

# Juan Kaelig Minkoa

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## EDUCATION

<b>University of Regina (Campion College)</b> <i>Bachelor of Science, Mathematics &amp; Computer Science   GPA: 3.7/4.0</i>	Regina, SK <i>Expected Sep 2028</i>
<ul style="list-style-type: none"><li>– <b>Relevant Coursework:</b> Linear Algebra I (98%), Probability &amp; Statistics (98%), Calculus II (100%), Programming and Problem-solving (91%), Object-Oriented Design (88%), Number Theory &amp; Combinatorics (Putnam Training).</li><li>– <b>Current Coursework:</b> Data Structures and Algorithms, Vector Calculus, Differential Equations, Introduction to Proof and Problem-solving .</li><li>– <b>Awards:</b> 1st Place Data Science Olympiad; Putnam Competition Team Member.</li><li>– <b>Research interests:</b> Matrix Analysis, Statistics, Combinatorics, Algebra, Machine Learning, Number Theory.</li></ul>	

## SKILLS

<b>Scientific Computing:</b> Python (NumPy, Pandas), Matplotlib, Jupyter, Scikit-Learn, Facebook Prophet.
<b>Programming &amp; Tools:</b> C++ (Object-Oriented Analysis), SQL.
<b>Languages:</b> English (Native Proficiency), French (Native Proficiency).
<b>Certifications:</b> Databricks Generative AI (2025), Coursera Prophet Forecasting (2025), DataCamp Intro to AI (2025), Python (2025).

## PERSONAL PROJECTS

<b>Matrix Calculus &amp; Optimization in Recurrent Networks   <i>Python, NumPy</i></b>	Jan 2026
<ul style="list-style-type: none"><li>– Constructed a Vanilla Recurrent Neural Network (RNN) using only linear algebra primitives to model sequential data.</li><li>– Derived Jacobian matrices for hidden state vectors (<math>h_t</math>) to analyze gradient flow and optimize differentiable memory.</li><li>– Addressed the vanishing gradient problem through explicit eigenvalue analysis of weight matrices during Backpropagation Through Time (BPTT).</li></ul>	
<b>Optical Character Recognition (OCR) via Linear Algebra   <i>Python, NumPy</i></b>	2025
<ul style="list-style-type: none"><li>– Architected a Multi-Layer Perceptron (MLP) from first principles to classify high-dimensional image data (MNIST), achieving 94% accuracy.</li><li>– Derived and implemented the chain rule for backpropagation across non-linear activation functions (ReLU, SoftMax) without using automatic differentiation libraries.</li><li>– Optimized weight convergence metrics through a manual implementation of Stochastic Gradient Descent (SGD).</li></ul>	
<b>Stochastic Modeling of Financial Time-Series   <i>Python, Prophet</i></b>	2025
<ul style="list-style-type: none"><li>– Engineered a stochastic predictive model to decompose financial data into trend, seasonality, and holographic noise components.</li><li>– Applied additive regression models to identify non-linear growth saturations and variance shifts in capital market data.</li></ul>	
<b>Statistical Regression &amp; Valuation Analysis   <i>Python, Scikit-Learn</i></b>	2025
<ul style="list-style-type: none"><li>– Developed a multivariate regression model for real estate valuation, employing feature engineering to isolate orthogonal pricing variables.</li><li>– Conducted correlation analysis on 15+ economic indicators (GDP, Interest Rates) to quantify macroeconomic dependencies.</li><li>– Validated model robustness using K-Fold Cross-Validation, achieving an optimized RMSE suitable for investment decision-making.</li></ul>	

## Professional Experience

<b>Marian Home</b> <i>Operations Assistant (Volunteer)</i>	Regina, SK <i>Sep 2024 – Present</i>
<ul style="list-style-type: none"><li>– Responsible for the accurate collection of daily data regarding meal counts and resident attendance.</li><li>– Verified manual records against physical counts to ensure zero errors in monthly reporting.</li></ul>	

## LEADERSHIP & ACADEMIC INVOLVEMENT

<b>Putnam Mathematical Competition:</b> Team member engaging in intensive weekly seminars on advanced combinatorics, number theory, and proof construction.
<b>Robotics &amp; Electronics:</b> Technical Lead for engineering challenges; applying algorithmic logic to hardware control systems.