

## Enhancing Cloud and Big Data Systems for healthy Food and Nutrition Information Systems Practice: A Conceptual Study

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**Abstract**— Cloud Computing is a kind of virtualization technology based on internet. In cloud computing, central remote server plays an important role for healthy data management and applications. It offers handsome efficiency in the field of Computing as well as Information Technology for providing centralized storage, money, processing, and bandwidth. Thus regardless of the size of the institute (i.e. big or small) there is no additional requirement for the establishment of own as well separate IT infrastructure for more and higher business units. Networking Technology and Internet Technology play a vital role in the establishment of cloud computing in different settings. Today it is treated as an emerging technology among the other applied Information Science & Technology. India is strong as well as developed in many senses with a good amount of educational institutes for diverse sectors and community. Cloud computing is applicable in a different field in the current scenario, such as Education, Public Administration, Business & Commerce, Health, and Medicine etc. Interestingly, cloud computing may be applicable in the field of Food and Nutrition. This is a conceptual paper deal with cloud computing related aspects which include benefits, advantages, challenges, and issues. Moreover, the paper also talks about cloud computing applications in different and diverse areas of Food Science, Nutrition and Dietetics. Further, the paper discusses some of the contemporary and future challenges to build Cloud Computing based Food Information Systems.

**Keywords**— Cloud Computing, Mobile Computing, Health Sciences, Food Science, Nutrition, Bio-Sciences.

### I. INTRODUCTION

The procedure and mechanism which is responsible for spreading Information Technology infrastructure with remote services is called Cloud Computing. This is a solution which is dedicated to data storage and data sharing needs. Consumption in several factors which include time, money, technology, hardware etc. are the core benefits of Cloud Computing [1], [5], [8]. Practically, the creation of sophisticated and advanced centralized storage, memory, processing, and bandwidth based IT services is the core motto of this technology. Cloud Computing has rejuvenated three core facets of Computing i.e. *Segment application, storage, and connectivity*. Today Cloud Computing gains rapid success in different types of organizations due to its ubiquitous network access as well as location independent resource pooling i.e. elasticity. In Food Technology and allied field also, cloud technology is important for sharing of information sharing [3], [6], [9]. Cloud Computing empowered

designing and development of Food Information Systems is very much important for a solid Cloud Food Network Creation (*Refer Fig: 1 for more clarification*). Here knowledge and skill sets of different fields such as psychology, management, computer science, food and agricultural science etc are also very much valuable [2], [4], [7].

### II. OBJECTIVE—

- To study about basic of Cloud Computing including its basic features and characteristics and so on.
- To learn about the main and core challenges of cloud computing as well as similar technologies in the context of developing countries.
- To learn about the main possible integration of food and other allied sciences (e.g. nutrition science) with cloud computing and virtualization.

- To find out probable applied areas within the Computing and Cloud computing in Nutritional Sciences.
- To suggest and make a policy to get a proper step for building a healthy cloud computing based systems which include practices in food and nutrition domain.
- To learn about the possible educational programs to build healthy and sophisticated Information Systems.

### III. MEANING—

The paper is interdisciplinary in nature and deals with computing, food science and its application in real world. Hence before move in core results section, let's discuss few basic concepts —

#### *Informatics—*

Informatics is an important domain dealing with several information jobs using not only manual knowledge organization tools but also automated or computational tools. Informatics has various foci. And it has also many domain dependencies or clearly concentration with other domains which results in the creation of many other domains. Informatics may be classified different types such as *Informatics focused with Social Science*, *Informatics focused with Humanities*, *Informatics focused with Pure Science*, *Informatics focused with Bio Sciences*. Informatics is dedicated to Documentation for using several IT components viz. Database, Web Systems, Networking.

#### *Cloud Computing—*

Computing is an Applied Science and Technology dedicated responsible for the design (as well as development), management including implementation of computer hardware, software, and supplementary systems. Cloud Computing is a kind of Virtualization which is closely associated with Networking Technology. Though it is important to note that it is more wider domain and basically responsible for several jobs viz. creating online availability, remote based services of hardware, offering software, application, utilities and operating system and so on. It is basically run by the centralized unit that is called Data Centre. Sometimes it also called as Cloud Service provider [6], [10].

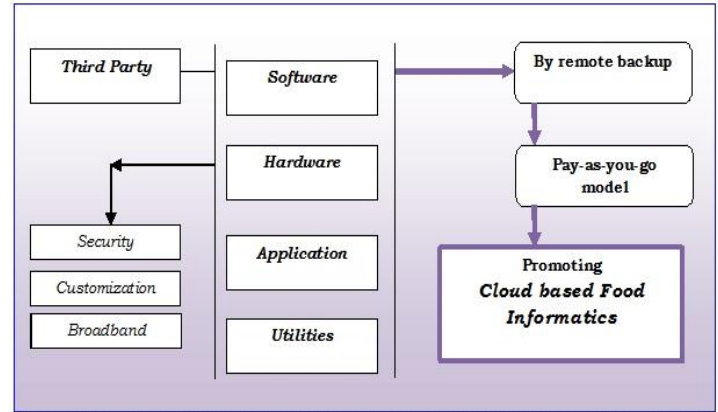


Fig: 1-Showing Cloud Computing and its proper backup for Cloud Informatics.

#### *Big Data—*

Big Data is also called as Data Science dealing the quantitative analysis of data and information in different context. Several methods which include statistical learning for blending classical statistical methods, as well as new methods normally have been deployed. The development and progress of the computational systems have created another domain called Health Data Science for more advance practicum [8], [10], [12]. It is also called as Big Data Management in which complex and large number of data basically analyzed by the use of Big Data Tools e.g. Hadoop.

#### *Food Science—*

Food science is an applied science devoted to the study of various food and nutrition related affairs. According to the Institute of Food Technologists defines food science as "the discipline in which the engineering, biological, and physical sciences are used to study the nature of foods, the causes of deterioration, the principles underlying food processing, and the improvement of foods for the consuming public". In another context, "the application of basic sciences and engineering to study the physical, chemical, and biochemical nature of foods and the principles of food processing" (Wikipedia) [15].

### IV. FOOD INFORMATION SYSTEMS AND CLOUD, BIG DATA: AN OVERVIEW—

Before move onto Food Information Systems, it is essential to learn about the Nutritional Science, as Food Information Systems basically established for solving Food and Nutrition related problems. Nutritional Science is an applied science domain which studies the effects of food and similar components viz. metabolism, health, performance and

disease resistance of human as well as animals [9], [11], [14]. Food Science is also includes learning about human behaviors linked or connected to food choices. For designing and development of a Food Information Systems following skills and knowledge are very much essentials among the professionals—

- Basic Nutrient functions, sources including metabolism. They also have to learn about and their effects on disease processes
- Changes and current trends in nutrition including nutritional requirements in different stages of the life cycle.
- Basic knowledge of several allied domains such as Chemistry, biochemistry, physics, and statistics for better productivity and better Food Information System designing.
- It is better to learn about the Physiology, biology, and molecular biology for creating a true and modern information system.
- Basic knowledge of community nutrition programs including food choices, food security, and public policy are essential to learn for future Food Information Science practice.
- Food Informatics Practitioner and Engineers have to learn about International nutrition, sports nutrition, and disease prevention.

We know that Information Systems is an interconnected hub responsible deal with for several information jobs viz. collection, selection, organization, processing, management as well as dissemination of information and contents. Information systems played a role of coordinator and core and apex branch of an Information Centre. Information systems may also be established on different subjects such as for *Science and Technology Information Systems, Humanities Information Systems, Agricultural Information Systems, Environmental Information Systems* and so on.

Hence there are huge potentialities on running Information Systems on different subjects including Food and Nutrition domain. And such established may be called as Food Information Systems or Nutrition Information Systems that may deal with many other stakeholders such as academician, researcher, common mass, food professionals etc [4], [13].

Based on above basic concept about Cloud Computing, which is an important tool for sharing virtualization with resources. Visually, virtualization is nothing but the mobility and remote

accessibility on hardware and other IT devices, application and software packages etc. It is a fact that Food Information Systems is dedicated to the information activities viz. collection, selection, organization, selection, management, processing, and dissemination regarding Food related fields. Hence information sharing depends on various kinds of electronic gadgets which include computers, servers, printers, networking devices (*router, switches, hub*), database and so on. Hence implementation of each and every Food Information Systems seeks some electronic devices. Thus here potentialities are exiting to use cloud computing based tools for Food Informatics promotion in the real sense.

In any cloud service provider offers cloud service to various regional [may be language based] a food information system then Food Information Systems does not require any kind of hardware and software implementation. Just service provider's service may be a valuable tool to run a sophisticated information system. As Information System is a combination of some information centers and so the connection between these centers and points possible to easier by cloud computing platform.

Communication within National Information Systems related to the Food as well as Agriculture with apex body such as international Information Systems is possible by the integrated platform of Cloud Computing. Several Cloud based application such as Kissan (Farmer) Call Centers, SMS based services for the farmer, weather Alert etc is also positively possible by the use of cloud computing and virtualization platforms.

As we discussed above, the Data science in which Big Data technologies play a vital role. This is rising and rapidly growing around the world. In today's context Big Data is applicable in various fields which include medicine and public health, education and training, marketing and sales and so on. The integration of Data Science with Health Science has created Health Data Science. The Big Data in Food indirectly required for determination of the best design treatments including resources based on food, nutrition and health and related medical data. Skilled and educated in this field may grab wider opportunities in workforce including in the industry and academia. Integrating Big Data into Food Systems is also responsible for creating smarter Health Systems as well. The details on this has been listed and illustrated with heading *Health, Food Informatics with Big Data*.

## V. CLOUD-BIG DATA BASED FOOD INFORMATICS: KEY CHALLENGES AND ISSUES—

For building Information Systems and Information Networks dedicated to the Food and Nutrition Sciences, may deal several issues, challenges, and problems as depicted bellow—

- Proper alertness and vigilance on cloud computing and cloud platform in the food information systems professionals.
- Initial financial sufficiency is very much important and essential to automated and fully computerized food information systems powered by cloud services [6], [8].
- Among the common mass food information systems are not yet popularized as a domain and thus there are huge potentialities to work on this.
- Food Informatics or Food Information Systems is an interdisciplinary domain and for its solid development, skills and interdisciplinary knowledge are highly desired.
- Use of 'HCI and Usability Engineering' is another facet which is crucial for healthy Food Informatics building. Here usable interface is treated as a healthy tool [7], [10].
- Regarding manpower development there are a lot of things are pending and possible to work with. Hence cloud and big data based systems will require attention on skill and manpower development for sophisticated development of food information systems.

#### VI. SUGGESTIONS AND POTENTIALITIES—

*Health, Food Informatics with Big Data*—The Health Data Science has a lot of things for the partial development of Food Informatics and Food Information Systems and which include—

- Big Data knowledge in respect of Health is accountable picking knowledge of several kinds which include the treatment of individuals (specific) to the wider sector and samples.
- It is required that Food Informatics professionals should gain knowledge on health applications as well as several information technologies having governance structures for improved healthcare sector and area.
- It is also required for getting experience including technical skills along with software for working and analyzing and manipulating health data and records.
- Food Information Systems or Nutrition Information Networks regardless of types require implementation for the root and initial level agricultural development.
- Food Information Systems or Networks is essential to start in computing as well as food science curriculum for its solid development [09], [12].
- Awareness among the common people is very much essential for solid development and utilization of Food Informatics in real sense,

- Educational Program emphasizing Major or Hons need to start on Food Informatics or similar domain. If starting of Major is tough at this point of time then the Minor program may be offered.

#### VII. CONCLUSION—

Health Data Science is not only an interdisciplinary health and medical science field but also an applied science field. Gear-up and modernization of Food and Nutrition Systems may also positively possible with the initiation of advanced research for the creation of a sustainable development. Food Informatics and its implementation are rising in some developed countries and in the industrial segment. It is essential to take proper steps for the creation of a modern advancement in healthcare systems and here healthy Nutrition System will help to reach the same. Planning is essential for any development and obviously, their solid implementations are required for real development. Hence for complete development such as management, statistical, information technology, information systems applications in the food and complete healthcare system initiatives, planning etc are highly desired. Join hands with other developed countries are also essential for providing sophisticated as well as intelligent healthcare systems in true sense. Academic professionals, as well as Industrial professionals who are working on Food/Nutrition and Informatics, need to work parallel basis for actual solution. Manpower development will be important criteria for solid ready workplace, no doubt!

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