MGP/B 437V-1: Healthcare Analytics

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Contact Information:

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Course Information:

Unit of Credit: 1 Unit

Quarter: Winter 2024

Course Format: Lectures, readings, individual exercises, final team project

Course Description:

Healthcare is the largest industry in the US economy and is currently going through significant innovation and transformation. This course is designed to give students an understanding of the US healthcare system and application of advanced analytics for data-driven insights in various healthcare domains towards improving patient & provider experience, improving care quality, and reducing healthcare cost. The course will introduce students to advanced analytics framework, key Artificial Intelligence & Machine Learning concepts, and Machine Learning modeling techniques towards solving high-value and high-impact healthcare business problems, such as preventive health, medical management, and administrative efficiencies.

Course Vision:

This course is designed to give students an understanding of the US healthcare industry and application of advanced analytics in the healthcare domain for data-driven-insights.

Course Materials:

1. Selected readings (available through the library)
    Linked items are available online or through the UC Davis library. If noted, some links will need to be accessed from on campus or by using the library VPN.

Team Project:

Students will also be given a team project (team of about 4 students) that will require them to apply the concepts and techniques covered in the course for a high-value healthcare analytics use case (Disease Predictive Model). Each team will develop and present a "pitch deck", with the following rough outline:

- What is your business case (business problem, potential analytics solution, and business benefits)?

- What are your recommended business actions (based on data-driven insights from the predictive model)? How would these actions drive the intended business outcome?

- What is your proposed Machine Learning solution approach for developing the predictive model?

Each team will submit and present their project report. Each team will be given 15 minutes (including 5 min for Q&A) to present to the class using a storytelling approach.

Course Schedule:

The course will use a combination of lectures, reading material, classroom discussions, and a final project.

#	Date	Topics & Readings
1	Session #1	**Topic: US Healthcare System** 1. US Healthcare System and Key Entities 2. Challenges & Opportunities Shaping the Healthcare Future 3. Healthcare Quadruple Aim: Care Quality, Patient & Provider Experience, Cost 4. Opportunities for Advanced Analytics & Machine Learning **Reading Material** *1. [How to Improve Care for High-Need, High-Cost Medicaid Patients](#) - Harvard Business Review **[Needs VPN]*** *2. [Getting Buy-In for Predictive Analytics in Health Care](#) - Harvard Business Review **[Needs VPN]***
2	Session #2	**Topic: Advanced Analytics Framework & Machine Learning** 1. Advanced Analytics Process Framework 2. Artificial Intelligence & Machine Learning and Business Value 3. Key Machine Learning techniques: Classification and Regression **Reading Material** *1. [5 Essential Principles for Understanding Analytics](#) - Harvard Business Review **[Need VPN]*** *2. [What Every Manager Should Know About Machine Learning](#) - Harvard Business Review **[Needs VPN]*** *3. [Next-generation member engagement during the care journey](#) - McKinsey*
3	Session #3	**Due Assignments:** 1. Three Summary Papers 2. Final Project Report & Presentation **Topic: Machine Learning in Healthcare** 1. High-Value Healthcare Business Use Cases: Care Management, Patient Activation & Engagement, Performance Management, Administrative 2. Healthcare Data Sources & Data Domains 3. Application of Advanced Analytics & Machine Learning **Reading Material** *1. [Boosting Healthcare Payer Performance with Advanced Analytics](#) - Boston Consulting Group* *2. [How a Pharma Company Applied Machine Learning to Patient Data](#) - Harvard Business Review **[Needs VPN]*** *3. [Supercharging the ROI of your care management programs](#) - McKinsey*
4	Session #4	**Storytelling & Final Project Presentations** 1. Storytelling framework: business question to business outcome 2. Final team project presentations 3. Key takeaways

Grading (*subject to change before the beginning of the course*):

Assignment	Weight	Deliverables
Class Participation	25%	Class attendance and participation in class discussions
Individual Assignments	30%	Based on assigned readings, students will write three summary papers (about 1 page): ● Summary paper #1 (10%) ● Summary paper #2 (10%) ● Summary paper #3 (10%) Each summary paper will be evaluated based on how well students respond to the following questions: 1. What are the key problems, challenges, or issues discussed in the article? 2. What are your 2-3 key takeaways (key insights) from this reading? 3. Is there anything that you can relate from your own experience?
Team Project	45%	1. Project summary report (30%) 2. Team presentation (15%) Project summary report and the presentations will be evaluated based on the following content and delivery (evaluation guidelines will be shared with the teams in advance): ● The "WHY": Articulation of the business case (business problem, potential analytics solution, and business benefits) ● The "WHAT": Based on the data-driven insights from the predictive model, what are the recommended business actions that would lead to intended business outcomes ● The "HOW": Application of a structured Machine Learning solution approach for developing the predictive model ● Creativity and use of storytelling!

Code of Academic Conduct: http://sja.ucdavis.edu/files/cac.pdf

Faculty Profile

Sharad Gupta is an executive leader with large-scale strategy and execution background in driving business outcomes and transformations through modern data & analytics and technology innovations. He is a tech-savvy leader and is an industry-recognized thought-leader with focus on applying Data Science, Artificial Intelligence / Machine Learning, Digital Technologies, and Modern Architectures for technology and business transformations.

Sharad is currently the SVP, Chief Data & Analytics Officer, at Pediatric Associates (largest independent pediatric primary care network in the US) and Alpine Physician Partners (integrated care delivery system for seniors). In this role, he leads the overall Data & Analytics vision, strategy, and capabilities for driving business performance, growth, and value-based care transformation. Prior to this role, Sharad was the Senior Director of Consumer & Commercial IT Portfolios at Blue Shield of California (large health plan with over $20 billion in annual revenue and over 4 million members) and had the overall IT accountability for the Senior Markets, Individual & Family Plan, Specialty, Commercial Fully-Insured, and Commercial Self-Funded/ASO business portfolios. At Blue Shield, he also held positions of Director of Health Innovation Technology and Director of Enterprise Architecture, and led product innovation strategies, large-scale data & analytics & technology transformations, and built ecosystem partnerships to promote innovation and investment opportunities to better support Blue Shield's business objectives. He also spent six years at Kaiser Permanente (large integrated healthcare system) and led several large-scale technology strategies & roadmaps.

Sharad is an adjunct faculty at the UC Davis, Graduate School of Management, in the MS in Business Analytics and MBA programs and teaches Application Domains (application of advanced analytics in high-yield domains), Healthcare Analytics, and Data Design & Representation courses. These courses give students a broad understanding of the applied-side of advanced analytics and teach concepts, methods, and techniques that are used in the Data Science and Machine Learning projects for data-driven insights in various business functional domains.

Sharad has an MBA (Technology Management and Marketing) from the UC Davis Graduate School of Management and a BS in Computer Science from the National Institute of Technology, Allahabad, India.