Friday, July 26, 2024

**HAP 786 Workshop in Health Informatics**

**Department of Health Administration & Policy**

**College of Public Health**

**George Mason University**

**Description**

Links material learned in the informatics courses with industry needs. Students work on a common challenge/problem in health informatics that can be addressed with material covered in the core courses of the program. All students work on the same problem in small groups of 2-3 people. The instructor has arranged access to data, and lectures on solutions to the problem. Students are expected to implement the solution, reports its performance, and communicate their findings.

**Pre-requisite**

HAP 671 or an equivalent course in Structured Query Language HAP 618 or an equivalent course in Python HAP 672 or an equivalent course in health data standards. The course must be taken prior to taking HAP 792 Practicum. It is your responsibility to check that you meet these prerequisites and you will receive a failing grade, even if you complete all assignments, and do not meet the prerequisites.

**Course Objectives**

Upon completion of the course, one will be able to:

1. Analyze current priorities of Chief Information Officers and other industry experts, using web data and hiring patterns
2. Communicate clearly (in text and video) how the student’s preparation meets industry priorities, using the web
3. Analyze project tasks: duration of tasks, and relationships among tasks.
4. Analyze correspondence between project tasks and available resources and time 5.
5. Demonstrate mastery of core health informatics skills, including coding, data stewardship, data preparation, and data analysis
6. Demonstrate ability to manage team conflict
7. Demonstrate ability to decide among alternative methods of analysis
8. Analyze data using data mining or other statistical tools
9. Evaluate findings in ways that are easily understood by persons without statistical background
10. Implement a web-based solution reporting statistical findings to individual web-users, including explanation of limitations of the online decision aid
11. Present results and findings using visual media.

**Topics**

1. [**Register for Data**](http://openonlinecourses.com/786/AllofUsProjectRegisteration.html)
2. [**Industry Needs**](http://openonlinecourses.com/786/Industry%20Needs.html) & [**Common Challenge**](http://openonlinecourses.com/786/Response%20to%20Antidepressants.html)
3. [**Introduction to Industry**](http://openonlinecourses.com/786/Introduction.html)
4. [**Create Database**](http://openonlinecourses.com/786/AllofUsProjectDatabase.html)
5. [**Analyze Mismatch**](http://openonlinecourses.com/786/Analyze%20Response%20to%20Antidepressants.html)
6. [**Remove Algorithm Bias**](http://openonlinecourses.com/786/Remove%20Algorithm%20Bias.html)
7. [**Actionable AI Advice**](http://openonlinecourses.com/786/Remove%20confounding.html) **& Patient Follow Up**
8. [**Report Progress**](http://openonlinecourses.com/786/Progress.html)& [**Presentation**](http://openonlinecourses.com/786/Project%20Presentation.html)

**Assignment to Semester Long Course Project**

You are asked to contribute to an AI system for management of depression. This system has many components: three of which are intake, advice, and coordination of care. You are asked to contribute to two of these components. There are 2 projects in the course. You participate in the project in teams of 2 people. You are assigned randomly to teams. Teams sign for assignments and provide a plan (tasks and completion dates) for their work to project managers. Provide a detailed schedule of your plans to the project management team. This schedule should describe the sub-tasks for each activity, such as gathering of data, analysis, and reporting. Each task should have a duration, task dependencies, and completion dates. Project managers will hold you to the dates you have proposed. You must complete all tasks on time. Then, carryout the plan and produce the needed findings.

The project management team is composed of students who are in the concentration for management of health informatics.  The project managers do not do the same work as students in the data analytics track. Project managers ask other teams in the class about their plans; and when the team will produce their findings. Project managers review the proposed dates to see that they are spread over the entire semester and that they reflect interdependencies among the activities and tasks. Then, they follow the teams to check on their work, monitor their progress, adjust plans, and solve problems the team is facing.  Project management team verifies that other teams have worked independently and the findings from two independent analysis is the same, thus accurate.  They verify that the output of analysis is in the format needed by the teams working on modification of feedback. Project managers are evaluated by the degree to which teams that they manage produce the desired output on time and accurately. Project managers present the progress of the entire class to the instructor on a weekly basis.

The entire class is completing one project, each team is completing different components of the same overall project. All assignments require data analysis and coding.

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| **Assignment** | **Data Source & Notes** |
| Project Mgmt (required from students in management track) | Collect tasks and schedules from other teams. Make sure that team assignments are not overlapping and cover all topics. Make sure that team members complete all assigned work on time and correctly. Students participating in these two teams must have completed course work on project management. See instructor for waiver of other assignments, if you are selected to do this assignment. |
| Common AI Challenge: Intake | Follow pre-designated description of patients, interact with the AI system following general rules for style of interaction. Verify that your response to the AI system retrieves the desired medical history information. Identify errors in the system for your portion of intake. Check that the system addresses digressions and arrive at a prompt which is more likely to do so. Communicate findings to programmers using standardized feed forward forms approved by instructors. |
| Analyze Mismatch between language and machine learning models | For 10 independent variables that predict response to antidepressants, impute the value of the independent variable when it is unreported or missing. Construct 10 regression, each predicting a different response variable, and identify what illness, procedure, or medication codes would predict the independent variable. The data for this analysis comes from All of Us. Standardized and approved forms should be used to provide output of your 10 regressions. This analysis is not restricted to any particular subgroup or minority group populations and is done on the entire population. |
| Remove Algorithm Bias | For one racial, ethnic, gender, or age subgroup, remove biases in assessment of response to treatment. The data source is All of Us database. Analysis should identify existence of bias and provide remedies. Standardized and approved forms should be used to provide output to teams working on feedback. |
| Actionable AI Advice | Verify accuracy of feedback. Identify errors in listing of summary of medical history. Redo feedback calculations to take into account imputed independent variables. Identify errors in providing feedback on top 3 recommendations. Correct errors in python code. |
| Follow-up | Create follow-up surveys that collects patients’ self-reported depression symptoms. Automatically analyze the data to identify depression severity and duration. Create web site to report the data automatically. See instructor for waiver of other assignments, if your team completes this assignment. |

# Students' Evaluation

1. **Attendance (10%):** This is a workshop, essentially time set aside for you and other team members to work together. There are no lectures. There is only lab session, lasting 2 hours and 45 minutes each week. You are required to attend for the entire scheduled time every week. If you miss a session, you are required to put in equivalent time into the teamwork. You are required to schedule a time with your team-members during the 2 weeks following your missed session.
2. **Linked-in® Assignments (20%):** These assignments include:   
   * (a) creation of your page (includes smiling professional image, describes projects that confirm your skills in python, R, SQL, describes your educational accomplishments, describes your past or current employment, etc.),
   * (b) provision of feedback to 3 other students on their page (copy the instructor regarding the feedback you are providing),
   * (c) identification of 3 individuals that are likely to hire you (international students should identify 3 individuals that belong to organizations that hire international students) and description of the skill set they need,
   * (d) creation of 2 posts on your page that increases traffic to your page,
   * (e) joining 2 professional groups on LinkedIn®, and
   * (f) responding to a professional post on LinkedIn® in a manner that increases your network.

At end of the course, you are asked to provide image evidence that you have taken the steps (a) through (f).

1. **Semester Long Project (50%):** You are required to complete 2 assignments related to semester long project. You complete this work in teams. The details of your assignment are set by the instructor and may differ from the work of other teams. No two students should work on more than one assignment together. Students select 2 out of the following 5 assignments, each 25% of the grade. Assignments are carried out individually in each team. Then team members check the accuracy of their work against each other’s results. Once a consensus model is created then the findings are reported to intake and feedback teams in standardized format set by the intake and Actionable AI Advice teams. :
   * Common AI Challenge: Intake (20%)
   * Analyze Mismatch between language and machine learning models (30%)
   * Remove Algorithm Bias (0%)
   * Actionable AI Advice (0%)
   * Patient Follow-up (0%)

There should be no complaints about you. All team work must be done on a timely basis and verified. For every verified complaint about your participation in the team or for every week of delay in delivery of your work, you lose 10% of the grade for that assignment.

1. **Exam (0%):** There are no exams in this course.
2. **Presentation and Communication (20%):** Students are expected to complete work on a timely basis (as reported to project managers). Students’ final presentations should be clear, correct, posted to the web, and engaging, with the emphasis on engaging.

**University grading policies**

This course follows university grading policies.

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| A | 4.00 | 94-100% |
| A- | 3.67 | 90-93% |
| B+ | 3.33 | 87-89% |
| B | 3.00 | 83-86% |
| B- | 2.67 | 80-82% |
| C | 2.00 | 70-79% |
| F |  | 69% and below |

# Honor code

This is an experiential course, where you learn by doing things. You are asked to collaborate with others and other students participate in your grading. It is not OK to copy paste a team member’s code. You must work independently, even when part of a team. You are to present your work to your team first, then work on creating a consensus approach. You are asked to inform project managers when you are starting on your project and when you presented your independent work to team members. Be on time, productive, and supportive in your team. If one member of the team does not work well with you, report the issues to project managers and ask for a remedy. For example, project managers can waive the creation of consensus model, if one member of the team is late.

“To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code: Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work” (George Mason University Catalog, 2006-2007, p. 31).

# Individuals with Disabilities

George Mason University is committed to complying with the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 by providing reasonable accommodations for disabled applicants for admission, students, applicants for employment, employees, and visitors.

Applicants for admission and students requiring specific accommodations for a disability should contact the Disability Resource Center at 703-993-2474, or the Equity Office at 703-993-8730.