ELIJAH CAVAN, MSC.

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RECENT PROFESSIONAL EXPERIENCE

R & D Fellow

Pittsburgh Pirates

June 2022 – Nov 2022 Pittsburgh, PA

Technologies: R-shiny | Regression | Tracking Data

- Develop R-Shiny app to display the 3D Batpath of Hitters
- Apply Cronbach alpha regression to normalize batter swing stats on a per swing basis
- Develop ML models to describe the feature importance of various features using historical MLB draft data
- Created a python package to summarize 100s of lines of code, and be easily run by peers who are weaker with programming

Sports Statistician

Stathletes

Oct 2021 – May 2022 Burnaby, BC

Technologies: R | Sci-kit Learn | Monte Carlo sim | Bayesian stat

- Develop Empirical Bayesian-Monte Carlo (MC) simulation algorithms by hand; used to develop a betting model to predict success in the 2022 NHL playoffs (6/8 for the first round).
- Leverage unsupervised machine learning to cluster players and develop new ways to classify players based on their play type and value to the team.
- Leverage Supervised Learning techniques to develop features which increased the success of the MC simulations.
- Wrote production level python code which was used to create a R-Shiny dashboard displaying metrics on pulling the goalie.

Data Scientist

Backr

October 2020 – April 2021 Kingston, ON

Technologies: GCP | Git | Dash | Keras | Tensorflow

- Leverage Google Cloud Storage and Google Big Query to work with large data sets including millions of YouTube comments.
- Create and present customized python dashboards using a specialized plotting library (Plotly & Dash) for professional clients. Offer strategies based off key insights from the data.
- Develop several algorithms to prioritize contents for clients leading to 15% increease in user retention.
- Develop a full production Neural Net using Keras (Tensorflow is used to optimize parameters) to predict customer churn rate.
- Participate in weekly code reviews, maintain professional quality code with comments, and leverage version control with git.

EDUCATION

Bsc. Mathematical Physics

University of Waterloo

Sept 2013 – Mar 2017

Specialization: Astrophysics B

Msc. Mathematics

Wilfrid Laurier University

Sept 2017 – Jan 2019

Specialization: Dynamical Systems A-

Msc. Statistics

Simon Fraser University

Sept 2021 – Jan 2023

Specialization: Sports Analytics A

TECHNICAL SKILLS

Python	●●●●●
Maple	●●●●●
SQL	●●●●●
R	●●●●●
Machine Learning	●●●●●
Mathematical Modelling	●●●●●
Excel	●●●●○
Spark	●●●○○
GCP	●●●○○

AFFILIATIONS

- SABR (Society For American Baseball Research)
- Waterloop (UWaterloo Hyperloop Challenge)
- BMUCO (Blackbeam United Cosmos Organization)
- CDL (Creative Destruction Lab)
- AQ (Associate Quantum)
- SAG (SFU Sports Analytics Group)
- <Phys|Club> (UWaterloo Physics Club)
- PI (Perimeter Institute)

TOP PERSONAL PROJECTS

Note: The repositories for my major projects are accessible through my GitHub or my through links on my Website.

NFL Big Data Bowl Grand Winner

NFL Competition

Sept 2021 Burnaby, BC

- Grand Winner in 250+ team challenge to leverage large data to develop strategies to optimize special teams in the NFL.
- Applied a Random Forest Conditional Density estimation model to create a "Return Yards above Expected" metric which was used to evaluate players. My results were sent to the NFL and were used to consider different rule strategies the league could enforce to limit injuries.
- Create short videos (gifs) using python to visualize results in a dynamic way.
- Communicate results in a PowerPoint presentation aimed at the level of a coach/general manager.

Quantum Computing Bootcamp

Creative Destruction Lab

July 2021 Toronto, ON

Technologies: Qiskit Julia Optimization NLP

- Participated in quantum computing boot camp consisting of 120 hours of lectures from professionals in the field focusing on applying quantum technology and optimization techniques in the real world.
- Solved challenges in cohort projects comparing classical algorithm to the quantum version- such as Quantum NLP, Molecule simulation, traveling sales person problem. Leverage SDKs such as Qiskit, Penny Lane, DWAVE, IonQ to run experiments on real quantum computers and simulators. Finished top 3 solution in 3/4 Cohort projects weeks.
- Focused on both technical and business aspects for each project. Developed PowerPoint presentations and Read-Me docs to explain the solution to a general audience.
- Finished 4/25 teams for the 3 day Hackathon, used three different quantum SDKs to build quantum inspired sports betting algorithms and Fantasy Sports lineup optimization.

2022 Student Research Challenge

Society of Actuaries

Mar 2022 Burnaby, BC

Technologies: Forecasting Risk Analysis Stochastic Processes

- Participated in an international challenge to develop strategies to optimize return on investment from simulated soccer statistics and country economies.
- Developed a player modelling using linear mixed effects to adjust for league scoring environment. Projected player performance multiple years into the future using a Churn model.
- Developed Monte Carlo simulations to estimate win probability in a tournament of teams. Created algorithms to optimize the players on our team under fixed budget constraints while maximizing the win-probability.
- Wrote a 30+ page business plan outlining recommendations and optimal strategies.

LIFE QUOTE

“When Euler died, he simply said I am finished and collapsed, to which someone in the audience muttered darkly ’Another conjecture of Euler is proved’ " — Paul Erdos
""I can calculate the movement of the stars, but not the madness of men" - Isaac Newton

SELECT PUBLICATIONS

- E. Cavan, I. Haranas, I. Gkigkitzis, and K. Cobbett, “Dynamics and stability of the two body problem with Yukawa correction” (2020)
- E. Cavan, C. Stoica, “Stability of regular polygon solutions in n-body problem with logarithm potential” (2018)
- E. Cavan, I. Gkigkitzis, I. Haranas, ”A Model for Massless Gravitons in Radiation and Matter Dominated Universes” (2020)

RECOMMENDATIONS

"...is never daunted by new challenges and uses his creativity and resourcefulness to accomplish his tasks"

"...has stood out with his first-class creative-thinking, attention-to-detail, and productivity"

"...strong technical skills, excellent communication abilities, and overall strong work ethic"

"...He is extremely dedicated, passionate, and intelligent... Elijah’s individual work has been well recognized around the world"

"...went above and beyond expectations and was an excellent addition to our team."

"He has an uncanny ability to map the world into mathematics and code, leveraging a multidisciplinary toolbox to overcome barriers"

AWARDS

- Randy Sitter Graduate Scholarship
- Tom Bertzi Campus Citizen Nominee
- Graduate Entrance Scholarship
- Graduate Work-Study Fellowship
- Student satisfaction award (as a Physics Instructor)