personal security systems. In

essence, anything that can house a computer chip is a candidate for this network. Accordingly, the scope of information has increased. In keeping with maintaining clarity between the storage of information and its rationale with its distribution, we will first look at big data in depth and its implication and then consider its mode of distribution (fog computing) in a similar light. A prefatory note about the origin of the present article is in order.

You are reading "Social Implications of Big Data and Fog Computing", which is a re-write and up-dating of "Visualizing Big Data from a Philosophical Perspective" that appeared in the 2018, *Handbook of Research on Big Data Storage and Visualization Techniques* (Segall and Cook, 2018, pp. 809-852). Most of the discussion was not simply of techniques but about the thinking underscoring why big data should be generated at all. Inasmuch as the current paper was invited, it can be assumed that someone "up there" thought that asking the "why" is important. The present article goes further and fits the "why" into a larger framework of how we regard societies and the challenges they are facing in an ever-increasing complex environment. As to the visualization, there are just as many ways of displaying data as there are projects and methods for creating it, as will be seen below.

Most of the technical aspects of the original work have not changed, and I will leave it to others to banter back and forth on all that updated "techie stuff". One can only imagine the further technological development that can and often has occurred during the last one or two years in which many of the sources used for researching the first article appeared. Too, the visualization aspect will not be emphasized here, because one only need read the original article for that information. Typing in "big data visualization" and related phrases will produce hundreds, if not thousands of images, each with its own purpose and technique. This is a trivial exercise without much intellectual content. What has been lacking in all these discussions about big data is similar to what was lacking and as expressed by J. Robert Oppenheimer in the development of the atomic bomb – the social implications of the technology.

There has been another addition to the previous article in the technological aspect, however, that does strengthen the sociological observations: the further development – fog computing - that is closely analogous to a neurophysiology and the argument made in the previous article. As in societies being at least analogously organic, there is a corresponding aspect of organicity in the technology, and that is beginning to assume literally a life of its own. But, we are getting ahead of ourselves a bit.

It is likely that each one of us has encountered some aspect of big data, it often being a buzz word. With fog computing as soon as one picks up a cell phone, works on a computer, or even opens the refrigerator door s/he in effect is one of the tentacles of a gigantic organism with emergent properties that we do not seem able to predict or control. Whenever we interact with a government agency, go to school, shop or use a computer, data is collected with or without our consent. As recent as 20 May 2018 controversy is swirling about Facebook's allowing its guard to be down so that the British company Cambridge Analytica could acquire through the popular social media outlet Facebook and mine its data to promote Donald Trump's U.S. presidential campaign. Insofar as privacy is concerned, if the information is in cyberspace, then logically it is accessible, the only secret in existence being the deodorant. The trail from the origins of data as representations of information ages ago to its present uses and abuses is long. While we marvel at the technology, it is critical to understand why the technology was created in the first place.

There is data (big or otherwise) and then there is its use and fog computing distribution. One should fathom the implications of the first to appreciate what happens with the latter. Otherwise stated and amplified, what applies to the first applies also to the second.

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