SBMT4000 SBM Undergraduate Honors Research Project

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Project Summary

Topic:

AI Technology for Patient Flow Management: Analyses of New Service Models in Healthcare Systems

Description:

Artificial Intelligence (AI) is increasingly being used in healthcare systems to transform care delivery, with applications ranging from AI-assisted diagnostic imaging to automated scheduling and predictive analytics. These technologies are expected to increase operational efficiency, reduce patient waiting times, and optimize the allocation of scarce medical resources. However, significant challenges can arise during their implementation, such as algorithmic bias, inaccurate prediction, and difficulties in integrating new AI tools with existing hospital systems.

Building on this context, our project aims to study how the use of AI technologies can affect and improve patient flow management in hospitals and other clinical settings. We will explore the new service models facilitated by AI in different clinical settings. For instance, in emergency departments, smart triage systems can prioritize patients based on real-time risk and dynamically allocate resources during patient surges. In outpatient services, AI-based models can evaluate patient symptoms and reroute them to necessary preliminary diagnostic checks before physician consultations. We will develop analytical models to describe such innovative service models and evaluate their impact on system efficiency, patient outcomes, and overall social welfare. Based on our analyses, we will then investigate how to better integrate AI technology into current healthcare systems in a way that balances cost effectiveness, care accessibility, and patient fairness.

To achieve these objectives, we will employ a comprehensive research approach that combines qualitative review, analytical modeling, optimization, and data analytics. Target students are expected to have a moderate quantitative background and a basic understanding of Operations Management (OM) concepts. Proficiency in statistical software or programming languages (e.g., STATA, R, or Python) for data analysis is considered a plus.

Remarks