

MICHIGAN STATE

UNIVERSITY

Alpha Presentation

Provider Anomaly Analytics Toolkit

The Capstone Experience

Team Roosevelt Innovations Data Science

Justin Doan

Carson Honkala

Jeffrey Lo

Tanawan Premisri

Junchi Zhu

Kate Roney

Department of Computer Science and Engineering

Michigan State University

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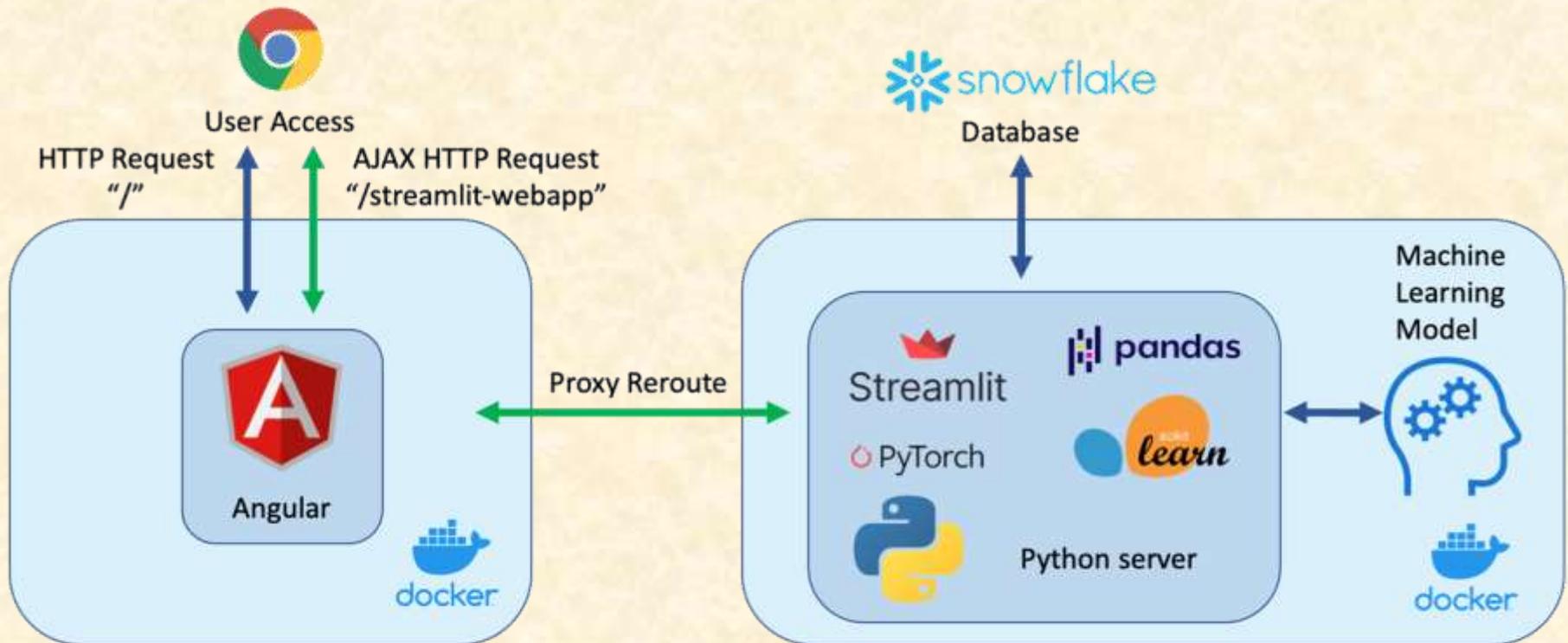
*From Students...
...to Professionals*

Project Overview

- Web app to eliminate fraud, waste, abuse
- Identify potentially problematic dental providers
- Create visualizations of key metrics for dental provider analysis



System Architecture



Outlier Identification

Outlier Identification

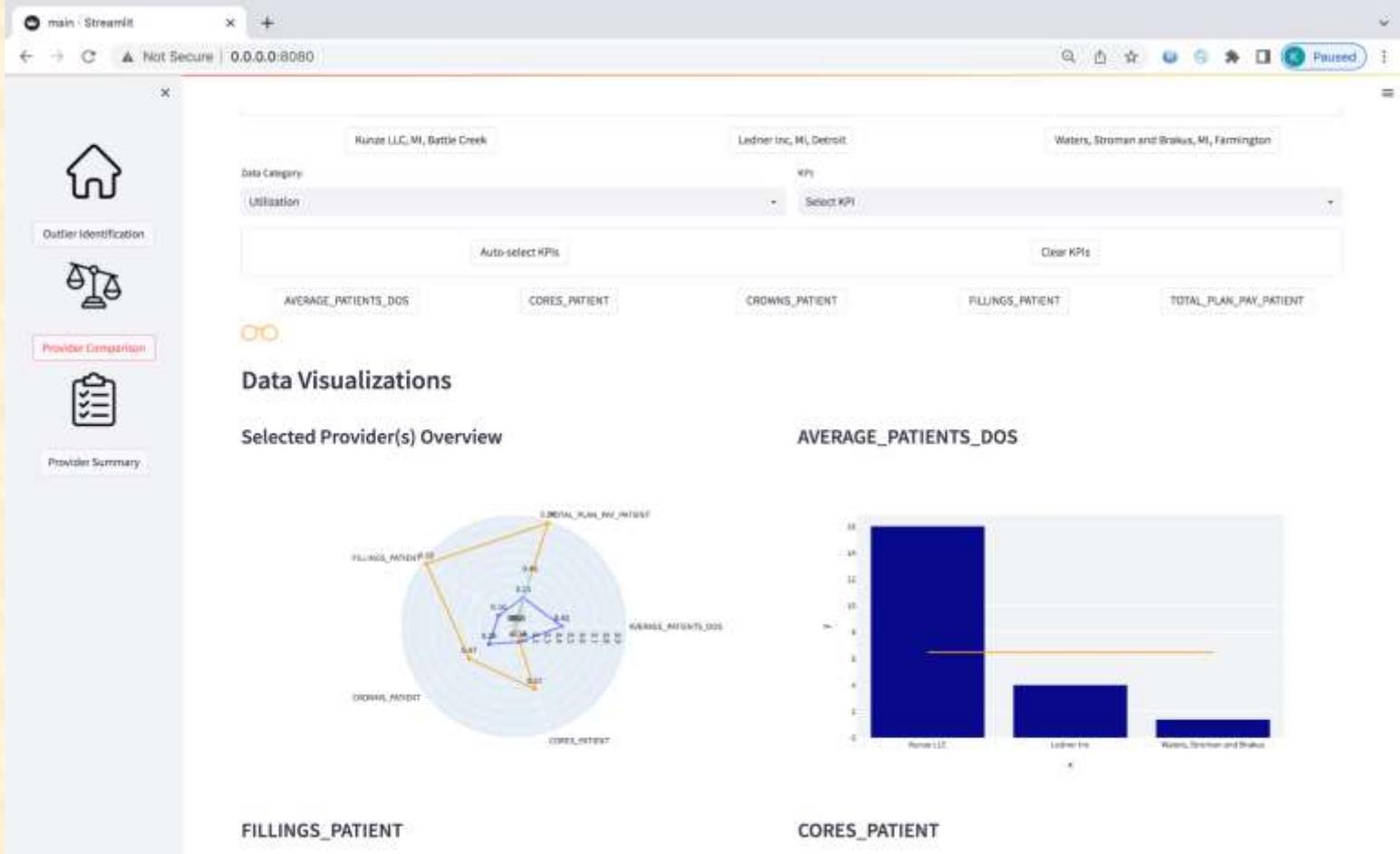
Region: MI City: Lansing Risk Score: 98

Submit

State	City	Provider	Risk Score	Total plan pay	Total number of days	Cost / patient
MI	Lansing	Raynor, Schamberger a...	100	257290.17	97	0
MI	Lansing	Balitzner Inc	100	91981.37	138	0.067055394
MI	Lansing	Sipes, Polich and Lang...	100	48897.27	94	0.181206054
MI	Lansing	Heathcote-Kirkin	100	344822.7	182	0.013215859
MI	Lansing	Beyer, Jaskolski and La...	100	532597.97	189	0
MI	Lansing	Muller Inc	100	332314.7	247	0.099903939
MI	Lansing	Streich and Sons	100	265843.7	194	0.037138279
MI	Lansing	Przbaska-Price	100	168799.25	191	0.079617634
MI	Lansing	Christiansen-Schmeler	100	297832.15	201	0.153716216
MI	Lansing	Blick-Mozciski	99	203663.71	205	0.149139579
MI	Lansing	Quigley LLC	99	302131.39	201	0.06302521
MI	Lansing	Streich-Reichert	99	265854.15	186	0.026578073
MI	Lansing	Gerlach-Dare	99	79257.54	94	0.251194539
MI	Lansing	Kozzy-Deckow	99	274465.01	193	0.067055866
MI	Lansing	Schamberger, Cummin...	99	364581.59	202	0.066811321
MI	Lansing	Howell, Kovocok and P...	98	302271.72	202	0.124804992
MI	Lansing	Wiza, Brakus and Smith	98	13645.46	94	0.040540541
MI	Lansing	Jacobs-Bode	98	327444.61	225	0
MI	Lansing	Bailey Group	98	121746.05	165	0.080896876
MI	Lansing	Gusikowski and Sons	98	208216.9	219	0.17
MI	Lansing	Szpinka and Sons	98	27696.7	27	0.05



Provider Comparison View



Comparison – One Provider Selected

The screenshot shows a Streamlit web application interface. At the top, the browser address bar shows 'main - Streamlit' and '0.0.0.0:8080'. The application title is 'Kunze LLC, MI, Battle Creek'. Below the title, there are two dropdown menus: 'Data Category' set to 'Utilization' and 'KPI' set to 'Select KPI'. A red box highlights the 'Auto-select KPIs' button, and a 'Clear KPIs' button is also visible. Below these buttons, five KPIs are listed: 'AVERAGE_PATIENTS_DOS', 'CORES_PATIENT', 'CROWNS_PATIENT', 'FILLINGS_PATIENT', and 'TOTAL_PLAN_PAY_PATIENT'. A sidebar on the left contains navigation icons and labels: 'Outlier Identification', 'Provider Comparison' (highlighted in red), and 'Provider Summary'. The main content area is titled 'Data Visualizations' and contains two radar charts. The left chart is titled 'Selected Provider(s) Overview' and the right chart is titled 'Selected Provider vs Most Outlying Providers'. Both charts compare the selected provider's performance across five KPIs against other providers. The right chart highlights the selected provider's performance in orange and compares it to the most outlying providers in blue.

main - Streamlit

0.0.0.0:8080

Paused

Kunze LLC, MI, Battle Creek

Data Category: Utilization

KPI: Select KPI

Auto-select KPIs

Clear KPIs

AVERAGE_PATIENTS_DOS

CORES_PATIENT

CROWNS_PATIENT

FILLINGS_PATIENT

TOTAL_PLAN_PAY_PATIENT

Provider Comparison

Data Visualizations

Selected Provider(s) Overview

KPI	Value
AVERAGE_PATIENTS_DOS	0.41
CORES_PATIENT	0.18
CROWNS_PATIENT	0.14
FILLINGS_PATIENT	0.15
TOTAL_PLAN_PAY_PATIENT	0.25

Selected Provider vs Most Outlying Providers

KPI	Selected Provider	Most Outlying Provider
AVERAGE_PATIENTS_DOS	0.41	0.68
CORES_PATIENT	0.18	0.84
CROWNS_PATIENT	0.14	0.60
FILLINGS_PATIENT	0.15	0.75
TOTAL_PLAN_PAY_PATIENT	0.25	0.89



Provider Summary View

The screenshot displays a web application interface for a Provider Summary. The browser address bar shows the URL 0.0.0.0:8080. The sidebar on the left contains four navigation items: Home, Outlier Identification, Provider Comparison, and Provider Summary (which is highlighted in red). The main content area is titled "Provider Summary" and features three filter dropdowns: State (MI), City (Select City), and Provider (Jaskolski, Gaylord and O'Hara). Below the filters is a table with the following data:

STATE	CITY	P_ID_NAME
MI	Lansing	Jaskolski, Gaylord and O'Hara

Below the table is a section titled "Key performance metrics" with two filter dropdowns: "Select KPI category" (Informational) and "Number of KPIs" (3). This section contains three summary cards:

SERVICE_DATES	TOTAL_TREATMENT_COUNT	TOTAL_PATIENT_COUNT
206 1299th out of 1638	2021 527th out of 1638	2283 89th out of 1638



What's left to do?

- Improve machine learning accuracy
- Implement shopping cart view
- Improve readability of visualizations
- Finish integration into Angular



Questions?

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