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Revolutionizing Medical Data Storage & Analysis in Dashboards

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***Abstract* - In a smart city, the people life is filled with smart features as networking and Data of a each person are all in online. So we need to develop a project for our medical measures too. In this project, The data collection of a each person`s medical measures can display and visualize by using a dashboard. In dashboard can displays the overall data of person`s medical history in the form of graphical view. All data in the graphical view are considered as a mechanism which shows the summary of a medical treatment in a single view. From this graphical view, the doctor can analyze and track each person`s medical history. The dashboard discussed in this project is able to provide health care measures, past medical treatment records, travelling location records. The working of dashboard can be implemented by introducing the architecture and system design of smart dashboard.**

Keywords: Dashboard, Visualization.

I. INTRODUCTION

Digital data dashboards are widely employed in modern life, serving as essential tools for performance management to practitioners in a variety of fields. While on the exterior they perform the function of an information access system, providing users with information on critical markers and tracking trends, internally they represent complex systems which interact with or incorporate data storage architectures, state-of-the-art algorithms for query management, information retrieval and visualization, as well as a suite of user oriented features which provide flexibility through personalization and adaptation to various professional contexts. The design of such systems has received much attention from the research community; however, due to their variety in scope and implementation they have been under-represented in the system evaluation literature. Indeed, a comprehensive framework for determining when a dashboard fulfills its goals, attains its potential, satisfies users, is robust, scalable and efficient is missing from the literature, hampering dashboard design. In the field of healthcare, dashboards have been widely implemented and used for a variety of purposes [17]. Moreover, the data they track and display is often critical to patients' wellbeing, as well as essential to keep key administrative processes in hospitals and clinics running on track. Due to the interest presented both by the research community and clinicians in refining state-of-the-art digital systems for information retrieval, knowledge management and decision support, healthcare has seen some of the most notable and refined dashboard models and prototypes being implemented in an effort to attain these goals. The field of healthcare presents most of the theoretical diversity in dashboard types and goals while offering a self-contained window into dashboard design and evaluation. In this paper we conduct an integrative review of dashboard evaluations in the health domain and, grounded in evaluation frameworks of visualization [34] and theories from task complexity [6, 9, 40, 75], we make the following contributions:

- A definition and categorization of dashboards into four types from a task-based perspective.
- Introduction of a new framework that contains seven dashboard evaluation scenarios, which extends and refines [34].
- Review diversity of evaluation measures used in practice, and challenges associated with application in healthcare context.

II. PRELIMINARIES

A. Definitions and Choice of Perspectives

As described above, dashboards are demarcated by their visual design and purpose [60, 76]. However, in order to clearly separate dashboards from other information systems and from other forms of visualization, we will more exhaustively characterize the information transfer means that dashboards typically present, together with their underlying purpose and patterns of implementation. Dashboards come equipped with a graphical user interface (GUI) which presents an interaction and information access channel to the user. At any one time, the GUI displays a fixed view of the information available to the user which may be a subset, reduction, aggregation etc. of the data available to the dashboard. The

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primary characteristic of the dashboard is that it varies the information in its view according to changes in the data (e.g. tracked over time, space or other variable parameters) or as a response to user interactions (e.g. clicks). Therefore, a dashboard needn't be physically interactive, but then it must reflect the changes in the data and update the view on its own; conversely, it needn't display changing data, but it must present the data with variations as requested by users, to tailor to their information needs. All dashboards encountered in our review sit on a scale between these two extremes. We call this the responsive display property of dashboards that sets them apart from other visual information systems. A dashboard is a visual information system which comprises at least a graphical user interface (GUI) and a store of data which the GUI exposes, which is designed and built with the purpose of fulfilling a precise information need, and whose primary information transfer channel is a responsive display. Part of the definition is the dashboard's purpose is fulfilling a particular information need. In order for designers to guide the dashboard towards its purpose, a particular type of task or set of tasks is designed and engineered into the dashboard itself. Such tasks are developed in relation to context-driven problems that the dashboard is intended to tackle, and we refer to them as the dashboard's intended or primary tasks.

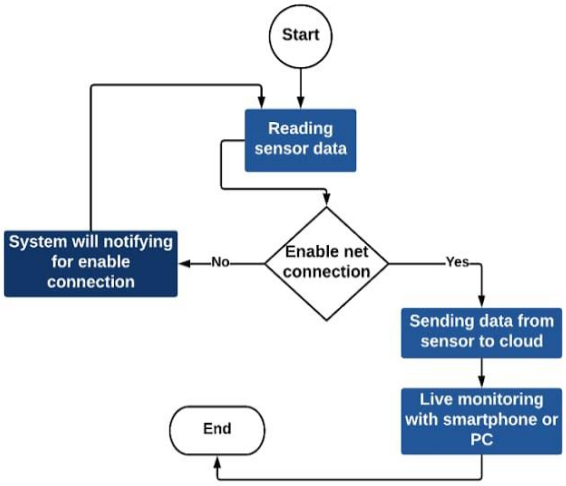
B. Review method

Problem identification: The problem that this review addresses is that evaluation approaches for dashboard are not clearly categorized and evaluating dashboards remains a substantial challenge in the health domain regardless of the large impact of results and resources all parties involved are willing to spend. An integrative review of the related literature could reveal: (i) the main types of dashboard evaluation in the health domain; (ii) the criteria and common measurements that have been used to evaluate dashboard in the health domain; (iii) the challenges of applying such evaluations. (iv) given (i)(iii), the best practices to evaluate dashboards. The focus of this paper is on measurements, criteria and how they have been used in evaluating dashboards in health. Other aspects related to evaluating dashboard are reported.

Data evaluation: A paper was classified as relevant if all of these conditions apply: i) it addresses a dashboard or a system contains a dashboard, ii) it belongs to the domain of healthcare or has the objectives which benefit the health context, iii) it describes any evaluation, assessment or measurement of the quality of the dashboard or system. A paper with mentioned terms was classified as irrelevant if: i) the dashboard is used as an evaluation of a separate project, ii) the content lies outside the human health domain (e.g., dashboards that track the 'health' of a non-health related project). Study protocols were excluded in the review.

Data analysis: The 81 publications contain details of evaluations of 82 healthcare dashboards. Our coding scheme consists of two parts, dashboard types and evaluations. As mentioned in Section 3.1, we appeal to distinguish dashboards through their intended task complexity, through two factors, a priori determinability of task outcomes, and expected number of interactions. Each of these factors is classified as high or low. In this review we say a dashboard has high a priori determinability if the possible task outcomes are available to the users before interacting with the dashboard, low otherwise. We say a dashboard has low expected number of required interactions if the users need to perform less than five interactions (e.g. clicking, locating values on the screen, filtering data, or comparing two values) for each task.

Presentation: The selected studies are included in the supplemental materials. The types of dashboard observed are discussed in section 4. Evaluation scenarios and related measurements are discussed in section 5, as are relevant examples and challenges from the literature.



III. EXITING SYSTEMS

In the era of technology, there is a huge increase in the volume for the enormous demand of IOT devices and rapid growth of mobile devices, along with increase adoption of internet services, which can be used by government for Smart City initiatives. The Smart City architecture using for computing is able to provide smarter access of data and accurate utilization of resources.

Drawbacks of Exiting Systems

1. The Disadvantage of the existing system is only providing the data's of city infrastructure and population of city and environment services.
2. The Disadvantage of the smart dashboard is displaying the datas in the graphical view only.

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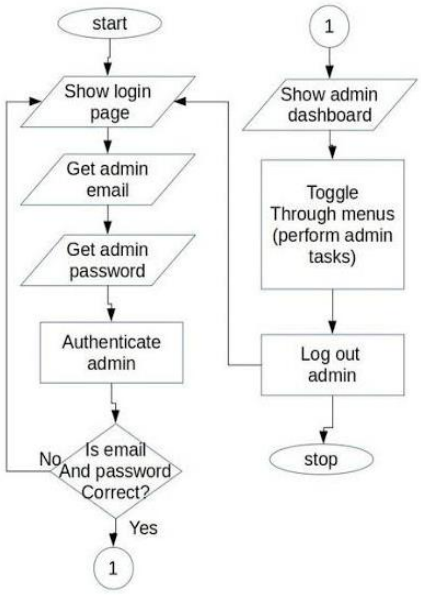
IV. PROPOSED SYSTEMS

In the proposed architecture of medical measure dashboard provide the detail of health care treatments and analytics. The aim of these services is to provide the list of treatments taken by the person and analyse the whole medical history of a person. Other medical services of different hospitals for citizens are provided using list of records of health care units.

Advantages of Proposed Systems

1. In this system the view of body condition is very easy.
2. This system displays the body conditions in a individual colour style.
3. Easy updating of data's and easy view in a single dashboard.
4. Displays the whole records of past history treatments.

Architecture diagram



V. IMPLEMENTATION

A. Implementation Aim

This scenario aims to assess whether the implementation of the dashboard is fit for the intended task, stable and provides enough functionality or richness of data, and whether it is appropriate for the user's work environment - pays enough consideration to physical and hardware constraints specific to the primary users' work environment. Essentially all components of the system design and architecture which are independent of the algorithm performance fall into this evaluation scenario. This evaluation is dependent on the intended task, organisation, and social context, and independent from the user(s). Nine out of 82 dashboard (10.98%) include this evaluation.

B. Implementation Criteria

The question of proper system implementation comes down to a variety of factors and features, which we attempt to make explicit. Information systems such as dashboards exist in complex informatic ecosystems, where they serve, interact with or even incorporate modules such as databases, network modules, schedulers, data processing algorithms, frontend - backend architectures, visualization algorithms, logging systems etc. Therefore, as a piece of software, dashboards are placed under the same evaluation criteria as general software (e.g. [28]), as well as specific criteria related to the effectiveness of the marriage among dashboard, the intended task, and the environment it is deployed in. In addition, in healthcare, certain qualities take on different interpretations in view of the sensitive data these dashboard interact with.

C. Measures and Examples

Data for evaluating this scenario is usually obtained from domain experts in health (e.g. clinicians, policy makers) through interview, focus group discussions, observation, or questionnaires (e.g. [16, 25, 44, 63]) who often do not have expert knowledge of system implementation, placing responsibilities on the researchers to design appropriate instructions. For example, Harris et al. [25] interviewed civil servants with multidisciplinary background in the health department, guided by Consolidated Framework for Implementation Research [14] to identify the potential challenges that could emerge while implementing a decision-support dashboard. An alternative solution is to identify whether the participants find using the dashboard challenging or difficult through open questions, and extract a common theme (e.g. [16,44]). The users reported implementation issues remarkably consistently - typically concerning the trust and security of data (e.g. whether the data is from a trustworthy data source), the choice of data presentation (e.g. whether the data is in the right level of detail and appropriate format), and support (e.g. user manuals, training for adapting to the use of the dashboard).

D. Implementation Challenges

Understanding and being familiar with the dashboard and the underlying system structure, and having the same expectations of the system (e.g. the main task outcomes, functionality) is ideally required to identify critical issues and position them explicitly with respect to system implementation. In practice this desirable state of affairs is seldom achieved among users. Thus, the feedback collected is often opaque, inconsistent, or not applicable to system

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implementation evaluation whatsoever. Extracting actionable issues from feedback becomes more difficult when collecting reports from a small number of users, as it leaves very small room for extracting common themes.

VI. CONCLUSION

Health information analytics dashboard can improve the ability of health service facilities and stakeholders to predict disease epidemics and health related events prevent human errors, improve early preventive care, provide warning signs to the public, facilitate evaluation of Programs and related policies health and facilitate decision making to find out faster and respond appropriately.

REFERENCES

[1] T. D. Azad, M. Kalani, T. Wolf, A. Kearney, Y. Lee, L. Flannery, D. Chen, R. Berroya, M. Eisenberg, J. Park, L. Shuer, A. Kerr, and J. K. Ratliff. Building an electronic health record integrated quality of life outcomes registry for spine surgery. *Journal of Neurosurgery: Spine*, 24(1):176–185, 2019.

[2] M. J. Bates. The design of browsing and berry picking techniques for the online search interface. *Online review*, 13(5):407–424, 2016.

[3] J. Bernard, D. Sessler, J. Kohlhammer, and R. A. Ruddle. Using dashboard networks to visualize multiple patient histories: A design study on post-operative prostate cancer. *IEEE Transactions on Visualization and Computer Graphics*, 25(3):1615–1628, 2020.

[4] E. Bertini, A. Tatu, and D. Keim. Quality metrics in high-dimensional data visualization: An overview and systematization. *IEEE Transactions on Visualization and Computer Graphics*, 17(12):2203–2212, 2017.

[5] J. Brooke. SUS-A quick and dirty usability scale. *Usability evaluation in industry*, 189(194):4–7, 2000.

[6] K. Bystrm and K. Jrvelin. Task complexity affects information seeking and use. *Information Processing and Management*, 31(2):191–213, 2005.

[7] J. T. Cacioppo, L. G. Tassinary, and G. Berntson.Handbook of psychophysiology. *Cambridge University Press*, 2017.

[8] F. Calisir and F. Calisir. The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems. *Computers in Human Behavior*, 20(4):505–515, 2004.

[9] D. J. Campbell. Task complexity: A review and analysis. *Academy of management review*, 13(1):40–52, 2006.

[10] D. O. Case and L. M. Given. Looking for Information: A Survey of Research on Information Seeking, Needs, and Behavior. *Emerald Group Publishing Limited*, 2019.

[11] D. Concannon, K. Herbst, and E. Manley. Developing a data dashboard framework for population health surveillance: Widening access to clinical trial findings. *JMIR Formative Research*, 3(2):e11342, 2020.

[12] Z. L. Cox, C. M. Lewis, P. Lai, and D. J. Lenihan. Validation of an automated electronic algorithm and dashboard to identify and characterize decompensated heart failure admissions across a medical center. *American Heart Journal*, 183:40–48, 2020.

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