Case #2: Startup Decision Support System

Develop a platform which will provide the top ten actions that an entrepreneur can take to strengthen a startup in a given industry and with a specific key performance indicator (KPI) provided by Shoemaker Innovation Center

Luddy Hackathon
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For our case project, we decided to focus on four KPIs which are gross sales, burn rate, customer acquisition, and customer lifetime value (CLV). These are the key metrics that we thought would be the most important to understand better and improve a startup's business capacity after initial funding.

- **Gross sales** represent the total revenue generated from selling goods or services before any deductions are made. This aspect is important for startup businesses because it provides a baseline measure of business performance, product demand, and growth potential. Regularly analyzing gross sales helps startups stay agile and make data-driven decisions to scale successfully.

- **Burn rate**: We picked burn rate due to cash runway being a prime indicator of responsible spending within an initial startup. Logically the burn rate of a startup will exponentially increase after initial funding, spending more in areas like R&D, Salaries, and miscellaneous costs. Its important for a startup to address its expenses to make sure that they are able to stay in business until they can get additional investors or funding. This burn rate is crucial until a startup can create positive cash flow.

- **Customer acquisition Cost**: Customer acquisition is a crucial KPI for startups after initial funding because it demonstrates market demand and validates product-market fit. It directly impacts revenue growth and serves as a foundation for scaling and expanding the business. By showing the ability to attract and retain customers efficiently, startups can build investor confidence and pave the way for long-term sustainability.

- **CLV**: Customer Lifetime Value (CLV) is a key KPI for startups after initial funding because it measures the total revenue a business can expect from a customer over their relationship. It helps startups understand the long-term profitability of their customer base and guides decisions on customer acquisition costs and retention strategies. A high CLV indicates strong customer loyalty and effective monetization, making it essential for achieving scalability and justifying further investment.

Generalized Process of Generating Insights from a DataFrame Based on Calculated Metrics

We generated insights by:

1. Understanding the Data: Identifying key columns and their business relevance.
2. Calculating Metrics: Deriving new metrics like Cash Runway, ROI, or Adjusted Runway based on existing data.
3. Setting Thresholds: Using averages, standard deviations, or domain-specific values to flag anomalies (e.g., high burn rates, low cash reserves).
4. Segmenting Data: Grouping or filtering to identify patterns (e.g., companies with short runway or high salaries).
5. Applying Business Logic: Interpreting patterns to generate actionable insights, such as cutting costs or scaling high-performing areas.

The process dynamically combines analytics and predefined rules to deliver meaningful recommendations.

Accomplishments:

- Through the use of pandas, we utilized data to analyze our 4 KPIs: gross sales, burn rate, customer acquisition, and customer lifetime value (CLV)
- Data was transformed using Python and PowerBI Dax query
- After analyzing our transformed data, we used it to make charts and graphs in PowerBi to better visualize data trends and patterns according to the different variables needed to calculate the KPIs
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Challenges:

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- Change of Initial KPI
    - One of the KPIs that we had initially thought of was Monthly Active Users (MAU)
    - The database for this KPI couldn't be found since it wasn't publicly disclosed information. Therefore, we had to change one of the KPIs that was initially planned
- Dataset Search
    - It was difficult to find company data that included what we wanted to find
    - We ended up using Kaggle and ChatGPT to find/create sample data
- NLP
    - We initially thought that we could use HuggingFace NLP models to take user information, analyze it, and give business recommendations but we soon found out that it proved to be inefficient, and we were unable to incorporate it into our product due to time constraints
    - We also tried exploring the OpenAI API, but again, we faced issues like expired API keys and quotas.
    - Our solution to that was to write the recommendations ourselves, based on certain thresholds predefined for each of the KPIs