

The background is a dark teal color with a pattern of faint, light teal vertical lines. Scattered across the background are various financial symbols and numbers in a lighter teal and a lime green color. Symbols include the dollar sign (\$), the yen sign (¥), the euro sign (€), and the pound sign (£). Numbers range from 1 to 9. Some numbers are accompanied by upward or downward pointing arrows, suggesting stock market trends. The overall aesthetic is modern and financial.

# \$tockPickr

MSCI 436 Project

Team 16

## Problem Space

**41%**

Of Canadians sought financial advice in the past 12 months<sup>1</sup>

**39%**

Of Canadians ranked their financial literacy as low<sup>2</sup>

# Value Proposition

**51%** Of Canadians between 18 and 34 seek financial advice through online platforms<sup>1</sup>



**Expected User:**

New or existing stock market investors



**Solution Objective:**

Help make informed financial decisions in the stock market



**Benefits:**

Decreases time spent researching stocks; speeds up time to positive returns

# Data<sup>3,4</sup>

<b>Data Points</b>	<ul style="list-style-type: none"><li>• Annual revenue</li><li>• Market cap</li><li>• Employee count</li><li>• Dividend yield</li><li>• YoY growth</li><li>• Risk level</li></ul>
<b>Data Processing</b>	<ul style="list-style-type: none"><li>• Data collection</li><li>• Data cleaning: Analyzing Correlation between variables</li><li>• Data Preprocessing: Scaling using StandardScaler, Handling categorical vs numerical data, ordinal categorical data</li></ul>
<b>Limitations</b>	<ul style="list-style-type: none"><li>• Data quality</li><li>• Market volatility</li><li>• Subjective risk</li><li>• Single year data</li></ul>
<b>Appropriateness</b>	<ul style="list-style-type: none"><li>• User centric</li><li>• Timely, recent data</li><li>• Comprehensive</li></ul>

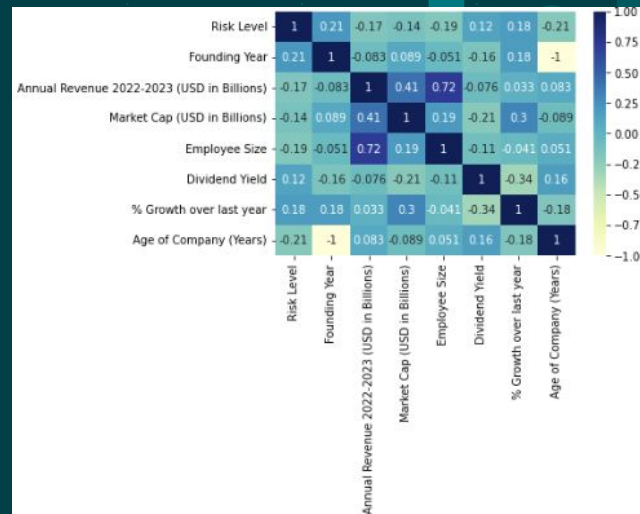
# Data: Snippet & Feature Correlation

We created a Jupyter notebook to conduct an exploratory data analysis on our data to analyze the shape, correlation, and distributions of our features. This ensured high data quality for model development.

Snippet of Data:

	Company Name	Industry	Sector	Country	Risk Level	Founding Year	Annual Revenue 2022-2023 (USD in Billions)	Market Cap (USD in Billions)	Employee Size	Dividend Yield	% Growth over last year
0	Apple Inc.	Technology	Consumer Electronics	USA	Low	1976	387.53	2520	164000	0.0	0.29
1	Alphabet (Google)	Technology	Software Infrastructure	USA	Low	1998	282.83	1350	190234	0.0	0.34
2	Amazon	Technology	Software Application	USA	Low	1994	513.98	1030	1541000	0.0	0.07
3	NVIDIA Corporation	Technology	Semiconductors	USA	Medium	1993	26.97	653	22473	0.0	2.03
4	Tesla	Technology	Software Infrastructure	USA	High	2003	81.46	625	127855	0.0	1.25

Feature Correlation:



# Model: Data-Driven Model

We utilized the Machine Learning Model K-Nearest Neighbours to align the the users preferences of the company they want to invest into. This system is appropriate due to its:

1. Customization and Scalability
  - a. Based on user inputs and preferences
2. Data-Based Decision making
  - a. Actual market data to ensure recommendations are in real-world performance and metrics
3. Accessible User Interface
  - a. Users can interact with the model to advice decision making quickly and effectively, reducing company research overhead

## Model - Pros & Cons



### PROS

- Considers multiple factors (revenue, dividend yield, employee count, etc.)
- Using recent data - relevancy
- Incorporating user preferences - more personalized



### CONS

- Only using data from a singular year
- Cannot predict future market changes or major events that could impact stock performance
- Risk levels are subjective and can vary between users



# UI Interface

The user interface of StockPickr allows you to effortlessly set your investment preferences through intuitive sliders for features like risk level, company age, annual revenue, etc. Based on your inputs, the system recommends the top 5 stocks that align with your criteria, providing detailed information on each stock to help you make informed investment decisions.

Here is a UI example of StockPickr, given a users preferences for the features of a company they want to invest into:

Page 1:

**User Input Features**

Please enter your preferences for the stock you would like to invest into. Move the sliders for each feature to enter your preferred description of a company you would like to invest into. Let us do the rest!

Industry: Technology

Country: USA

Risk Level: Low

Age of Company (Years): 25

Annual Revenue 2022-2023 (USD in Billions): \$25.97

Market Cap (USD in Billions): \$208.73

Employee Size (employees): 8,717 employees

Dividend Yield (%): 0.00

% Growth over last year: 13.00%

**StockPickr**

We get it, investment decisions are not easy. Let us help you with your decision making, and recommend some stocks to invest into!

**User Input**

Risk Level	Annual Revenue 2022-2023 (USD in Billions)	Market Cap (USD in Billions)	Employee Size	Dividend Yield	% Growth over last year	Age of Company (Years)
Low	50	\$242	8,717	0.00	0.1287	25

**Recommended Stocks and Their Feature Values**

Based on your responses, we recommend you to invest in these 5 stocks! Here is their respective descriptions:

**Company: Black Inc.**

Industry: Technology  
Sector: Software Infrastructure  
Country: USA  
Risk Level: Low  
Age of Company (Years): 15  
Annual Revenue 2022-2023 (USD in Billions): \$17.53  
Market Cap (USD in Billions): \$47.00  
Employee Size: 8521 employees  
Dividend Yield: 2.00%  
% Growth over last year: 13.00%

**Company: AstraZeneca**

Industry: Pharmaceuticals  
Sector: Health Care  
Country: UK  
Risk Level: Low  
Age of Company (Years): 25  
Annual Revenue 2022-2023 (USD in Billions): \$47.61  
Market Cap (USD in Billions): \$14.49

Page 2:

**Company: Equinix**

Industry: Technology  
Sector: IT Services  
Country: USA  
Risk Level: Low  
Age of Company (Years): 26  
Annual Revenue 2022-2023 (USD in Billions): \$7.26  
Market Cap (USD in Billions): \$64.00  
Employee Size: 11451 employees  
Dividend Yield: 2.00%  
% Growth over last year: 19.00%

**Company: Worldpay Inc.**

Industry: Technology  
Sector: Software Application  
Country: USA  
Risk Level: Low  
Age of Company (Years): 19  
Annual Revenue 2022-2023 (USD in Billions): \$6.21  
Market Cap (USD in Billions): \$49.00  
Employee Size: 17522 employees  
Dividend Yield: 3.00%  
% Growth over last year: 15.00%

**Company: GlobalFoundries**

Industry: Technology  
Sector: Semiconductors  
Country: USA  
Risk Level: Low  
Age of Company (Years): 15  
Annual Revenue 2022-2023 (USD in Billions): \$8.10  
Market Cap (USD in Billions): \$38.00  
Employee Size: 14600 employees  
Dividend Yield: 1.00%  
% Growth over last year: 12.00%



# Operationalization & Deployment Plan

<b>Automated Data Integration:</b>	<ul style="list-style-type: none"><li>- Utilize APIs to pull real-time financial data from reliable sources</li><li>- Automate the current data preprocessing scripts to clean and format the data for model training</li></ul>
<b>Model Training and Validation:</b>	<ul style="list-style-type: none"><li>- Continue to update and train the KNN model using updated historical financial data</li><li>- Validate the model using accuracy measures and performance metrics to ensure reliability</li></ul>
<b>Performance Tracking:</b>	<ul style="list-style-type: none"><li>- Continuously monitor the model's performance using KNN accuracy measures</li><li>- Set up dashboards and alerts to detect any data drift or performance degradation</li></ul>
<b>Hosting:</b>	<ul style="list-style-type: none"><li>- StockPickr is currently hosted using Streamlit on a local server</li><li>- Plan to migrate to a cloud provider (AWS, Azure, GCP) for better scalability and reliability, and to allow for users to interact with the platform</li></ul>
<b>Scheduled Data Updates:</b>	<ul style="list-style-type: none"><li>- Deploy scripts that automatically update financial data daily due to its time-series nature</li><li>- Schedule these jobs/updates using cloud provider services through (e.g Kubernetes, cron jobs)</li></ul>
<b>Accessibility:</b>	<ul style="list-style-type: none"><li>- Increase accessibility for users by adding in multiple platforms (mobile, etc)</li><li>- Implement continuous deployment practices to ensure the application stays updated with the latest data and features</li></ul>

# Github

Link to Github Repo:

<https://github.com/matterxleben/StockPickr>

## References

- 1 <https://www.canada.ca/en/financial-consumer-agency/programs/research/canadian-financial-capability-survey-2019.html#toc5>
- 2 <https://mnpdebt.ca/en/resources/mnp-debt-blog/financial-literacy-in-canada-lack-of-skills-and-education-contributing-to-surging-consumer-debt>
- 3 <https://www.moneysense.ca/save/investing/stocks/top-100-dividend-stocks/>
- 4 <https://companiesmarketcap.com/>