



2024-2025

PFE Internship Book

Data Science Department



About Us

At **MASS Analytics**, we specialize in Marketing Mix Modeling (MMM) and Media Effectiveness Measurement. We offer our clients a comprehensive MMM software suite supported by a wide range of managed services solutions to help identify their sales drivers, measure MROI and optimize Marketing budgets.

Why Join Us?

At **MASS Analytics**, we value a positive work environment made up of all of the elements that can affect your day-to-day productivity, including when, where, and how you work. Join a fun, collaborative, and creative workplace.



TOPIC 1

Genetic Algorithm For Multi-Objective Optimization

The Decomposition Root Sum of Squared Distance (DECOMP.RSSD) function quantifies the discrepancy between the effect share of a selected variable and its share of spend, aligning closely with business logic.

This project focuses on developing a new objective function for genetic algorithms (GAs) and integrating it into the primary Automodeller algorithm in MassTer.

The goal is to enhance the existing bi-objective GA by adapting it into a multi-objective framework. This enhancement will allow users to select any number of objectives (two or more) and execute the algorithm, enabling more flexible and robust model optimization.

Main Competencies

- Experience with Evolutionary Algorithm and Regression Analysis
- Experience with mathematical modeling problem and muti-objective optimization
- Experience with Java coding
- Excellent research and analytical skills.
- Excellent writing and presentation skills.

Learning Outcomes

- An understanding of the GA algorithm and its application to muti-objective problem.
- The ability to implement new objective functions related to MMM and integrate it with muti-objective model.
- Evaluate the performance of the muti-objective genetic algorithm in terms of pareto set.

TOPIC 2

Reinforcement Learning In Regression Models

This project explores the integration of reinforcement learning (RL) principles into regression modeling, aiming to enhance the model's adaptive capabilities for dynamic and complex data environments.

This project will conduct an in-depth exploration of existing RL techniques and evaluate their suitability for regression tasks, focusing on creating a framework that adapts to new data and optimizes predictive accuracy.

Main Competencies

- Develop a comprehensive understanding of reinforcement learning principles and investigate how they can be applied to and enhance regression modeling.
- Assess the performance of RL-enhanced regression models, using both traditional and adaptive metrics to evaluate accuracy, adaptability, and reward optimization.
- Experience with Java coding and Python
- Excellent research and analytical skills.
- Excellent writing and presentation skills.
- Conduct rigorous testing on real-world datasets, evaluating the model's ability to continuously learn and adapt.

Learning Outcomes

- Acquire specialized knowledge in combining reinforcement learning with regression
- Demonstrate the ability to develop and refine regression models that respond adaptively to new data inputs, learning from feedback and improving prediction quality over time.
- Gain proficiency in designing experiments and evaluations to compare RL-enhanced models with traditional regression

TOPIC 3

Long-term effects in MMM Using Error Correction Models (ECM) and Log Linear Approaches

This project investigates the measurement of long-term effects in marketing mix modeling by applying Error Correction Models (ECM) and generalizing them within a log-linear framework. It aims to capture both short-run and long-run impacts of media and other variables, reflecting the sustained influence of marketing activities. Expanding on traditional ECM applications, this project will explore how log-linear ECM structures can better quantify interactions and allow for more nuanced, multiplicative interpretations of relationships. The project also examines cointegration and model stability within ECMs, assessing their suitability for dynamic marketing data with continuous fluctuations.

Main Competencies

- Develop a comprehensive understanding of Time Series Analysis, ECM, and Cointegration Techniques
- Experience with log-linear regression and understanding of multiplicative effects in modeling
- Proficiency with R or Python for econometric modeling
- Experience with Java coding
- Strong analytical and research skills
- Excellent writing and presentation skills

Learning Outcomes

- An understanding of ECM and its applications in long-term impact measurement
- Gain the ability to adapt ECM to a log-linear framework and assess its impact on model interpretation
- Evaluate model performance over time, comparing traditional and log-linear ECMs in capturing sustained effects
- Learn to design empirical tests to validate long-run and short-run relationships within a marketing mix

TOPIC 4

AI-Driven Solution For RFP Responses Automation in Marketing Mix Modeling (MMM)

AI-based chatbots are computer programs that use AI techniques to interact with users through text or speech-based conversations. These chatbots are trained on large datasets and can learn from user interactions to improve their performance over time.

This project is about developing an AI-driven solution to automate the process of responding to Request for Proposals (RFPs) in the field of Marketing Mix Modeling (MMM). By leveraging a trained model based on an existing database, the system will be based on NLP techniques (potentially using ChatGPT or other advanced tools) to accurately interpret RFP questions related to MMM and generate contextually relevant responses.

Main Competencies

- Organize a structured database of past proposals that includes MMM methodologies, performance metrics, and analytical case studies to inform the model
- Implementation of machine learning models that learn from historical MMM responses, optimizing output to reflect industry-specific insights and data-driven approaches.
- Develop machine learning models that learn from historical MMM responses, optimizing output to reflect industry-specific insights and data-driven approaches.
- Excellent research and analytical skills.
- Excellent writing and presentation skills.

Learning Outcomes

- Gain experience on the best practices in using AI based chatbot for marketing mix modeling.
- Develop the ability to evaluate the AI system's performance, making data-driven improvements based on real-world RFP scenarios in MMM.
- Gain a thorough understanding of Marketing Mix Modeling concepts, including attribution models, budget allocation strategies, and effectiveness measurement.



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