Volume 5, Issue 11, November 2015 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Data Management and Prediction about Health Status to Support Health Care System Using QR Code

Madhuri Chaudhari, Jyoti Dighe, Supriya Gadhave, Snehal Khairnar, Prof. Sonal Gore
Assistant Professor, Department of Computer Engineering,
Pimpri Chinchwad College of Engineering,
Nigdi, Pune, Maharashtra, India

Abstract: ***In this, we describe an integrated system, developed for use by the healthcare personnel within healthcare facilities, adapted to smartphones, tablets and other handheld devices. Our key goal is to facilitate doctors, nurses and the patients throughout the facility, regardless of the existence of network connection in the area using a typical smartphone. The proposed application and its backend system support access to patient's history, that is previous diagnoses, medication, prescription. More features include updates on the progress of the patient. Also, we integrate Quick Response Code (QR code) for coding and accessing medical related data of the patient using a smartphone or a tablet, to be used by the facility itself or anyone else certified. In this we provide the QR code bracelets to patients which stores information about the patient.***

Keywords— Healthcare Information Systems, Mobile Application, Quick Response Codes.

I. INTRODUCTION

Hospital are very essential part of our lives, providing best medical facilities to people suffering from various diseases. But keeping track of all the activities and records is very error prone. It is also very inefficient and time consuming process observing the continuous increasing population and number of people visiting the hospital. Recording and maintaining the records is highly unreliable and error prone and inefficient. It is also not economically and technically feasible to maintain the records on paper. The main aim of project is to provide paper-less up to 90%. It also aims at providing low cost reliable automation of the existing system. The system also provide excellent security of data at every level of user system interaction and also provides robust, reliable storage and backup facilities[1].

Our proposed solution introduces a smartphone APP based solution, developed to operate within hospitals. The proposed APP and its backend system support access to patient's medical history, i.e. previous diagnoses, medication, and specification of allergies. More features include updates on the progress of the patient (e.g. thermometer chart), sending referrals directly to hematology, microbiology or biochemistry laboratory and instant notification for the retrieval of laboratory results.

II. QR CODE

QR stands for Quick Response codes created in 1994 by Toyota subsidiary Denso-Wave where this special code is created as two-dimensional symbology. This technology is the code advanced from the current barcode. It is initially used for tracking parts by vehicle manufacturers. The QR Code system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing. A QR code consists of black modules (square dots) arranged in a square grid on a white background, which can be read by an imaging device (such as a camera, scanner, etc.).

The amount of data that can be stored in the QR code symbol depends on the datatype (*mode*, or input character set), version (1, …, 40, indicating the overall dimensions of the symbol), and error correction level. The required data are then extracted from patterns that are present in both horizontal and vertical components of the image[2].

Fig. QR code bracelet

III. ARCHITECTURE

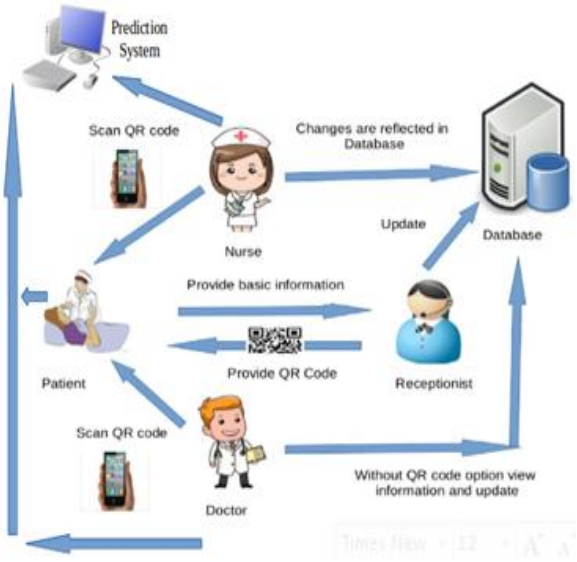
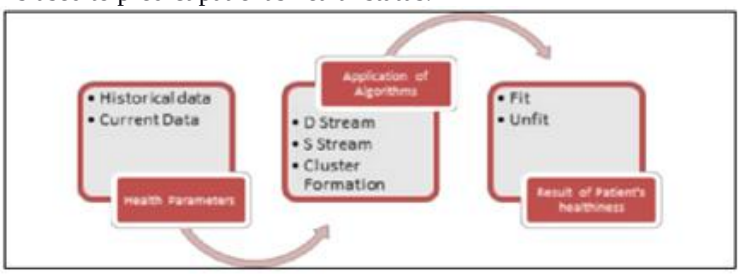


Fig. Detailed Implementation Architecture.

Basically when patient is admitted in hospital,the basic information of that patient is provided to the receptionist. On the basis of that information the QR code is generated. The QR code is given to that particular patient in the form of bracelet. Then that patient wear that bracelet. Now when the nurse go for checking she didn't need to keep pen paper with it. She only scan the QR code which is given to that patient and then the database of that patient is opened and she will add the new records of that patient. In case of doctor two options are provided- First, with QR code when doctor is present at the patient then he will just scan the QR code and get the information or if needed update or add the information. Second ,Without QR Code when doctor is outside the hospital then if any emergency is there at that time he will be able to see the records of that patient in his smartphone and suggest which medicines are give to patient. In case of patient he/she will see his/her information by simply scanning that QR code but only in read only form. And all the changes done by receptionist,doctor and nurse are reflected in database.

IV. PREDICTION SYSTEM

Prediction system is used to predict patient's health status.



I) D-stream Algorithm

We used D-stream algorithm to predict whether patient is feet or not. D Stream algorithm is used for clustering stream data using a density-based approach. The algorithm uses an online component which maps each input data record into a grid and an offline component which computes the grid density and clusters the grids based on the density. The algorithm uses a density decaying technique to capture the dynamic changes of a data stream. Exploiting the intricate relationships between the decay factor, data density and cluster structure, our algorithm can efficiently and effectively generate and adjust the clusters in real time. The technique makes high-speed data stream clustering feasible without degrading the clustering quality.

This algorithm is used to predicts patient's health status and provides feedback to patients through their mobile devices.

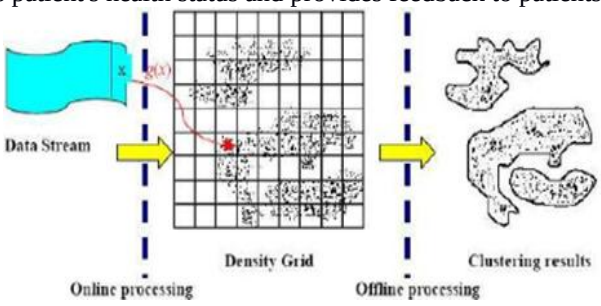


Fig. Illustration of the use of density grid

The **D-stream** algorithm is explained as follows

1. procedure D-Stream
2. Tc = 0;
3. Initialize an empty hash table grid list;
4. while data stream is active do
5. read record x = (x1, x2, · · · , xd);
6. determine the density grid g that contains x;
7. if(g not in grid list) insert g to grid list;
8. update the characteristic vector of g;
9. if tc == gap then
10. call initial clustering(grid list);
11. end if
12. if tc mod gap == 0 then
13. detect and remove sporadic grids from grid list;
14. call adjust clustering(grid list);
15. end if
16. tc = tc + 1;
17. end while
18. end procedure

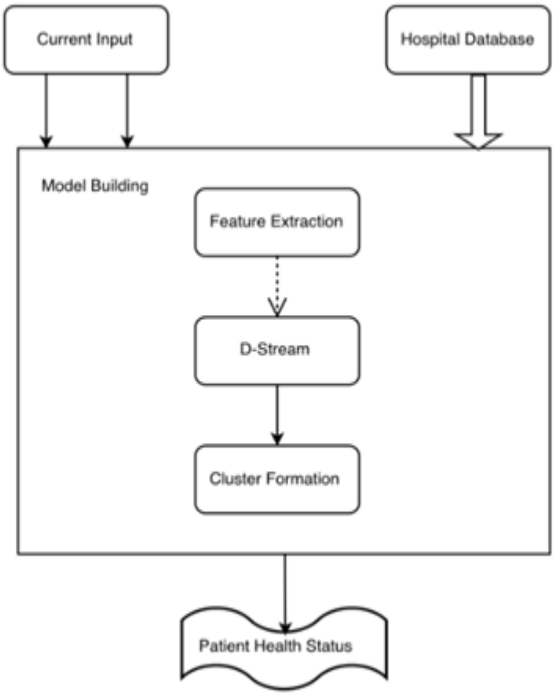


Fig. Prediction system

Procedure for initial clustering

1) procedure initial clustering (grid list)
2) update the density of all grids in grid list;
3) assign each dense grid to a distinct cluster;
4) label all other grids as NO CLASS;
5) repeat
6) for each cluster c
7) for each outside grid g of c
8) for each neighboring grid h of g
9) if (h belongs to cluster c′)
10) if (|c| > |c′|) label all grids in c′ as in c;
11) else label all grids in c as in c′;
12) else if (h is transitional) label h as in c;
13) until no change in the cluster labels can be made
14) end procedure

Procedure for adjust clustering

1) procedure adjust clustering (grid list)
2) update the density of all grids in grid list;

3) For each grid g whose attribute(dense/sparse/transitional) is changed since last call to adjust clustering()
4) if (g is a sparse grid)
5) delete g from its cluster c, label g as NO CLASS;
6) if (c becomes unconnected) split c into two clusters;
7) else if (g is a dense grid)
8) among all neighboring grids of g, find out the grid h whose cluster ch has the largest size;
9) if (h is a dense grid)
10) if (g is labeled as NO CLASS) label g as in ch;
11) else if (g is in cluster c and |c| > |ch|)
12) label all grids in ch as in c;
13) else if (g is in cluster c and |c| <= |ch|)
14) label all grids in c as in ch;
15) else if (h is a transitional grid)
16) if ((g is NO CLASS) and (h is an outside grid if g is added to ch)) label g as in ch;
17) else if (g is in cluster c and |c| >=|ch|)
18) move h from cluster ch to c;
19) else if (g is a transitional grid)
20) among neighboring clusters of g, find the largest one c′ satisfying that g is an outside grid if added to it;
21) label g as in c′;
22) end for
23) end procedure

II) Cluster Formation

The architecture of D-Stream, which assumes a discrete time step model, where the time stamp is labeled by integers 0, 1, 2, · · · , n, D-Stream has an online component and an offline component.

For a data stream, at each time step, the online component of D-Stream continuously reads a new data record, place the multi-dimensional data into a corresponding discretized density grid in the multi-dimensional space, and update the characteristic vector of the density grid. The offline component dynamically adjusts the clusters every gap time steps, where gap is an integer parameter. After the first gap, the algorithm generates the initial cluster. Then, the algorithm periodically removes sporadic grids and regulates the clusters. D-Stream partitions the multi-dimensional data space into many density grids and forms clusters of these grids

III) Patient's Health status

Using clustering algorithm we form the clusters for attributes stated above. And then for patient's current input we predict patient's health status i.e. patient is fit or unfit.

V. CONCLUSION

A more efficient way of recording and updating data to Electronic Health Record(EHR) of patients is provided through these application. To provide an application that saves the time of hospital's staff by using QR code and smartphones.

REFERENCES

[1] http://www.slideshare.net/HimaniChopra/hospital-management-system-project
[2] https://en.wikipedia.org/wiki/QR_code
[3] "APPification of hospital healthcare and data management using Qrcodes" Mersini, P.; Sakkopoulos, E.; Tsakalidis,A. Information, Intelligence, Systems and Applications (IISA), 2013
[4] "Intelligent Healthcare By Integrating D-Stream and S-Stream" Deshmukh Priya, Nawathe Anuradha, Deshmukh Vishwajit ME Student, 2 Assistant Professor, A.V.C.O.E. Sangamner. B.E PICT Pune.
[5] "Reversible data hiding with histogram-based difference expansion for QR code applications" Hsiang-Cheh Huang,Feng-Cheng Chang,Wai-Chi Fang Consumer Electronics, IEEE Transactions on Year,2011

