Chapter 22
Introduction to Smart City and Agricultural Revolution:
Big Data and Internet of Things (IoT)

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ABSTRACT

In this chapter, a discussion is presented about what Big Data and Internet of Things (IoT) really is and what intricacies are used while building big data and internet of things. Further Big Data and Internet of Things have been used for building an application used for Smart City & Agriculture. A smart city is an urban development vision to integrate multiple information and communication technology (ICT) solutions. Smart city's goal is to improve quality of life with technology to improve the efficiency of services and meet residents' needs. Smart agriculture approach is to develop, transform and reorient agricultural development under new realities of climate change. It increases productivity enhances resilience (adaptation), reduces mitigation with achievement of national food security and development goals. This chapter includes detailed discussion on Smart City and Smart Agriculture along with planning, designing as well as various approaches used to build and implement them effectively.

INTRODUCTION

At present, most companies store data in inconsistent formats and also the data is scattered on a variety of servers. It is not uncommon to hear the phrase "Data Rich, but Information Poor" in the context of enterprise information systems. (Ferrao, 2006). This graveyard of information makes it extremely difficult to locate a particular data set and make base decisions on it. (Apache Hadoop, 2014).

Many companies are seeing a loss in efficiency and an increase in development costs due to "islands of information". This is the reason we need a technology called Big Data which works on the three Vs namely Volume, Variety and Velocity. There is a great deal of opportunity if companies can unlock the potential of data by using big data analytics. Big Data and analytics enable enterprises to generate greater insights and improve efficiency or develop new products, services or business models. However, there

Figure 1. Reference model for data visualization: Data visualization relates Business Performance Management (Rajesh Angadi, 2016)
(Source: Designed by Rajesh Angadi)
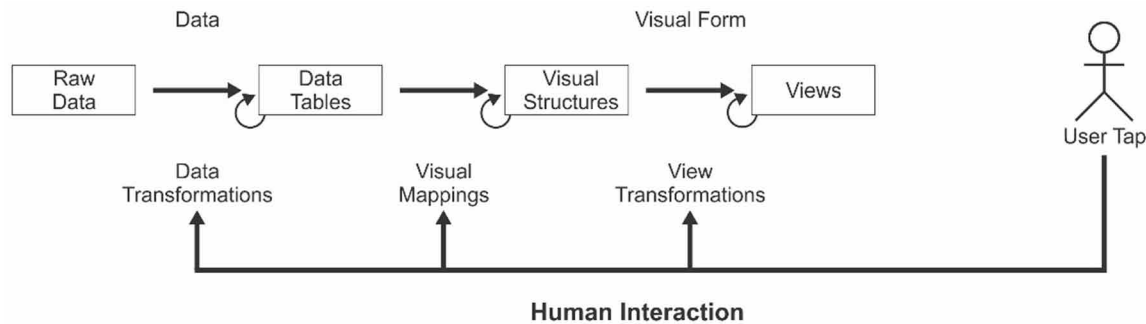
are many considerations about source of the data to get actionable insights. Successful Big Data and analytics initiatives involve a variety of decisions from mapping business strategy to use cases to making the right technical choices to implement a cost effective system. Organizations also need to consider aspects such as data governance, privacy, organizational change and talent management. As Big Data technologies evolve at a rapid pace and analytics make it possible to extract greater insights, Big Data and analytics are set to become a mainstay in an enterprise.

What Is Big Data?

Big data is a term that describes the large volume of data – both structured and unstructured – that inundates a business on a day-to-day basis. It's not the amount of data that's important. It's what organizations do with the data that matters. Big data can be analysed for insights that lead to better decisions and strategic business moves. It includes data sets with sizes beyond the ability of commonly used software tools to capture, curate, manage and process data within a tolerable elapsed time. Big data requires a set of techniques and technologies with new forms of integration to reveal insights from datasets that are diverse, complex and of a massive scale.

Big Data is needed to add value in several key areas – increasing transparency, improving efficiency, automating human tasks and developing new products and business models. However, when enterprises find themselves with increasing volumes of data, it is enticing whether to invest in large systems to store and catalogue the data prior to a thorough analysis which maps the analytics to real business problems.

There are several key considerations along the path from source data to actionable insight – formulating the business need, identifying and gathering the relevant data, designing the system and delivering the right solutions. A Big Data initiative is best positioned for success when it starts with an analysis of the impact on business goals and clearly defines the use cases enabled by such an activity. Designing the right system and picking up appropriate technologies are the most complex steps in the process. (Apache Hadoop, 2015).

The rise of Big Data – large, heterogeneous datasets generated by the increasing digitization of social media leads to revolution concept called smart cities and smart agriculture. For example, Amazon Web Services provides easy, secure, low cost access to tools such as Hadoop and NoSQL data stores

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