APPLICATION OF SOCIAL MEDIA, MOBILITY, ANALYTICS AND CLOUD COMPUTING PLATFORMS (SMAC) ON HEALTHCARE SECTOR

Jayant Gulati[1], Kanika Sharma[2], Khyati Sethi[3], Parul Yadav[4]

1,2,3,Student, Department of Information Technology, Bharati Vidyapeeth College of Engineering, New Delhi (India)

4(Assistant Professor, Department of Information Technology, Bharati Vidyapeeth College of Engineering, New Delhi (India)

ABSTRACT

The healthcare systems around the world have a need to culminate together to stay in tolerable and sustainable range. Thus, a remote healthcare system is the need of the hour which can be ensured by patient mobility.

Four vast technologies, namely, Social, Mobility, Analytics and Cloud, can be augmented together to provide a platform where healthcare can be accomplished inexpensively yet flexibly.

The social aspect of it focusses on Epidemiology which is the medicinal branch of dealing out and sourcing of diseases prevalent in a particular demography.

Mobility focuses on bringing hands on approach to basic amenities by providing an application.

Analytics and Cloud ensure the extraction and collection of data; organisation it, processing it and generating output signals, which ensures generation of alerts for patients to monitor health.

SMAC in itself is a growing set of technologies clubbed together to integrate solutions of various healthcare problems under one single roof.

Keywords-Big data, data processing, Infodemiology, location API, remote healthcare.

I. INTRODUCTION

The culmination of Social, Mobility, Analytics and Cloud ensures a common platform that would provide mobile, around the clock health care facilities.

The social facet of it enlightens the distribution and determinants of diseases prevalent in a particular demography.

Being social, the platform must include techniques like SEO (Search Engine Optimization), reliable back-end and information service, and an interactive user interface.

Mobility centres on bringing active practicality on approach to basic aids by providing an application.

Apart from being user friendly, mobility focuses on just-a-click-away facilities, enhancing the ease of use.

Analytics and Cloud make certain the management and collection of data; organising it, processing it and generating output signals, which verifies generation of alerts for patients to monitor health.

International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 10, October 2017
www.ijarse.com

IJARSE
ISSN: 2319-8354

Analytics here, is to be performed on real time unstructured data. Infodemiology, the science of collecting and processing real time data, is applied so as to map users with their possible search keywords and their current location to analyse locational diseases and generating instant alerts for the same. Also, devices like heart-rate meter and more can be connected to these databases for behavioural symptom analysis by the patients.With the rapid market growth of Internet of Things, we have applications covering a huge domain from remote monitoring to medication adherence.

Apart from this, location APIs are to be mapped with the structured list (database) of government and private hospitals that are scanned to be closer to the user's location (preferably residential address), and the hospital information can be used and increased for further purposes.

Cloud storage, helps to be the repository of all databases, user prescriptions and user registered information that are being used and worked upon by the analytics system.

With a huge figure of connected devices, comes an obstacle to manage huge amount of data accumulated. With the question of maintaining the confidentiality and security of that data, particularly if it is being shared with supplementary devices, the solution of cloud comes up.

II.   EXISTING PROBLEMS

[1.]   Elderly patients are unable to have convenient access to hospitals because of being too weak.

[2.]   Problems arise with hand-written drug orders as prescribed by doctors, causing misunderstandings and other significant issues.

[3.]   Synchronization of activities, that includepatient visits and resources planning with other provisions is lacking. Thus, pre and post consultation process should be effective.

[4.]   Now a days there is shortage of beds in many hospitals so by using mobile app we can locate how many beds are available.

[5.]   Due to the absence of a robust reporting system, easy Availability of Prescribed Medicines leads to hard tracking or tracing Pharmacy Name and Pharmacist Name.

[6.]   Self-Medication by patients, as they get prescription medicines easily from nearby chemists without prescription. Chemists do notcompel for prescription due to the fear of loss of business since other chemists do that.

[7.]   Small clinicsgenerally do not prescribe on letterheads, leading to the prescription being invalid as per laws, as writing on plain paper can be done by anyone.

[8.]   Cardiac & Diabetic patients hardly go to their physician for prescription refills to save money. The patients keep getting medicines on same prescriptions over & over.

[9.]   Records for prescriptions are not stored, neither patients, nor pharmacists. So, inquiries done by regulators yield irresponsibility of pharmacists. It is found that Pharmacist dispense drugs without prescription.

[10.] Locating hospitals that are renowned and are known to be best for specific specialities, in emergency is hard.

International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 10, October 2017
www.ijarse.com

IJARSE
ISSN: 2319-8354

III.FEATURESOF MODEL INTRODUCED

The implementation of Data Analytics and Social Mapping can help solve the problems in HealthCare Sector by following methods:

- Evidence based medicine with patterns predicting risks for diseases that would further lead to early and better treatment.
- Real time monitoring of voluminous patient data.
- Provision for decision making information that may help patients to effectively consider and manage their well-being.
- Low costs deliverable procedures for diagnosis.

For the implementation of above mentioned areas, Structured Data is to be analysed which can be easily stored, queried, recalled, analysed and manipulated. The execution is performed and distributed to various nodes using divide and conquer approach with the techniques of data mining, statistical approaches and algorithm. Platforms such as Hadoop, bigQuery, hive, HBase, Nosql, oracle, Mysql, etc. have encouraged the utilization of healthcare as Big Data. The input data is converted to transformed data using tools like traditional format files(CSV, JSon, exc), or data warehouse. Increasing capability of hardware and software will make big data accessible.[1]

For the motive of implementation of cloud services, into healthcare, features that may be included are:

•SMS for alerts

•For security reasons, OTP checking/unique link while uploading prescriptions can be used.

•Login privacy for authorized access.

•Maps and locators APIs.

To enhance these features and make them user friendly and interactive, the middleware has platform tools for mobile operating systems (applications), and personal computers(websites), with both using APIs for data integration, access and storage.

By the same criteria, the mobility factor helps us achieve the following features:

- Easy management of patient records.

  This Provide doctors effortless access to patient history thus, eliminating errors and duplicity of attempts. Patient satisfaction is achieved through this, and increments at every treatment phase.

- Encouraging education for patients.

  Suggested diagnosis and anticipated outputs are very well explained by Virtual simulation and animated graphics. This is seen to be more persuasive.

- Remote patient supervision.

  Elderly patients, not having convenient access to hospitals due to weakness, can get help with this. Patient engagement technology can improve outcomes and enhance care.

- Direct drug order entry.

  A CPOE, also known as Computerized Physician Order Entry, provides authorization to a medical practitioner holding a license, to enter prescriptions. This almost eliminates errors.[2]

- Easy records or availability of beds.

Though there have been cases people take patients to hospitals and there are no availability of beds so this application of mobility will help the patients, provided that the hospital authorities engage with the system wisely.

All these combined will give a combustive and conclusive platform for a uniform and universally accepted system that will benefit every stakeholder in the healthcare sector.[3]

IV.ADVANTAGES

The implementation of Infodemiology can help trace chronic and easily transmittable diseases in an area that can then be geographically mapped to understand the medical attention for any specific given area.[4]

Information and communication patterns over the global network are not constant. They can be considered as a premature "symptom" of transformations in population health. [5]Infodemiology is implication of the idea that, there exists a relationship between population health and the above mentioned Patterns. This alliance exists in some areas and implementations in the information media.[6]

This pattern and keyword matching can be done using real time unstructured data processing, with every user search being traced with his location, as current location, or registered area (preferably residential address). [7]

The continuous flare up in the volume of patient data is advantageous for the analytics industry that is to constitute betterment in decision making on health basis. Once the drift in healthcare is judged, a rigorous thought with treatments and high quality medical care with low costs can be followed up.

The potential has a variety of layouts. This ranges from predictive modelling of patient profiles to broad scale disease profiling including prevention initiatives as well as curing tools. It varies from assisting a patient with their health regimes to offering treatment suggestions. [4] The focus is to identify the loop holes in the Indian healthcare industry and offer conclusions and direction suggestions.

Big data will help healthcare sector by improved prescriptive analysis, predictive analysis, automated external and internal reporting of patient data and fragmented point solutions. The data generated here is non-trivial, it continues to increase. Human inspection at this sized scale is impossible, hence there's a desperate requirement for intelligent, efficient and convenient tools for handling the information being missed out and more than that, handle them accurately. With the immense growth of digitization globally, the healthcare industry has seen massive shift from hard copy driven data to analytical computerised form, the big data. This complex form of data relates to patient health care with general well-being trends, together sum up to form big data for the healthcare industry.[8]

Resources in cloud computing have been merged that are henceforth able to serve a large number of consumers.The dynamic allocation and de-allocation of resources, also called multi-tenancy, is used. This process is performed on demand. Tasks like building, deploying, managing, and scheduling are a part of user-cloud interaction that should be allowed by this. Other than this, cloud computing pricing is dependent on usage, eliminating any upfront cost.Billing is done in accordance to the resource usage.

Based on Gartner's report, in the top ten strategic technical trends for 2016, Cloud Computing stands at the top most position to swipe the industry with its technical wave. With the benefits that range from customer centricity betterment to reduction in economic barriers, cloud computing is helping organizations reinvent

themselves for the newly born digital age. All the four technologies, namely social, mobility, analytics, and cloud, altogether will serve to be a boon for the healthcare sector and will help healthcare systems reach globalisation, and citizens reach betterment in their health.

V.FUTURE SCOPE

Today, we have the capability of managing reliable and scalable cloud-based platforms in the market withrespect to mobile devices that include all phones, slates or laptops. The arrival and intersection of mobility with Big Data Analytics and Cloud computing are framing business schemes into a new shape.

The raw data comes from hospitals, patients, pharmaceuticals and government agencies. This data is pooled generally at middleware or data ware houses, from where it is to be analysed and manipulated. The next step of analysis platform includes queries, data mining and reports.

The mechanism is based on concepts to assure satisfaction to the need of such tools; on trade-offs that existing organisations offer. Henceforth, the methodology is carried out and bifurcated into a chain of thesis so that statistical approaches can be applied. Subsequently, revelation is extracted from the analytics.

Since multiple perspectives exist, fundamentally, there's a need for improved business insight. These are complex challenges to solve as data velocity, variety and volume continue to grow.With this, the urge of companies of capitalizing on legacy data sources grows. This client server system of storing bulk data and process it with databases together advance towards the essence of cloud computing. This integration serves to common nomenclature under which heterogeneous sources' data is managed. The middleware combines the collection, organisation, exchange and process of data, input from patients, hospitals, pharmaceuticals, etc. the virtual machine works towards the separation of cloud services that include deployment configuration, storage buckets and other processing tools.

It is very safe to state that every human has undergone a boundless number of doctor's appointments, hospital stays and visits to emergency rooms in his sequence of life events. Each time, the recording of patient information takes place which is stored and later updated in electronic health records. But there exists lack of interoperability of health sector in IT. Due to which this collected data, that is necessary to healthcare, may not be fully accessible because EHRs can't always communicate with each other and other platforms that doctors and nurses access regularly. [2]This can be incorporated using Internet of Things within SMAC.

With all these technologies, security of data also is a huge customer concern. Hence improved and strict cryptographic algorithms must be applied with maximum security possible. SSL (Secure Socket Layer) Encryption, in addition to Intrusion Detection System should also be applied for data protection in cloud storage.[9]

VI.CONCLUSION

Overall, the system has the prospects of ensuring safety and health of patients, as well as the way physicians deliver it. Rise in patient engagement and contentment is achieved including the patient-doctor interactions with the use of IoT.

Viewing the lack of flexibility, scalability and energy efficiency in the existing systems designed for the betterment of healthcare,SMAC can prove to be the next big thing for HealthCare sector which can benefit every stakeholder not just monetarily, but also help to fulfil their social responsibility towards the society.

REFERENCES

[1] Raghunath Nambiar, Ruchie Bhardwaj, AdhiraajSethi, Rajesh Vargheese, A look at challenges and opportunities of Big Data analytics in healthcare, IEEE International Conference. 2013, Electronic ISBN: 978-1-4799-1293-3

[2] Nana Assyne, Leah Riungu-Kalliosaari, A framework for implementing cloud computing for record sharing and accessing in the Ghanaian healthcare sector, IST-Africa Conference, 2014, Electronic ISBN: 978-1-905824-44-1

[3] Maged N KamelBoulos, Steve Wheeler, Carlos Tavares, Ray Jones, How smartphones are changing the face of mobile and participatory healthcare: an overview, with example from eCAALYX, BioMedical Engineering OnLine 2011 5th April, ISSN 1475-925X

[4] Yanchun Zhang, Health Information Science and Systems, Volume 1 / 2013 - Volume 5 / 2017, December 2013, ISSN 2047-2501

[5] AmirGandomi, MurtazaHaider, Beyond the hype: Big data concepts, methods, and analytics, International Journal of Information Management: Volume 35, Issue 2, April 2015, ISSN 02684012

[6] John Torous, Rohn Friedman, MatcheriKeshavan, Smartphone Ownership and Interest in Mobile Applications to Monitor Symptoms of Mental Health Conditions, JMIR mHealt anduHealth, Vol 2, No 1, (2014): Jan-Mar, ISSN 2291-5222

[7] Kim NormannAndersena, RonyMedagliab, HelleZinnerHenriksen, Social media in public health care: Impact domain propositions, Government Information Quarterly, ISSN 0740-624X

[8] Tracie Risling, Juan Martinez, Jeremy Young, Nancy Thorp-Froslie, Evaluating Patient Empowerment in Association With eHealth Technology: Scoping Review, Journal of Medical Internet Research, Vol 19, No 9 (2017): September, ISSN 1438-8871

[9] E. Ekonomou, L. Fan, W. Buchanan, C. Thuemmler, An Integrated Cloud-based Healthcare Infrastructure, Cloud Computing Technology and Science IEEE Third International Conference-2011,January 2012, Print ISBN: 978-1-4673-0090-2

[10] Francisco Jose Grajales III, Samuel Sheps, Kendall Ho, Helen Novak-Lauscher, Gunther Eysenbach, Social Media: A Review and Tutorial of Applications in Medicine and Health Care, JMIR, ISSN 1438-8871

[11] INFORMATION BLOG: ENGLISH IT http://informaticablogit.blogspot.in/

[12] Amalia R. Miller, Catherine Tucker, Active Social Media Management: The Case of Health Care, Information Systems Research, March 1, 2013, ISRE: 1120.0466.