QMM1: BSDMDA Capstone Topic Approval and Release Form

Data Management and Data Analytics Capstone Topic Approval Form

The capstone challenges students to integrate skills and knowledge from several program domains into one project. The guidelines for this capstone course require you to demonstrate the application of academic and professional abilities developed as an undergraduate student in the BSDMDA program. It is highly recommended that the topic of your capstone be about resolving a current or perceived business problem. Your research topic should exemplify scholarship and research at the highest level and should be significant enough that it would help potential employers identify your abilities. It is also recommended that you use publicly available datasets for transparency and external validity.

This document is designed to help you clearly state the research question you will be exploring in your capstone project, the scope of your project, and your timeline in order to ensure that all of these align with your degree emphasis. Without clearly defining each of these areas, you will not have a complete and realistic overview of your project, and it cannot be accurately assessed whether your project will be acceptable for this capstone course.

If your project is one you have already completed at work or elsewhere, this document should be easy to fill in. Many students do use a project they have already completed in the past. In that case, you will write the proposal as if the project has not been completed yet, and when you report on your project, you will use your complete after-implementation report. If you have not yet completed your project, this document can help ensure the scope is within the acceptable range for this capstone. A course instructor must approve this form before you submit this task for evaluation. The task will not be evaluated without a course instructor's signature. The course instructor may ask for additional information before approving this form.

Before submitting this form for approval, please remove all italicized directions in the form.
Please only submit a Topic Approval Form that has been signed by a course instructor for evaluation.

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Capstone Topic Approval Form

Student Name: [redacted]

Student ID: [redacted]

Capstone Project Name: Automate Insurance Premium Prototype

Project Topic: Car Insurance Premiums

Research Question: Using a dataset of 1000 car insurance claims, I would like to build a prototype including functions that would take in a simulated new customer application and indicate potential premium. Included in this project will be a Machine Learning model that will predict cost associated with claims for the purpose of determining profitable premium

Hypothesis: Machine learning and AI can be used to automate insurance premium calculations

Context: Most insurance companies rely on underwriters who have proprietary and complicated formulas and processes for analyzing risks. This is often a time intensive process which leaves customers waiting for extended periods of time to find out insurance premiums. What I would like to do is create a function that would provide an instant indication or estimation of premium based on a form submission. Although this would be an estimate only, it would give prospective customers some idea of the premium cost. I believe this would be beneficial to insurance companies. The option of an instant estimate would be an advantage over competitors and likely draw customers to the company and increase brand exposure in the market.

Data: *insurance_claims.csv*

This dataset contains 1,000 automotive claims. Each claim is detailed with many variables related to the insured including how long they were a customer, age, and location as well as details related to the policy and claim including premium amounts, deductible, repair costs, year/make/model of vehicle, incident_type, and severity.

This data was downloaded from a public repository and made available for data analytics projects on Kaggle.

Data Gathering: All data that will be needed will be supplied in insurance_claims.csv. Additional data will be supplied from the customer as an input to the function that performs the premium indication.

Data Analytics Tools and Techniques: I will use a combination of statistical testing and Machine Learning/Predictive Modeling to assess each indication request

Justification of Tools/Techniques: *S*tatistical Testing can be used to relationships between different variables. For instance, to determine if there is a correlation between age and claim amounts. Machine learning will be used to build a model that will predict potential claim cost and determine an appropriate premium.

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Application Type, if applicable (select one):

☐ Mobile
☐ Web
x Stand-alone

Programming/Development Language(s), if applicable: Python
Operating System(s)/Platform(s), if applicable: Jupyter Notebook
Database Management System, if applicable: N/A

Project Outcomes: The key outcome for this project is a collection of functions that can be used to make an instant premium indication along with documentation and statistical findings in a Jupyter notebook

Projected Project End Date: [redacted]**2023**

Sources: Shah, B. (2018, August 20). *Auto insurance claims data*. Kaggle. https://www.kaggle.com/datasets/buntyshah/auto-insurance-claims-data

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Human Subjects or Proprietary Information

Does your project involve the potential use of human subjects? (Y/N): N
Does your project involve the potential use of proprietary company information? (Y/N): N

[redacted]

STUDENT SIGNATURE

By signing and submitting this form, you acknowledge that any cost associated with the development and execution of your data analytics solution will be your (the student) responsibility.

TO BE FILLED BY A COURSE INSTRUCTOR

COURSE INSTRUCTOR SIGNATURE:

Jim Ashe, Ph.D. Mathematics

COURSE INSTRUCTOR APPROVAL DATE:

Friday, [redacted] 2023

Project Compliance with IRB (Y/N): Y