Healthcare Analytics

Contact Information:

Instructor: Sharad Gupta

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Course Information:

Unit of Credit: 1 Unit

Quarter: Fall 2020

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 Harvard Business Publishing (noted as **[HBS]**) and links in this syllabus.

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 to solve a high-value healthcare business problem. The team project will require each team to:

- Understand and articulate the business problem and intended business outcomes
- Apply a structured analytics solution approach to develop an advanced analytics solution (Machine Learning classification predictive model)
- Based on the data-driven insights gained from the predictive model, make business recommendations for actions that deliver the intended business outcomes

Each team will submit and present their project report. Each team will be given 10 minutes (including 3 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	TBD (2.5 hours)	**US Healthcare System** 1. US healthcare system and key entities 2. Current challenges and key drivers shaping the future 3. Healthcare triple aim: patient & provider experience, care quality, and cost
2	TBD (2.5 hours)	**Advanced Analytics Framework & Machine Learning** 1. Analytics framework for applying Machine Learning 2. Advanced Analytics Process Framework 3. Artificial Intelligence & Machine Learning and business value 4. Key Machine Learning techniques: Classification and Regression **Reading Material (draft list)** *1. 5 Essential Principles for Understanding Analytics - Harvard Business Review* **[HBS]** *2. What Every Manager Should Know About Machine Learning - Harvard Business Review* **[HBS]** *3. The Artificial Intelligence for the Real World - Harvard Business Review* **[Needs VPN]**
3	TBD (2.5 hours)	**Due Assignments:** 1. Class quiz (15-min) 2. Three summary papers 3. Final project report & presentation **Machine Learning in Healthcare** 1. Key healthcare business use cases: preventive health, medical management, admin 2. Healthcare data domains and data analysis 3. Application of advanced analytics (Machine Learning) to high-value use cases **Reading Material (draft list)** *1. How a Pharma Company Applied Machine Learning to Patient Data - Harvard Business Review* **[HBS]** *2. Boosting Healthcare Payer Performance with Advanced Analytics - Boston Consulting Group* *3. Insurers Hold the Key to Healthcare's Digital Future - Bain & Company*
4	TBD (2.5 hours)	**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	15%	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?
Quiz	20%	Quiz with multiple choice questions and requiring short answers
Team Project	35%	1. Project summary report (25%) 2. Team presentation (10%) 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): ● Articulation of business problem and intended business outcomes ● Application of a structured analytics solution approach to develop the advanced analytics solution (Machine Learning classification predictive model) ● Based on the data-driven insights gained from the predictive model, proposed business recommendations to deliver the intended business outcomes ● 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 strategy and execution experience in driving innovation and technology transformation initiatives for business enablement. He is a tech-savvy leader and has deep healthcare industry experience in the payer and provider domains. He is an industry-recognized thought-leader with focus on applying emerging technologies, Artificial Intelligence / Machine Learning, Data Science, Digital Technologies, and Modern Architectures for new innovations and business capabilities.

Sharad is currently the Director of Health Innovation Product Strategy at Blue Shield of California (leading Health Plan in California with 4+ million members and annual revenue of ~$20 billion). In the current role, he is responsible for new product innovation strategies & execution, evaluation of emerging technologies, cultivating innovation culture across the enterprise, and building external partnerships to promote innovation and investment opportunities to better support Blue Shield's business growth, transformation, and innovation objectives. Prior to this role at Blue Shield, he was the Director of Enterprise Architecture and led the enterprise architecture program, technology strategy, multi-year implementation roadmaps, and architecture blueprints for the delivery of new digital capabilities and large business transformation initiatives.

Sharad is a lecturer at the UC Davis Graduate School of Management in the Master of Science in Business Analytics (MSBA) 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.

GETTING GSM CAMPUS READY
BAY AREA PROGRAM - COVID SAFETY PROCEDURES

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Keeping our community safe and healthy will require patience, consideration and empathy. Welcome back to campus for a unique year. We are in it together and are here for you!

BEFORE YOU ARRIVE AT THE BAY AREA CAMPUS

Please assess how you are feeling. **DO NOT COME TO CAMPUS IF YOU ARE NOT FEELING WELL.** Err on the side of caution. Your professors and organization leaders will not penalize you for staying home.

symptomsurvey.ucdavis.edu

While on campus and in the building, we expect you to follow these guidelines:

- Wear a face covering at all times.
- Maintain social distancing of six feet from other individuals.
- A Daily Symptom Survey (CAS login) which you can complete via a smart phone and is required to be on campus.
- Wash your hands frequently and use sanitizer. The GSM is providing several hand sanitizer stations located throughout the building.
- Stay home if you are sick.
- Employees and students must report a COVID-19 diagnosis for themselves or someone with whom they share a residence. To report a positive case or concern, email reportcovid@ucdavis.edu. You may also visit the Campus Reporting website for more information.

If the GSM is allowed to reopen the building and hold in-person classes, you can expect the following in addition to the guidelines above. Entrance will only be allowed at the front of the building and the building will be closed to the public.

As community members enter the Bay Area campus at Bishop Ranch 15 Suite 190, you will be “screened” by staff at the front. Please allow plenty of time, as we expect lines. The screening will include:

- A temperature check. Those with a temperature of 100.4 or higher will not be allowed into the facility.
- A “screened” sticker for you to wear while in Bay Area Campus.

All guidelines follow Campus Policy 290-01. While in the building, please follow the safety signage posted throughout the building. Signage has been placed for your safety. We appreciate your cooperation to keep yourself and others safe. If you have any questions or concerns about COVID Safety procedures and protocol, please contact: **Christina Sanchez (chrsanchez@ucdavis.edu)**
Director of Project & Instructional Resources
530-574-7438 (cell)

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