Research Assistant - Forecasting and Scenario Analysis



Role Description

GRADE

Grade 4

LOCATION

Craiglockhart, Edinburgh

LINE MANAGER

Professor and Associate Dean Research and Innovation - Maxwell Chipulu

Project Overview:

The Bicycle Association (BA)'s Market Data Service (MDS), was established in 2020 using UK cycling consumer sales data gathered from c70% by value of retailers, informs advocacy and member decisions.

Following a 2024 platform upgrade moving all the data into the cloud via Snowflake and with a new user dashboard in Amazon QuickSight, the BA aims for global expansion via partnerships with trade associations in other markets.

In December 2024, the BA, in partnership with ZIV, the German cycling trade association, and Edinburgh Napier University (ENU) secured a grant from EIT to develop its MDS in Germany, as an operating proof of concept to scale it across multiple markets.

Led by ENU, this project will integrate predictive analysis of historical sales and stock data into the MDS to enhance cycling products supply chain optimisation.

Role Summary:

As Research Assistant, you will be tasked with developing a forecasting and scenario analysis tool for bicycle product stock control.

This role will use historical sales and stock data in Amazon Quicksight, as well as other complementary and available data sources like weather, to optimise inventory management for users within the context of market stock and demand.

The work involves the full project lifecycle, from research and model development through to implementation and user support. It requires a solid analytical background, skills in data cleansing, manipulation and statistical modelling, and experience with cloud platforms like Snowflake and dashboard solutions like Amazon Quicksights. Collaboration with BA and ZIV project leads and Data Science teams, as well as MDS stakeholders, including MDS users, will be key to understanding needs and delivering a solution that helps decision-makers set optimal stock levels based on predicted sales across different demand scenarios.

Led by Edinburgh Napier University (ENU), this project will integrate predictive analysis of historical sales and stock data into the MDS to enhance cycling products supply chain optimisation.

Line Management Responsibility for:
This role does not have any line management responsibilities currently.

Main Duties and Responsibilities

- **Requirement Gathering and Analysis:** Partner with stakeholders to thoroughly understand available data, their forecasting needs, challenges in current data quality and stock control processes, and desired functionalities of the tool, with additional focus on how scenario analysis based on varying demand forecasts can inform stock holding decisions.
- **Forecasting Model Development:** Research, develop, and implement appropriate statistical and machine learning forecasting models (e.g., time series analysis, regression models, machine learning algorithms) to generate reliable demand forecasts, not only for specific segments of bicycle products but also by applying cross-category associations to enhance predictive accuracy.
- **Stock Holding Level Optimisation Integration:** Develop mechanisms within the tool to translate the low, medium, and high forecasted demand scenarios into communicable, actionable insights for determining appropriate stock holding levels under different potential future outcomes. This may involve incorporating cost considerations, lead times, risk profile and service level targets for each scenario.
- **Tool Development and Integration:** Develop an intuitive tool or integrate the forecasting and scenario analysis capabilities into existing systems, ensuring seamless connectivity with Amazon Quicksight and other relevant data sources. The user interface should clearly present the low, medium, and high

demand forecasts and their implications for recommended stock levels under each scenario.

- **Validation and Testing:** Rigorously test and validate the accuracy and reliability of the forecasting models and the scenario analysis tool's ability to inform effective stock holding decisions across the range of low, medium, and high demand estimates.
- **Documentation and Training:** Create comprehensive documentation for the tool, including methodology, user guides explaining how to leverage the three-point demand scenarios for stock holding decisions, and training materials. Provide training and ongoing support to end-users.
- **Performance Monitoring and Improvement:** Continuously monitor the performance of the forecasting models and the tool, particularly its impact on stock holding efficiency and accuracy across different demand scenarios, identifying areas for improvement and implementing necessary updates and enhancements.
- **Collaboration and Communication:** Effectively communicate progress, findings, and challenges to stakeholders through clear presentations and reports, specifically highlighting how the tool supports better stock management decisions based on the three-point demand forecast scenarios. Collaborate with the Bicycle Association and Mesosys Data Science team on best practices and knowledge sharing.

General:

- Travel between Edinburgh/Cambridge/Germany
- Communication with Bike Assoc.
- Work independently and be self-managing and self-motivated
- Role model the University's values & behaviours.
- Be responsible for ensuring that the information and records processed (received, created, used, stored, destroyed) on behalf of the University are managed in compliance with all applicable legislation, codes and policies e.g. Data Protection, Information Security and Records Management.

PERSON SPECIFICATION

	ESSENTIAL	DESIRABLE
Education / Qualifications		
• Masters in a quantitative field such as Analytics, Operational Research, Computer Science, Data Science, Statistics, Mathematics, or a related discipline.	✔	
• PhD degree in a quantitative field		✔
Skills / Experience		
• Experience in developing and implementing forecasting models, ideally with a focus on their application in inventory management or supply chain optimisation.	✔	
• Strong understanding of the forecasting process, statistical forecasting techniques (e.g., ARIMA, Regression, and Exponential Smoothing), judgemental forecasting and ideally experience with machine learning algorithms for time series forecasting (e.g., Prophet, Ensemble methods, Joint Time Series Modelling, etc).	✔	
• Knowledge of forecasting accuracy testing and model validation techniques.	✔	
• Proficiency in data manipulation and analysis using languages such as Python (with libraries like Pandas, NumPy, Scikit-learn, Prophet) or R.	✔	
• Experience in designing and developing user-facing tools or integrating analytical models into existing systems (e.g., using Python Software Development Kits) with a focus on presenting insights for decision-making based on different forecast scenarios.	✔	
• Strong analytical and problem-solving skills with the ability to interpret complex data and convert them into actionable recommendations for stock holding levels based on the low, medium, and high demand scenarios.	✔	
• Excellent communication and presentation skills, with the ability to clearly explain technical concepts and the implications of forecasts and scenarios to both technical and non-technical audiences, particularly in the context of stock management under varying demand.	✔	

	ESSENTIAL	DESIRABLE
• Ability to work independently and collaboratively within a dispersed, remote team environment.	✔	
• A proactive and results-oriented approach with a strong attention to detail and a focus on delivering practical solutions for business needs.	✔	
• Experience with stock control and inventory management principles and best practices.		✔
• Familiarity with supply chain planning and inventory control systems.		✔
• Hands-on experience working with cloud-based data warehouses, specifically Snowflake, including writing SQL queries for data extraction and manipulation.		✔
• Experience with data visualisation tools (e.g., Amazon Quicksight, Tableau, Power BI) to effectively communicate the three-point forecasts and their implications for stock levels.		✔