



Project Plan Presentation

Provider Anomaly Analytics Toolkit

The Capstone Experience

Team Roosevelt Innovations Data Science

Justin Doan

Carson Honkala

Jeffrey Lo

Tanawan Premisri

Kate Roney

Junchi Zhu

Department of Computer Science and Engineering

Michigan State University

Fall 2022



*From Students...
...to Professionals*

Project Sponsor Overview

- Software platform provider for Delta Dental
- Optimize insurance business operations
 - Auto adjudication of claims
 - Data visualizations
- Expanding outside of Michigan



Project Functional Specifications

- Reduce cost for insurance companies and providing a better quality of care
- Automatically identify potentially problematic providers
- Streamline analysis of these problematic providers



Project Design Specifications

- App is WebUI that contains three different analysis views
 - Creates a table showing the top most potentially problematic providers
 - Displays interactive key performance indicators
 - Uses dynamic charts to provide a quick comparison of specific providers



Screen Mockup: Outlier View

The screenshot shows a web application interface for 'Roosevelt simple. seamless. smart. Provider Analytics Analysis Toolkit'. The left sidebar contains navigation icons for Home, Provider Comparison, Provider Summary, and Outlier Identification (which is highlighted). The main content area is titled 'Outlier Identification View' and features a 'Filter Conditions' section with dropdowns for Region (Michigan), Date (9/12/19 to 7/4/22), Location (East Lansing), and Risk Score (85), followed by an 'Apply' button. Below this is a section titled 'Potentially High-Risk Providers' containing a table with the following data:

Provider	Location	Risk Score	Total Claims in Period	Claims Per Patient	Average Claim Amount
Healthy Smiles Dental	Birmingham Hills, MI	94.5	1024	2.13	\$302.41
Dearborn Dentistry	Dearborn, MI	89.1	1541	1.40	\$251.04
Wolverine Dental	Ann Arbor, MI	85.2	954	3.42	\$526.63



Screen Mockup: Provider Filtering

The mockup shows a web application interface for the Roosevelt Provider Analytics Analysis Toolkit. The left sidebar contains navigation links: Home, Provider Comparison (active), Provider Summary, and Outlier Identification. The main content area is titled 'Provider Comparison View' and is divided into three sections: Filter Conditions, Search Results, and Selected Providers.

Filter Conditions

Region: Provider:

Location: Date: to

Search Results

Provider	Region	Location	Additional Info
EL Dental	MI	East Lansing	N/A

Selected Providers



Screen Mockup: Summary View

The mockup shows a web browser window with the URL `portal.rooseveltsolutions.com`. The page has a dark blue header with the Roosevelt logo and the text "Provider Analytics Analysis Toolkit". A left sidebar contains navigation icons for Home, Provider Comparison, Provider Summary, and Outlier Identification. The main content area is titled "Provider Summary View" and features a search bar with a yellow "Search" button and a table with a yellow "Select" button. Below this is a "Key Performance Metrics" section with four filters: Comparison Region (Michigan), Data Category (Quality of Care), Selected Provider (EL Dental), and Selected Date Range (9/12/19 - 7/4/22). Three metric cards are displayed: Repeat Claims (12, 8th of 110 Providers), Claims Per Client (Avg) (3.4, 57th of 110 Providers), and Cost Per Claim (Avg) (\$152.40, 43rd of 110 Providers).

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Provider Analytics Analysis Toolkit

Provider Summary View

Search

Select

Key Performance Metrics

Comparison Region
Michigan

Data Category
Quality of Care

Selected Provider
EL Dental

Selected Date Range
9/12/19 - 7/4/22

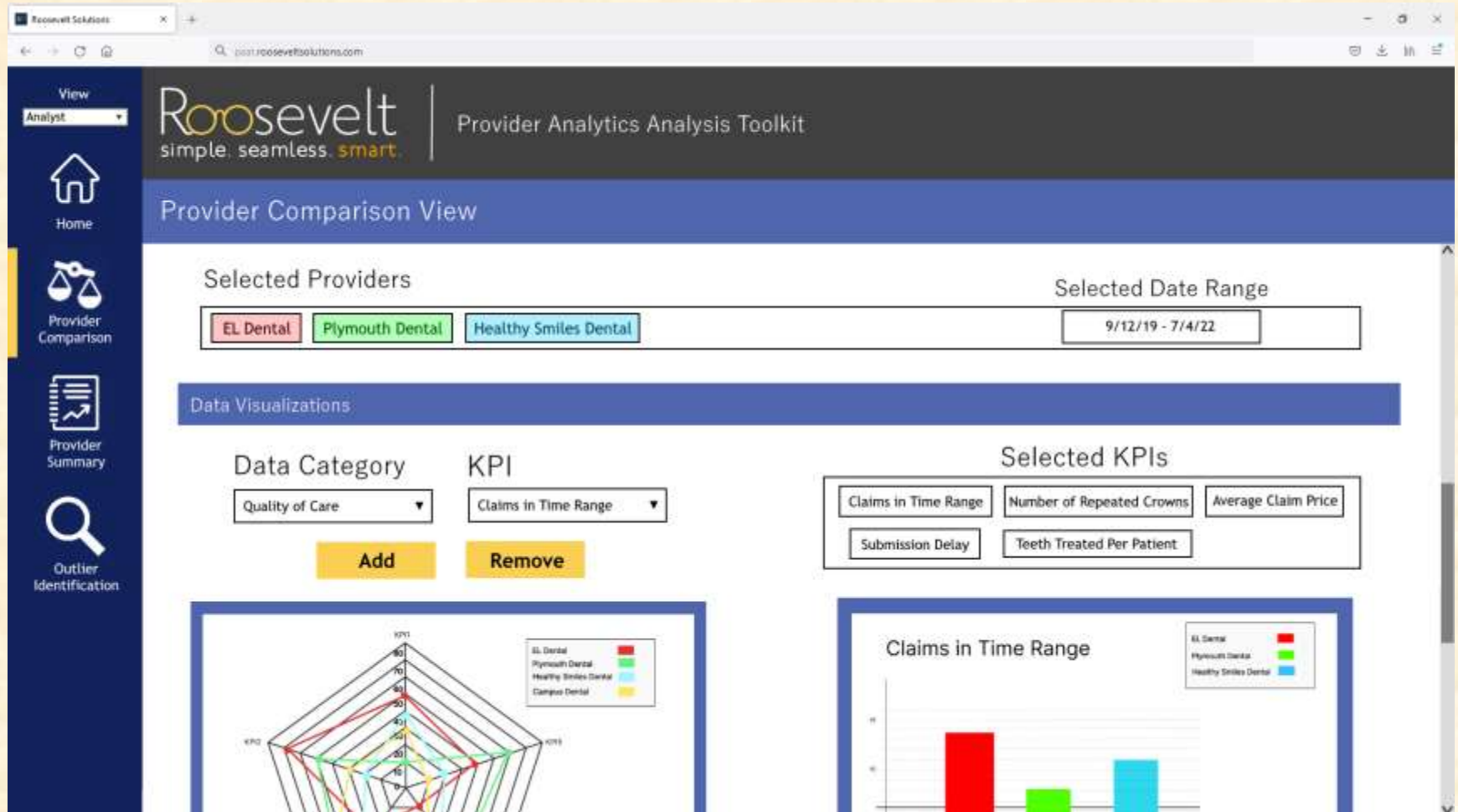
Repeat Claims
12
8th of 110 Providers

Claims Per Client (Avg)
3.4
57th of 110 Providers

Cost Per Claim (Avg)
\$152.40
43rd of 110 Providers



Screen Mockup: Comparison View



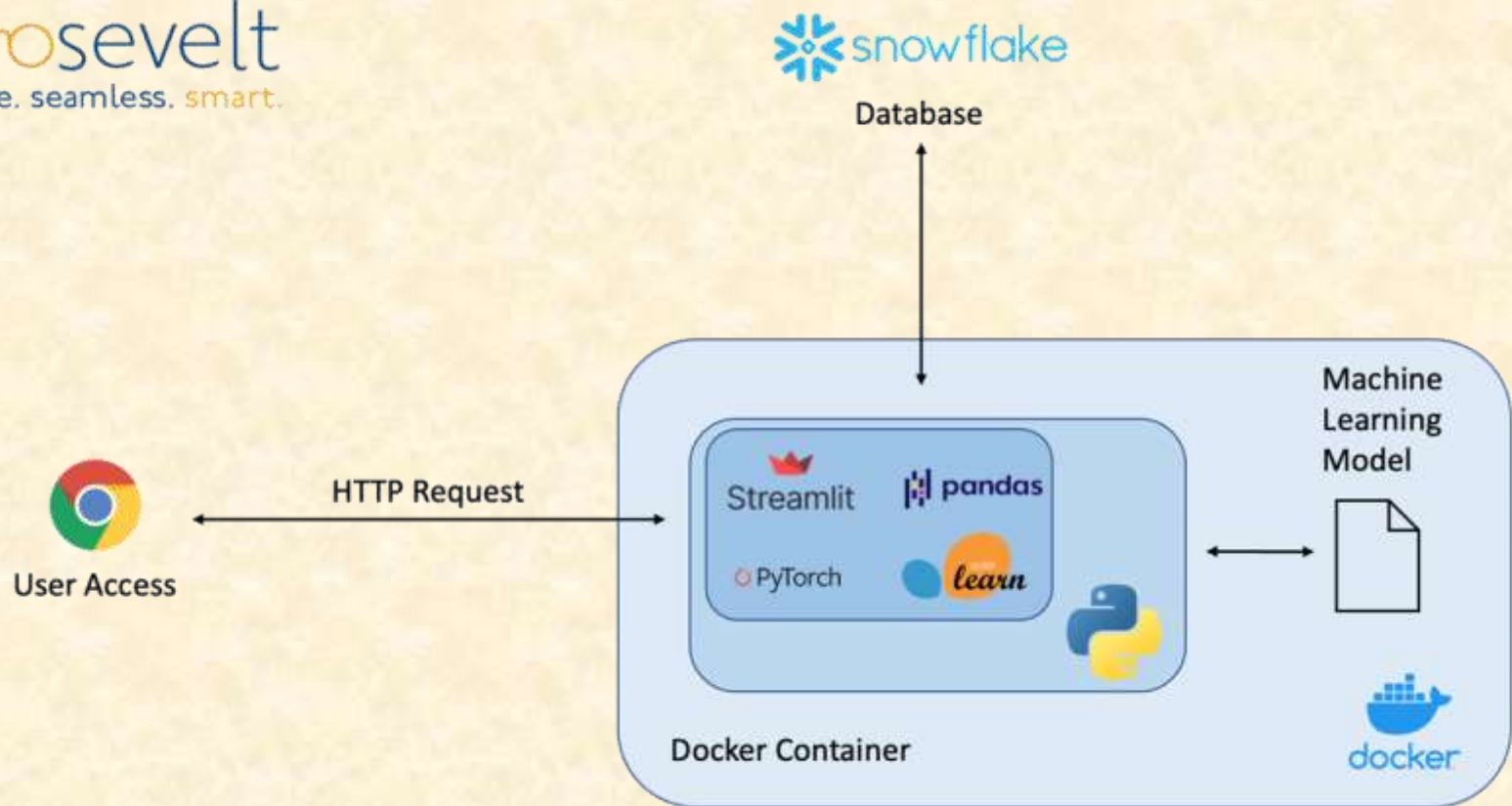
Project Technical Specifications

- Use Docker containers to host Python server
- Use Python connector to query the data from the Snowflake
- Use data analysis and machine learning to automatically identify potential outliers



Project System Architecture

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Project System Components

- Software Platforms

- IDE

- PyCharm
 - VSCode

- Technologies

- Docker for hosting server
 - Python as main component
 - Streamlit library for frontend development
 - Pandas and NumPy for data processing
 - Scikit-learn and PyTorch for machine learning
 - Git for version control repository



Project Risks

- Risk 1: Ensure solution is modular
 - Description: Features need to be reusable in other software
 - Mitigation: Design with due diligence in planning phase
- Risk 2: Identify useful business insights from claims data
 - Description: Inefficient to display all data, must show most impactful metrics
 - Mitigation: Consult weekly with the sponsors, allow customization from users
- Risk 3: Find effective way to determine high risk providers
 - Description: Unknown criteria to identify problematic providers
 - Mitigation: Test variety of machine learning techniques, evaluate accuracy of the results
- Risk 4: Match website UI to existing Roosevelt products
 - Description: Switched from Angular to Streamlit, unsure of how customizable Streamlit can be
 - Mitigation: Assess what is possible and ensure similarity to existing products



Questions?

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