



# Overcoming the Bottlenecks in the Health System by Using Process Mining Approach

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### Dear Editor

The health care is one of the most complex systems in the industry. The processes of this system include a set of activities such as prevention, diagnosis, treatment, and rehabilitation of their clients. For simplifying, facilitating, and providing high-quality healthcare services, it is recommended that the current processes should be drawn and then its challenges and bottlenecks such as long waiting times for services, increased costs and customer dissatisfaction in dealing with them should be identified and analyzed. Using process mining and its methods in the health system is one of the practical and affordable ways to analyze, modify, and improve the processes.

In this regard, Homayounfar (2012) considers the use of the mining process in the hospital information system (HIS) as a modern and suggested approach (1). Garcia et al. (2015) extracted elements of the HIS using process mining techniques and drew the hospital information system algorithms to support clinical and managerial decisions. It was concluded that the obtained models were not suitable for understanding the health personnel with the help of the analysis of developmental components. Therefore,

it was supposed to use the process extraction methods into the HIS, which enabled us to analyze the data by non-experts. The use of process mining techniques can play an important role in making clinical and managerial decisions (2).

Zhou et al. (2014) evaluated process mining for analyzing workflows of healthcare in an outpatient clinic. Based on their results of the process mining, a discrete simulation model was developed and presented for numerical analysis at the healthcare center. In addition, the results have shown that this method is a good tool used to improve the performance of therapeutic processes (3).

Mans et al. (2013) explained that process mining was capable of providing an accurate view of the care process by identifying and using large volumes of centralized data in the hospital information system (4). Similarly, Poelmans et al. (2010), who used a combination of process mining and knowledge discovery techniques, pointed out that process mining was capable of identifying and using large volumes of centralized data in the hospital information system. They examined data extracted from treatment activities on 148 patients with breast cancer at a teaching hospital in Belgium. They used this combination to

gain a deeper understanding of the treatment process for patients with breast cancer and their actual activities; also, process inefficiencies, expectations, and fluctuations were discovered. It leads to finding the root cause of inefficiencies in the treatment process as quickly as possible. Their results showed how these processes worked and issues, bottlenecks, and challenges were able to be interpreted based on available data. Therefore, the cases are resolved with the aim of increasing the application of the process mining technique in healthcare. It can be said that understanding how processes are implemented will be effective in improving the processes (5).

### Conclusion

Therefore, it seems that, due to the numerous capabilities of the process mining in health systems, its implementation can lead to improved healthcare quality, increased services, reduced waste in time and resources, and ultimately increased patient and therapist satisfaction.

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### Authors' Contribution

A.A. Conceptualization, Data curation, Supervision, Writing - review & editing, Writing - original draft.  
S.A. Conceptualization, Data curation, Supervision, Writing - review & editing, Writing - original draft.  
T.A. Conceptualization, Data curation, Writing - review & editing, Writing - original draft.

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### References

1. Homayounfar P, editor Process mining challenges in hospital information systems. 09-12 September 2012. Wroclaw: 2012 federated conference on computer science and information systems (FedCSIS); 2012.
2. Orellana Garcia A, Perez Alfonso D, Larrea Armenteros OU. Analysis of Hospital Processes with Process Mining Techniques. *Stud Health Technol Inform.* 2015;216:310-4.
3. Li C, Hu J, Zhou D, Zhao J, Ma K, Yin X, et al. Differentiation of bland from neoplastic thrombus of the portal vein in patients with hepatocellular carcinoma: application of susceptibility-weighted MR imaging. *BMC Cancer.* 2014;14:590. doi: 10.1186/1471-2407-14-590.
4. Mans R, van der Aalst W, Vanwersch R. Process mining in healthcare: opportunities beyond the ordinary. *BPM reports.* 2013;1326.
5. Poelmans J, Dedene G, Verheyden G, Mussele HVd, Viaene S, Peters E, editors. Combining business process and data discovery techniques for analyzing and improving integrated care pathways. Berlin: Industrial conference on data mining; 2010;505-517. doi: 10.1007/978-3-642-14400-4\_39.