UC Irvine Data Science Students Partner with CHOC Research and Rady Children's Health to Develop Personalized Pediatric Dehydration Management Solutions

Innovative collaboration applies advanced analytics to improve treatment outcomes for pediatric patients

UC Irvine Data Science students successfully completed a project in partnership with CHOC Research, part of Rady Children's Health, to develop personalized approaches for pediatric dehydration management. The 208-week collaboration demonstrates the transformative potential of academic clinical partnerships in advancing pediatric healthcare through data science innovation.The student research team developed sophisticated algorithms to analyze deidentified clinical data, identifying unique patient subgroups and examining treatment effects on hydration management. Working with cleaned and standardized emergency department data for 75,000 patients~~across nine tables~~, the team performed a hierarchical classification using ~~manually categorized~~ ICD 10 codes to distinguish between long term health conditions and acute injuries. The primary objective focused on predicting post treatment serum sodium levels to optimize hydration therapy. The team~~. By segmenting patients into subsets based on percentage change outcomes and applying robust regression modeling, the team successfully grouped patients into distinct clusters,~~ identified associated treatment effects, and examined detailed therapeutic impacts across different patient segments treated for dehydration. ~~populations~~.

Key Findings and Clinical Impact

The research yielded three significant outcomes: successful patient clustering into unique therapeutic groups, identification of treatment management effects across subpopulations, and detailed analysis of treatment responses. The team accomplished these objectives using free software on deidentified, sparse clinical data over two academic quarters. Future applications include further cluster refinement for actionable clinical insights, profile blending for optimized treatment configurations, and potential development of automated treatment management applications.

Leadership and Mentorship

The initiative was co-led by Steven Martel, MD, Chief Health Information Officer, pediatrician, and clinical informaticist at CHOC, now part of Rady Children's Health. Lois Sayrs, PhD, Director of Biostatistics at CHOC, served as mentor, guiding students throughout the project development. "CHOC's expertise and UCI's talent in advanced data science methodologies demonstrates our collaboration's strategic value in addressing critical healthcare challenges," states Dr. Lois Sayrs.

"Our students are gaining invaluable experience applying cutting edge techniques like natural language processing and deep learning to real world clinical problems," states Sharad Mehrotra, PhD, Associate Professor, Donald Bren School of Information and Computer Sciences, UC Irvine.

"This collaboration creates a unique learning environment where statistical rigor meets clinical innovation, preparing the next generation of health data scientists and the next generation of data-science-driven clinicians," states Babak Shahbaba, PhD, Professor of Statistics, UC Irvine.

Student Perspectives

"I am grateful to have had the opportunity to contribute to work that has real potential to improve patient outcomes. By exploring ways to personalize dehydration treatment, I was able to see firsthand how data science can support the important work being done at CHOC," said Jamie Tevis, B.S. in Data Science, UC Irvine. "This experience gave me a glimpse into the meaningful impact that careful analysis and collaboration can have in a clinical setting."

Colin Yee, B.S. in Data Science, UC Irvine, emphasized the practical value of the experience: "Working with CHOC Research offered opportunities we would never have had at school. I was very intrigued with how data science can be used in healthcare, learning about hospital data collection, medical standards such as ICD 10 codes, and how different drugs affected patient vitals over time. What resonated most was being able to use my data science skills for good."

Strategic Partnership Vision

"I am consistently impressed by the exceptional caliber of talent from UC Irvine's Data Science program," states Nadine Afari, CHOC Research, who facilitates strategic partnerships with UCI and other academic institutions. "The future belongs to leaders who can always learn from each other and synthesize insights across academic and institutional boundaries."

About the Organizations

CHOC Research, part of Rady Children's Health, is dedicated to advancing pediatric healthcare through innovative research and clinical applications. The organization focuses on translating cutting edge research into improved patient outcomes for children and families.

UC Irvine's Donald Bren School of Information and Computer Sciences offers comprehensive data science programs that prepare students to address complex real world challenges through advanced analytical methodologies and interdisciplinary collaboration.

This partnership represents a model for academic clinical collaboration, demonstrating how data science innovation can directly impact pediatric patient care while providing students with meaningful real world experience in healthcare applications.