Process in pediatrics: applying process mining and simulation

TREO Talk Paper

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To analyze and improve business processes, data has become a key input. Process mining (PM) has emerged as an interdisciplinary field that allows extracting knowledge and generating valuable insights based on data, providing the possibility for process owners to make informed decisions based on what really happens in the processes and guiding their improvement [1].

Studies integrating process mining with other techniques are increasing, as are the number of sectors in which applications have been developed. Healthcare is one domain in which the combination with other areas is also growing, for example, the combination of PM with process simulation [2].

This research is focused on combining PM and simulation applied in pediatrics, which, to the best of the author's knowledge, is a less explored area with further research opportunities. We have selected the medical area of a national pediatric hospital in Costa Rica. The lack of a formal patient journey mapping, the need to discover role interaction models, understand how healthcare professionals are currently collaborating in the process, and review the time involved to perform process activities are factors that can help generate a more in-depth analysis to face a relevant problem in healthcare: the waiting list of patients.

This research aims to identify specific guidelines for the development of a reference framework from which decision-makers can be provided with a clear and easy-to-apply route for process optimization. We propose a process mining method to analyze a pediatric outpatient clinic process as a case study. As a first stage, the method includes the following steps: a) business case and value definition; b) extract and transform data; c) event log generation; d) create data repositories and models; d) upload data; and e) process analysis.

Currently, we are focused on step a): identify valuable opportunities, analyze their potential root causes, and prioritize which valuable opportunities to pursue. Also, we are working on establishing the minimum data requirements to be process mining-ready from the available information systems. Preliminary outcomes reveal the need to obtain a complete process map of what is really happening (as-is), analyze inefficiencies and root causes to define future improvement actions (e.g., simulation scenarios), as well as the selection of system(s) and the definition of the data attributes.

References

[1] Van Der Aalst, W., & van der Aalst, W. (2016). "Data science in action". Springer Berlin Heidelberg, (pp. 3-23).

[2]Rojas, E., Munoz-Gama, J., Sepúlveda, M. & Capurro, D. "Process mining in healthcare: A literature review". Journal of Biomedical Informatics, 61, 224–236, (2016).