Big Data-driven method could save money, increase efficiency in pharmaceutical management

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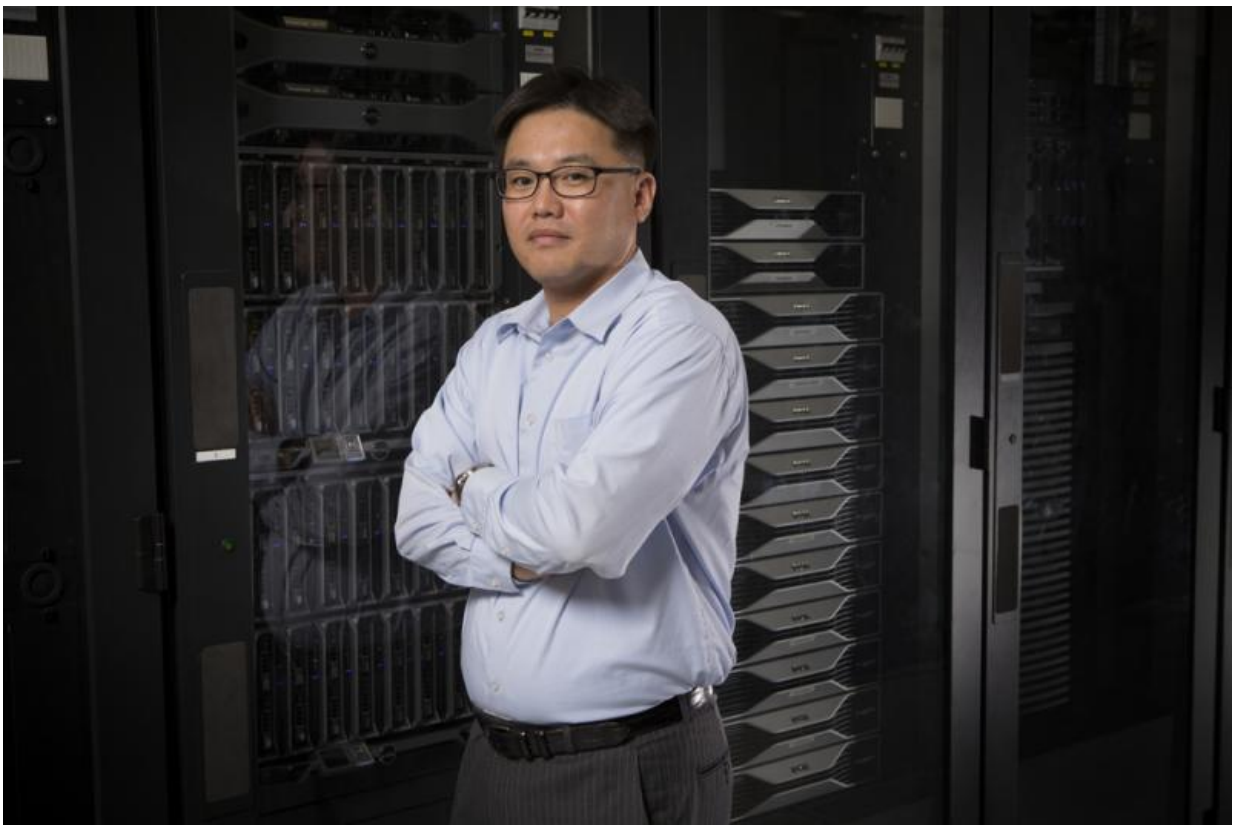

Sang Won Yoon, assistant professor of systems science and industrial engineering at Binghamton University. Credit: Jonathan Cohen/Binghamton University

Researchers at Binghamton University and pharmacy solutions provider Innovation Associates have developed an optimized approach for determining prescribed medication associations within a high-volume pharmacy environment that could save money and time.

Automated pharmacies are facing extremely large demands of prescription orders, specifically at the central fill pharmacies that distribute drugs to retail pharmacies. With this rising demand, it is necessary to increase the throughput of prescriptions in automated pharmacies through improvements to the Robotic Prescription Dispensing System (RPDS). Many pharmacies ignore the hidden patterns and the knowledge that can be extracted from the stored transactional database.

Researchers Sang Won Yoon, assistant professor of systems science and industrial engineering at Binghamton University; Norma Khader, graduate student at Binghamton University and graduate research associate, Watson Institute for Systems Excellence (WISE); and Alecia Lashier, director of software systems engineering for Innovation Associates, extracted knowledge from a prescriptions transactional database to improve different strategies in pharmacy automation and management. The authors' research, which applies the technique for assigning optimal fulfillment locations for specific medications based on their frequency of association with other medications, shows substantial positive effects. For example, it demonstrates how the method reduces the overall processing cost of dispensing prescriptions, increases the throughput of the high-volume technology and process, and improves the management of the pharmacy's medication inventory.

"In this research, we applied big-data analytics to enhance the efficiency of pharmacy automation and management by finding different rules and patterns of subscribed medications," said Yoon. "Additionally, we can apply this research to both enhance pharmacy automation and

management, and to help us understand patients' medication adherence and compliance issues in the future."

"The work published in this paper provides a great example of how industry and academia can work together to solve complex real-life challenges. Our partnership with Innovation, a leader in pharmacy automation, provides our graduate students and faculty with great opportunities to test some of their newly developed algorithms," said Mohammad Khasawneh, professor and chair of Systems Science and Industrial Engineering at Binghamton University, and associate director for the Watson Institute for Systems Excellence (BU WISE). He added, "In addition to accomplishing significant return on investment for our industry partners, collaborative efforts like this are indeed critical to our educational mission at the university."

To further highlight and encourage participation on this type of research, Innovation and BU WISE will hold a two-day symposium at Binghamton University on April 9-10, 2016. The symposium, "Exploring Successful Change Management for Pharmacy Operations," will leverage myriad proven industry methodologies and lessons, and relate them to pharmacy operations. Discussion will also consider a wide range of different objectives, approaches, priorities, technologies, and tools that will empower pharmacies to adapt to change and more effectively improve their operations.

The thesis paper, "Pharmacy Robotic Dispensing and Planogram Analysis Using Association Rule Mining with Prescription Data," has been published in *Expert Systems With Applications* (ESWA).

More information: Nourma Khader et al. Pharmacy robotic dispensing and planogram analysis using association rule mining with prescription data, *Expert Systems with Applications* (2016). DOI: 10.1016/j.eswa.2016.02.045

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