Townsend Saunders III

Bellingham, Washington
townsend.saunders3@gmail.com
https://townsend-saunders3.github.io
https://townly.streamlit.app

Summary

AI Engineer with 5 years of full stack experience in **Machine Learning, AI, LLM's, Cloud Computing, Data Mining, and Data Visualization** within the retail, manufacturing, and financial industry. Specialized in **Deep Learning** and **Natural Language Processing (NLP)**, most notably demonstrated by the standardization of 95% of inventory across 75 brands at Reliance Inc and selection to **lead the AI engineering efforts at the Department of Treasury**. Skilled in **Python, SQL, Statistical Analysis**, Production end-to-end **ML Pipelines**, and especially adept at **bridging the gap between technical teams and non-technical stakeholders.** Experienced in leading teams in lean 0-1 product development in both hardware and software across the entire lifecycle of a product including: design, prototyping, testing, launch, marketing, and production.

University of California, Berkeley — College of Engineering — 2015 – 2019

Bachelor of Science, Engineering Mathematics and Statistics, Software Engineering Focus

- 1 of 4 graduates.
- Berkeley Undergraduate Scholarship Recipient
- Tim Vorenkamp Award Recipient

AI Engineer — Department of Treasury — Dec 2024 - Present

Taxpayer AI Assistant

- **Led the maiden effort** to develop an **AI Agent** to help taxpayers navigate the cumbersome US tax system. Utilized **Llama 3.1** as the base **LLM**, **RAG** for document embeddings, and the entire IRS Manual as data.
- Migrated legacy **sklearn random forests fraud detection** and taxpayer **regression and classification pipelines** from on-prem to the cloud via **Databricks**.

Lead Data Scientist — Tree Ring Design — Sep 2023 – Present

Olympic Gymnastics Rings

- Built Tree Ring Design's **online retail web app** with 2024 Olympic team member, Dominique Parrish, and led the launch of her signature product.
- Made use of **Dall-E 3** for product images and assets, allowing for **agile smoke tests** and **market research** without the need for a physical product. **Directed AI-driven marketing strategies**, leveraging **Dall-E 3 and Google Ads** to achieve a **261% increase in impressions** and a **57% boost in CTR** within 1 month, demonstrating the potential of AI in product promotion.
- **Developed interactive dashboards** using **Python** and **deployed them to the Cloud with Streamlit**, providing **real-time insights** into manufacturing cost vs. profit scenarios, **aiding in data-driven decision-making**, and leading to the **reduction of manufacturing cost by 67%.**
- Designed a set of "Blue Ocean" product features aimed at **minimizing competition** and maximizing untapped market space.
- **Negotiated a 30% contract discount** with a 3rd party Engineering and Product Design firm saving precious capital while ensuring the development of a safe and manufacturable design.

Senior Data Scientist — Reliance Inc. — Feb 2022 – Sep 2023

Inventory Mastering Lead Engineer

- **Built a unified Item Master solution**, streamlining inventory management across 50+ subsidiaries and 6 million products, **allowing for inventory sharing**, **improved efficiency**, and **reduced customer churn**.

- Collaborated with stakeholders to deliver a standard inventory labeling system using **Agile workflows, Python**, **Spark (PySpark), AWS tools,** and various statistical modeling and **Machine Learning techniques**.
- Applied **NLP** techniques such as **tokenization, stop word removal,** and **term frequency-inverse document frequency (tf-idf)** to convert industry/company-specific language into concise product descriptions. Employed tools such as **NLTK, spaCy, Gensim, Hugging Face Transformers libraries (BERT),** and **Scikit-learn** for **stemming, lemmatization, text preprocessing and feature generation.**
- Automated **real-time model optimization**, **deployment, and algorithm evaluation** via **AWS Sagemaker** and held the leadership role on a team consisting of internal Data Scientists, Data Engineers, and external Deloitte analysts.
- Wrote rigorous documentation and testing via **Python scripts**, **Jupyter Notebooks**, and **GitHub** for long term code maintenance, explainability, and debugging.

Data Scientist | Reliance Inc. | Feb 2021 – Feb 2022

Anomaly Detection and Predictive Maintenance

- Spearheaded an **anomaly detection** system for warehouse machinery, preventing costly breakdowns and hazards.
- Interfaced with supervisors, creating **real-time alert systems** based on **critical telemetry data** from 30+ Bosch XDK devices.
- **Mentored our Junior Data Scientist** on the ins and outs of Machine Learning projects and provided guidance on how to effectively communicate timelines and deliver results.
- Utilized **AWS** for data streaming, analysis, and **TensorFlow** for **Deep Learning** (**Long-Short-Term-Memory Networks)** as well as **Principal Component Analysis (PCA)** and **Latent Factor Analysis** for preprocessing enabling diagnostic, predictive, and prescriptive insights, including machine shutoffs and preventative maintenance.
- The initiative preempted multiple breakdowns, expanding its application across various warehouses.

Serverless Forecasting Web Application

- **Enabled large-scale forecasting for 50 companies' entire product lines.**
- Designed a serverless Data Lab web app using **AWS tools, Docker, GitHub, Sagemaker**, and **Python** allowing for an interactive forecasting experience for non-technical stakeholders.
- Developed a UI for non-tech users to query our **Data Warehouse** via **Snowflake's Snowpark** and try a multitude of statistical forecasting methods **(Decision Trees, Neural Networks, Random Forests, Linear and Logistic Regression, ARIMA, etc.)** without the end user having to write a single line of code.
- Established an **ML pipeline** for time-series data, with visualizations using **Streamlit, Plotly, Lambda, matplotlib, seaborn, Altair, and Pandas.**
- **Created a Data Lake in Amazone S3** featuring **millions of data points scraped** from sources across the internet.

Business Systems Analyst | Reliance Inc. | Feb 2020 – Feb 2021

Automating Customer Support

- Automated manual dashboard reloads that were performed hourly from 6:00 AM to 3:00 PM 365 days a year by a team of 8 BI developers: monitoring loads of 60+ dashboards with **end users in China, India, Europe** and the **US.**
- **Saved tens of thousands of dollars in wasted man-hours per year.**

Cleaning Supplier Data

- Implemented a **probabilistic matching process** that matched unknown Reliance Suppliers to their corresponding DUNS numbers.
- **Accounted for millions of dollars** of previously unknown purchasing figures.

Personal Projects

GPT-4o Gender Bias Research

- GPT-4o has significant gender bias when giving responses. Designed a framework for testing product recommendations depending on gender, race, and product category. Started with book recommendations.
- Discovered significant differences in product recommendations depending on the user profile given. Default GPT-4o assumes the user is a white male.
- Research is ongoing. Currently co-authoring a study with two international master's students at Simon Fraser University in Vancouver.

Resume ChatBot

- Developed a web application leveraging OpenAI's GPT-4 model to interact with recruiters on my behalf.
- Fine-tuned on my past projects, education, and personal history
- Can fill out entire applications without any input from my end
- Knows my schedule and can help organize meetings.

AI-powered Resume Optimizer Web App

- Developed a web application leveraging OpenAI's GPT-4 model to optimize resumes based on specific job postings.
- The application is designed to analyze job descriptions and modify resumes to highlight relevant skills and experiences, thereby increasing the chances of candidate shortlisting.
- Hosted the application using Streamlit, providing an intuitive user interface for users to input their resumes and desired job postings.
- All project code is publicly available on GitHub for transparency, future collaboration, and improvement.

USA Women's Wrestling Stats

- Created a web app for USA women's wrestlers to upload, view, and analyze their match statistics.
- Users can link video of tournaments, view match performance, and uncover what helps them win matches.
- Most Women's Wrestlers have no sports analytics offered to them by their organization. This app serves to help a historically underserved market and democratize sports analytics.

AI-driven Personalized Nutrition Tracker Web Application

- Developed a nutrition tracking web application using OpenAI's GPT-4 model, focusing on promoting healthier eating habits.
- The app is designed to accept natural language inputs from users regarding their daily food and drink intake along with basic demographic data (like weight, age, sex, etc.).
- Leveraging AI, the app parses these inputs to identify specific foods, types, and quantities consumed.
- It subsequently generates comprehensive nutrient data for each item, including amino acids, macronutrients, micronutrients, minerals, and vitamins.
- Through an analytical dashboard, users receive a visual summary of their daily nutritional intake, highlighting areas where their diet is deficient or excessive.

Smart Agriculture: Automated Irrigation System

- Engineered a Raspberry Pi-based automated irrigation system with the objective of optimizing water usage in agriculture.
- Incorporated a soil moisture sensor to continuously monitor soil conditions and send data to AWS for real-time analysis and set up an alert mechanism that triggers notifications when soil dryness reaches a specified threshold, enabling timely irrigation.
- Future enhancements for the project include the integration of multiple sensors for a comprehensive environmental analysis (including nitrogen, oxygen, temperature, wind, and sunlight intensity). Plans also include implementing a smart drip irrigation system that uses valves controlled by real-time moisture readings, further automating, and optimizing the irrigation process.

Skills

Programming Languages
- Python
- Java
- SQL
- C
- Ruby
- Julia
- MATLAB
- R
- JavaScript
- React
- Django
- Flask

Tech Stack
- AWS
- Azure
- Databricks
- Jupyter
- Streamlit
- JavaScript
- GitHub
- Docker
- Snowflake
- Tableau
- Power BI
- Linux, Windows, MacOS

Machine Learning
- PyTorch
- TensorFlow
- Scikit-Learn
- NumPy
- Pandas
- PySpark
- Spark
- SageMaker
- Hugging Face
- Llama 3.1
- Open AI
- ChatGPT, GPT-4, GPT-4o

Volunteer Work & Personal

Live For Others Foundation
- Volunteer at the annual volleyball tournament in which all proceeds went to fund research to find a cure for synovial sarcoma and other rare pediatric diseases.

Volunteer Youth Coach/Mentor
- Ran practices and activities for the 02' -05' youth soccer teams.

Math Tutor
- Varsity Tutors math Tutor for High School and College Students

Co-Ed Recreational Soccer Manager & Player
- Organized and played on several soccer teams in Berkeley, California, Phoenix, Arizona and Corvallis