VUSAL BABASHOV

DATA SCIENCE & ADVANCED ANALYTICS

CONTACT

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PROFILE

Applied research scientist with expertise in **operations research** and **machine learning** aiming to contribute to success of the organization by optimizing the decisions and improving the efficiency using advanced analytics.

EDUCATION

2021 (Completed)
UNIVERSITY OF OTTAWA [OTTAWA, ON]
PhD in Management (Analytics)

2012
WESTERN UNIVERSITY [LONDON, ON]
MSc in Biostatistics (Health Economics)

2010
UNIVERSITY OF PITTSBURGH [PITTSBURGH, PA]
MSc in Industrial Engineering

2007
QAFQAZ UNIVERSITY [BAKU, AZE]
BSc in Industrial Engineering

DATA SCIENCE PROJECTS

Loan Classification | GitHub

- Built an imbalanced loan classification model using **Logistic Regression, Random Forest and LightGBM** classifiers in Python to determine whether an applicant is eligible for mortgage.
- Demonstrated superior performance of the **Random Forest Classifier** through nested-cross validation and showed **52%** improvement compared to **baseline Dummy classifier** using the **ROC-AUC** score.

House Prices Prediction | GitHub

- Developed predictive models using **Python** with **Random Forest, LightGBM and Xgboost** methods to predict the price of house given house and sale characteresics.
- Using **nested-cross validation**, demonstrated that **LightGBM** the best model and it results in **32%** improvement in **MAE** compared to **baseline OLS Regression** model following the feature engineering and hyper-parameter tuning.
- Generated predictions on unseen features using the **LightGBM** model and saved them to **SQL database**.

EXPERIENCE

2015 - 2021
Research Scientist | Telfer School of Management, U of Ottawa

Setting Wait Time Targets in a Multi-Priority Patient Setting

- Developed a **convex optimization** model using **simulation, deep neural network** approximation, and **linear programming** using **Python** to determine optimal targets in a case study for rheumatology clinic leading to a reduction of **30%-60%** in total cost of waiting and overtime.

Dynamic Advance Patient Scheduling with Follow-up Visits

- Demonstrated **500%** improvement in average daily costs compared to current clinical practice (i.e., Myopic policy) by developing **Reinforcement Learning - Markov decision process (MDP)** model in **Java** to optimize scheduling decisions in a case study for an endocrinology clinic.

Predictive Framework for Drug Formulary Decisions

- Built a **multi-criteria decision analysis** model in **R** to sort and classify alternatives along a set of criteria given decision maker's preferences and illustrated the **UTADIS^{GMS}** method to **streamline the decision-making process** in a case study with oncology drugs.

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MANAGEMENT SKILLS

- Leadership
- Project Management
- Coaching
- Problem Solving
- Git/Github

TECHNICAL SKILLS

- **Machine Learning**: scikit-learn, xgboost, lightgbm, keras. statsmodels
- **Operations Research:** Linear/Integer Programming, Markov Decision Process (Gurobi, Cplex)
- **Programming:** Python, R, SAS, SQL (SQLite, PostgreSQL), Java, Jupyter, LaTeX
- **Data Visualization**: Tableau, Matplotlib, Seaborn
- **Time Series Forecasting:** Arima, Exponential Smoothing
- **Big Data Technologies/Cloud:** Azure, Databricks
- **AutoML:** DataRobot

EXPERIENCE (Cont'd)

Instructor/ Lecturer | Telfer School of Management, U of Ottawa

- **Business Analytics** (2018, 2019)
- **Business Forecasting Analytics** (2020)

Note: Lectured BCom students on fundamentals of **mathematical (e.g., linear, integer) programming**, **decision–tree models** and **time series forecasting** models including but not limited to Arima and Exponential Smoothing.

Analyst, PhD Internship | Currency Department, Bank of Canada

Banknote Demand Forecasting

- Implemented classical time series, **random forest** and **deep neural network** models in **Python** and **R** to forecast the banknote demand by each denomination and region to ensure right amount of bank notes in the right place at the right time.
- Proposed a forecasting model for production that showed approximately **15%** improvement in MAE compared to the seasonal naïve approach.

2012 - 2014

Health Economist | Health Quality Ontario | Pivina Consulting Inc.

- Developed an **economic model** to inform a policy decision for funding of MRI-guided high intensity focused ultrasound treatment in Ontario by the Ministry of Health.
- Built **cost-effectiveness, budget impact and survival analysis** models for medical products to support pharmaceutical companies for regulatory/reimbursement approval and market authorization in Canada.

2010 - 2012

Research Assistant | Biostatistics, Western University

Economic Evaluation of brentuximab vedotin for persistent Hodgkin lymphoma

- Developed a **Markov-Decision Tree** model to evaluate lifetime costs and benefits and perform **cost-effectiveness analysis** for brentuximab vedotin using a survival analysis resulting in an incremental cost-effectiveness ratio of $164,248 per quality adjusted life years.