

ORACLE®
Health Sciences



10th-13th November
RAI Amsterdam
The Netherlands

EU 2019

The Clinical Data
Science Conference



SD07 - Oracle Analytics Cloud

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Oracle Health Sciences

Nov 2019

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Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Agenda

1. Oracle Analytics Cloud
2. Dashboards and Advanced Analytics
3. Machine Learning in Oracle Analytics Cloud
4. Graph Data, Model Development and the Oracle Data Science Cloud

Oracle Analytics Cloud

Connected and Collaborative

Autonomous

- Uniting machine learning, AI, and service automation in an autonomous platform that delivers personalized, proactive analytics anytime, anywhere

Collaborative

- Amplifying human insights to conquer the barriers of complex interactions and information overload

Connected

- Bringing the power of analytics to any data, enabling every process, decision, and action to be data-driven

Complete

- Self-service data discovery and powerful predictive analytics, enterprise-class reporting, and easy what-if analysis

Oracle Analytics Cloud

Advanced Analytics and Machine Learning

Visual Stories

- Combine data from Clinical Data Warehouses, CTMS and Safety Systems to create powerful visual stories

Interactive Dashboards

- Configurable dashboards enable you to quickly analyze and manage activity across the entire system

Advanced Analytics

- Select interactive visualizations and automatically create advanced calculations to reveal the insights in your data

Workflow

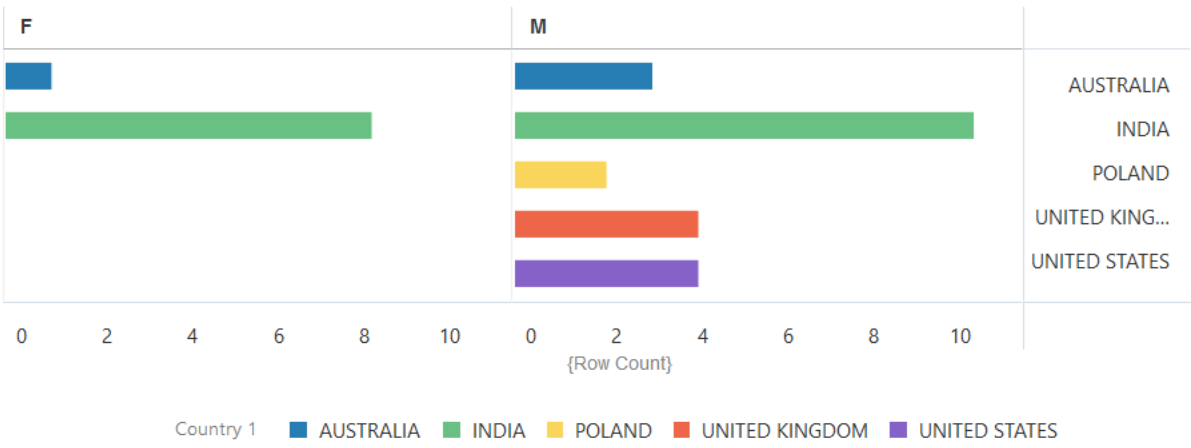
- Formalize collaboration and share approved models across a wide audience

Agenda

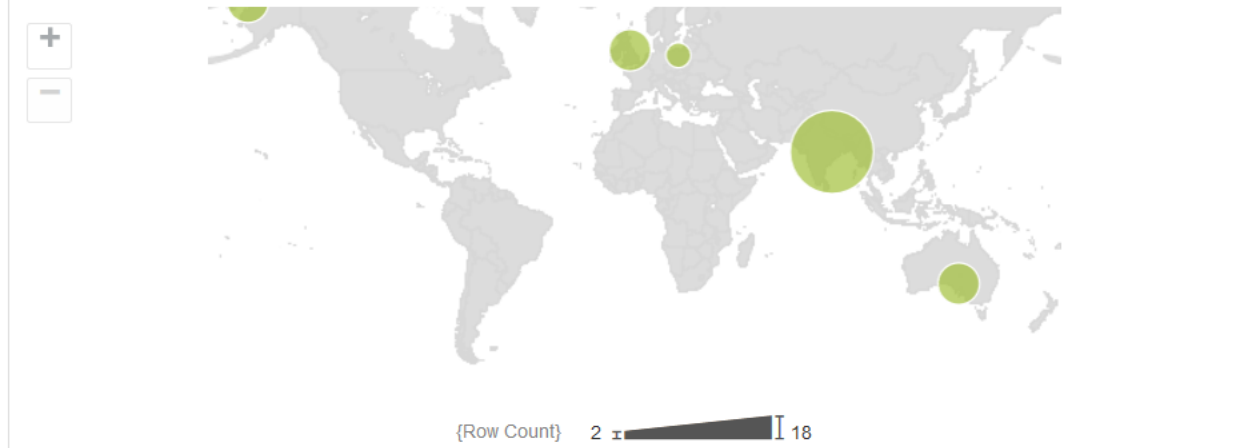
1. Oracle Analytics Cloud
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Recruitment

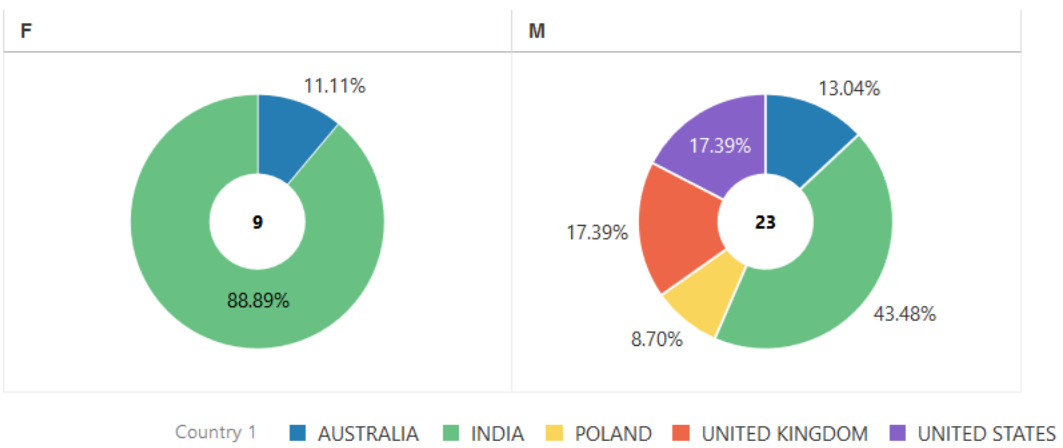
Subjects by Country, Gender



Subjects by Country (count)



Subjects by Country, Gender

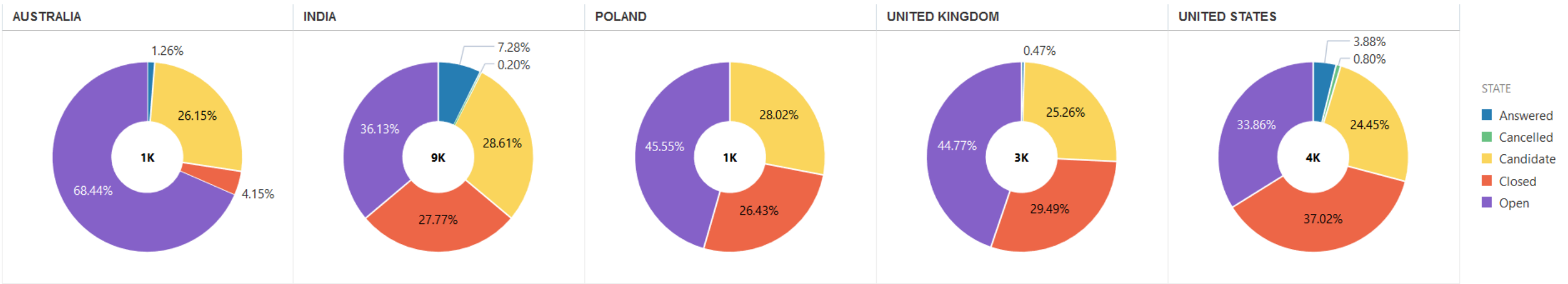


Medical History Terms by Gender

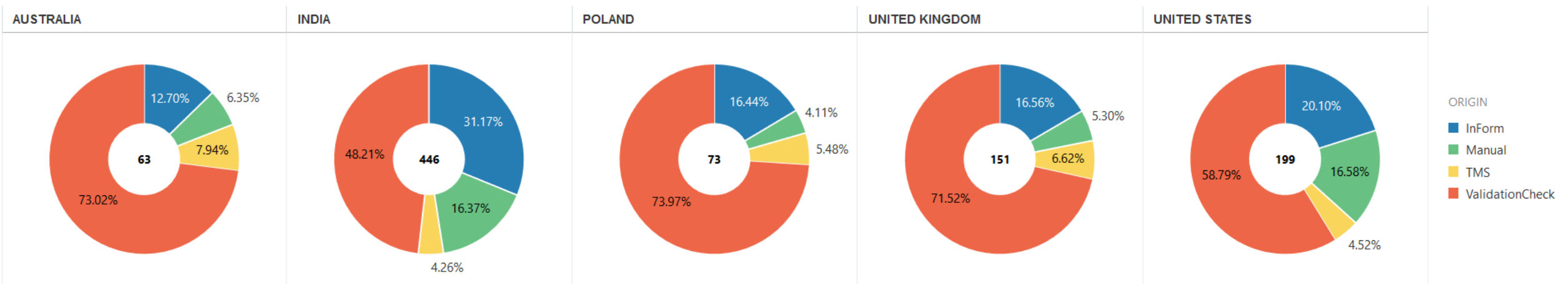


Discrepancies

Days in Sate by Country

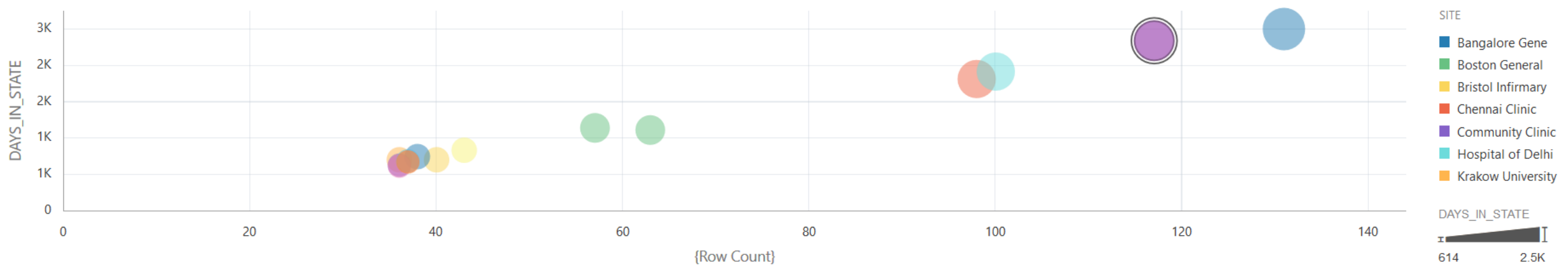


Discrepancies by Origin, Country

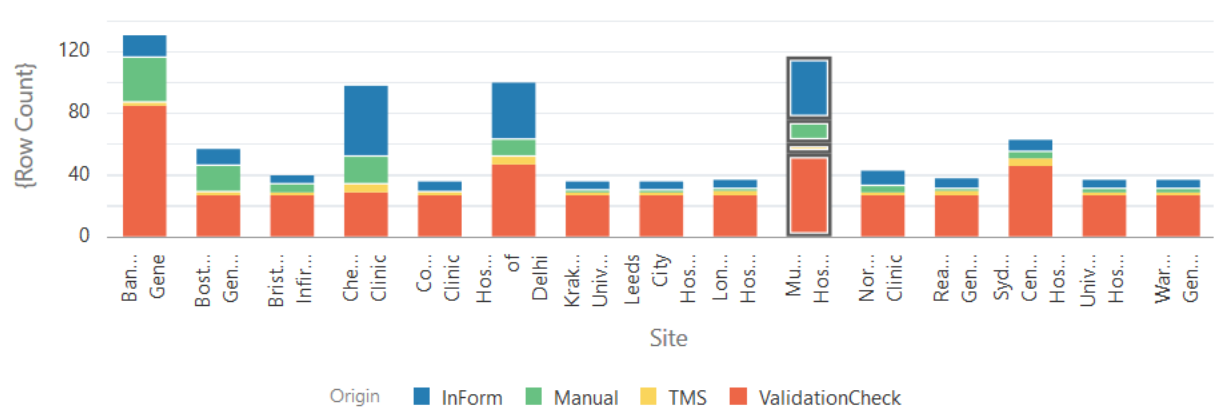


Discrepancy Counts

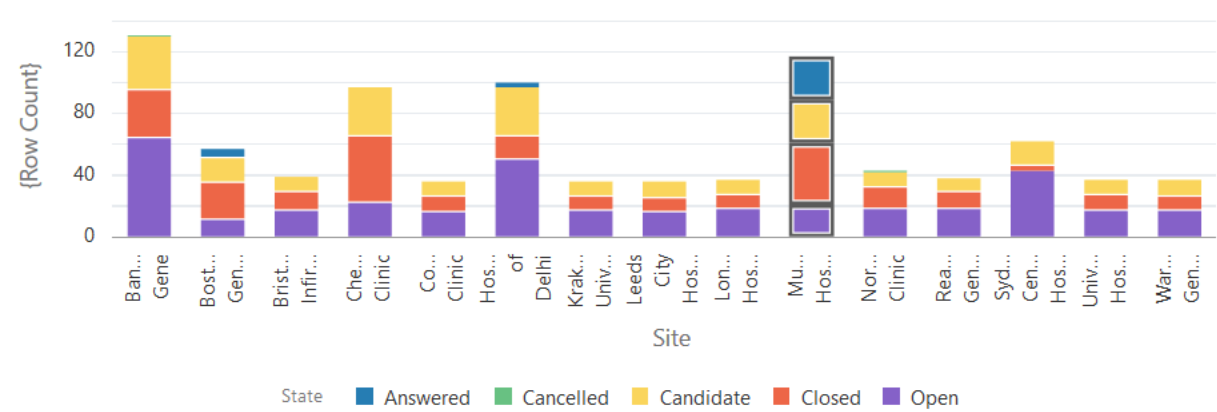
{Row Count}, DAYS_IN_STATE by SITE, DAYS_IN_STATE



{Row Count} by Site, Origin



{Row Count} by Site, State

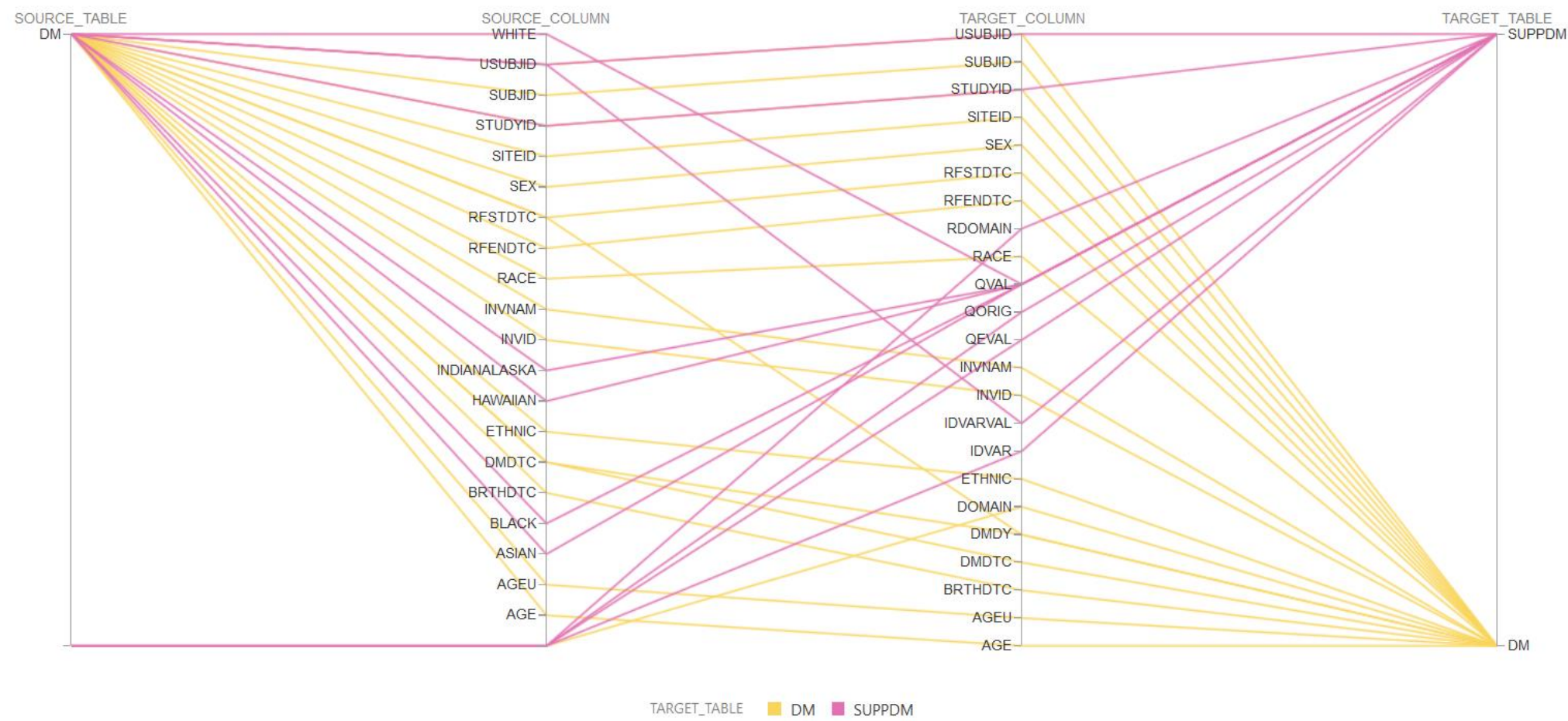


Study: All Site: Bangalore Gene, Boston General... +13 Category: All State: All Origin: All



Review to SDTM Mappings

SOURCE_TABLE, SOURCE_COLUMN, TARGET_COLUMN, TARGET_TABLE

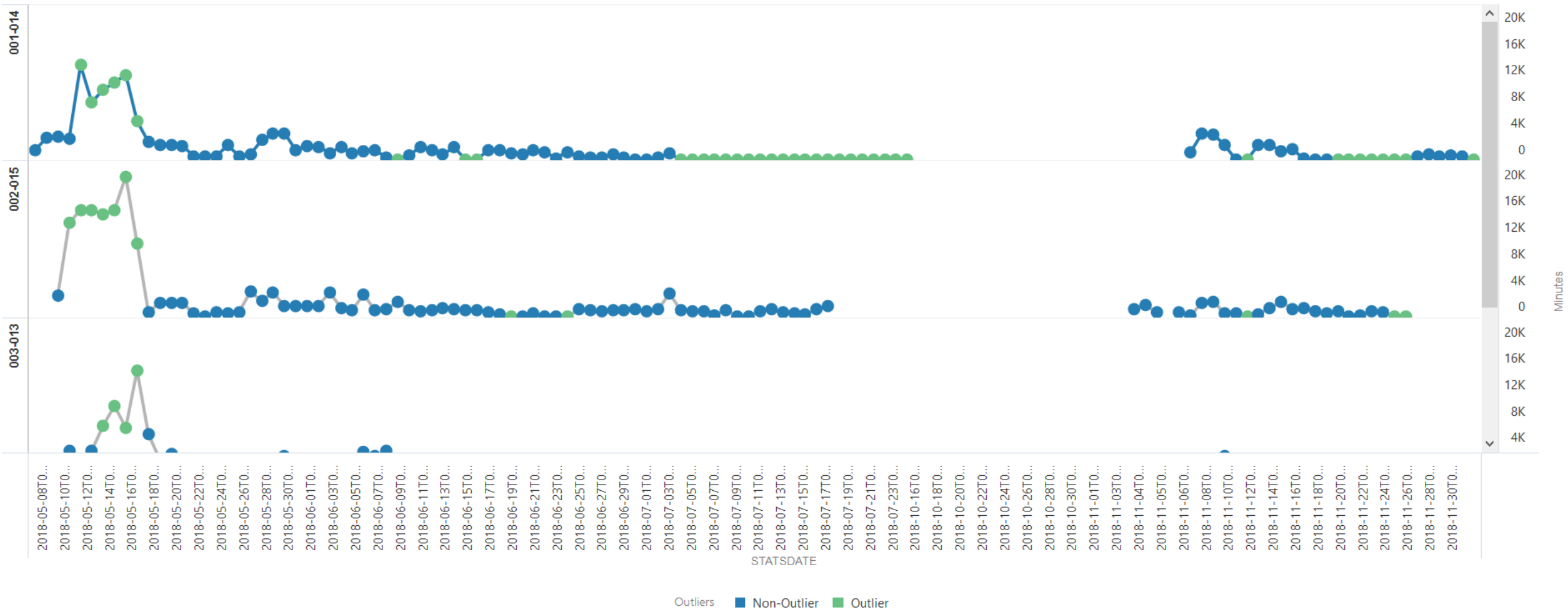


SOURCE_COLUMN: AEACN, AEACNOTH, AEBDSYCD, AEBODSYS, AEDECOD... +... TARGET_TABLE: DM, SUPPDM STUDY: Sep2018Study



Actigraphy Outliers

Minutes by date, Patient, Multivariate Outlier



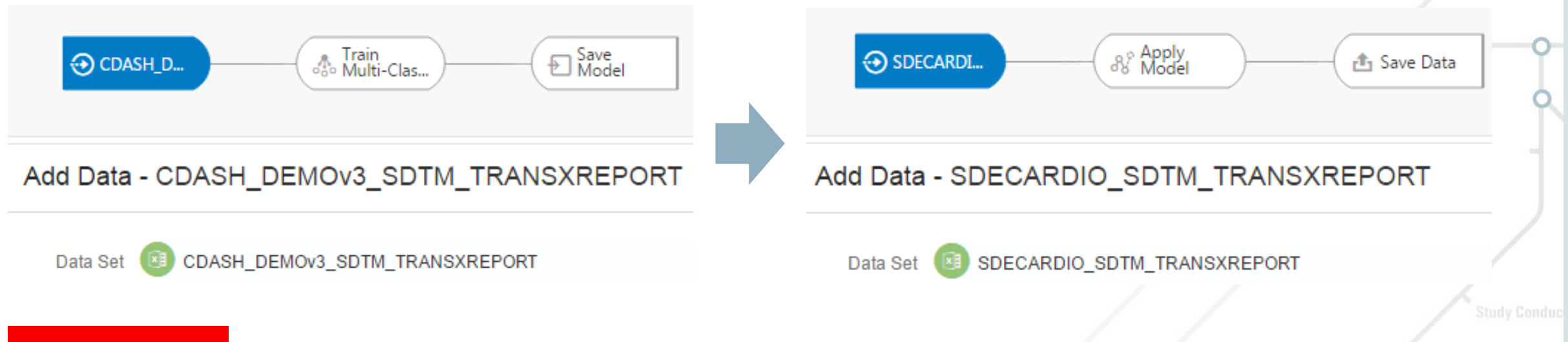
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Machine Learning in Oracle Analytics Cloud

Introduction

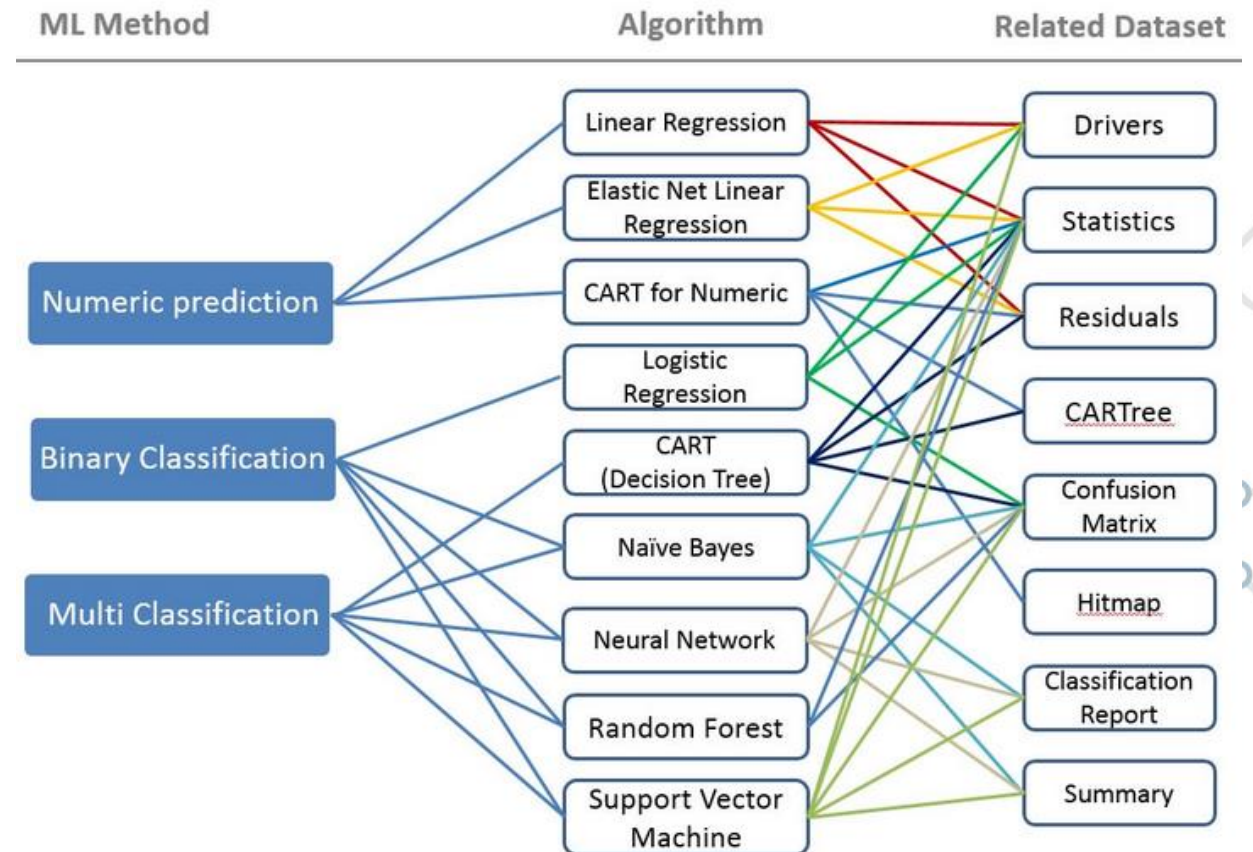
- Machine Learning is a branch of Artificial Intelligence that allows computer systems to learn directly from examples, data, and experience
- Through enabling computers to perform specific tasks intelligently, by learning from examples, Machine Learning systems can carry out complex processes by learning from data, rather than following pre-programmed rules



Machine Learning in Oracle Analytics Cloud

Model Comparison

- There are a huge number of options for models and model training
- How do I pick the right one?
 - Take two different models with the same input and compare the built-in outputs such as Statistics, Drivers and Confusion Matrix side by side
 - Decide based on reported accuracy and expected number of false positive and false negative rates



<https://blogs.oracle.com/analyticscloud/which-machine-learning-model-is-the-right-one-for-me>

Analytics Cloud

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Projects

Data

Machine Learning

Console

Academy

ORACLE Analytics Cloud

Machine Learning

Create

Sort By Date

Model - WBCD_RF_Test

General

Quality

Permissions

Related

Positive Label for diagnosis M

F1 Value 0.88

Model Accuracy 89%

Precision 82%

Recall 94%

False Positive Rate 17%

Actual Values

Predicted Values

	M	B	Total
M	46	2	48 (42%)
B	10	55	65 (58%)
Total	56 (50%)	57 (50%)	113 (100%)

Correct Prediction 0 100%

Incorrect Prediction 0 100%

OK

Cancel

WBCD_CART_Test



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ORACLE Analytics Cloud

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Create

Sort By Date

Model - WBCD_NN_Test

General

Quality

Permissions

Related

Positive Label for diagnosis M

F1 Value 0.92

Model Accuracy 95%

Precision 100%

Recall 85%

False Positive Rate 1%

Actual Values

Predicted Values

	M	B	Total
M	39	6	45 (39%)
B	0	69	69 (61%)
Total	39 (34%)	75 (66%)	114 (100%)

Correct Prediction 0 100%

Incorrect Prediction 0 100%

OK

Cancel



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Search the PGX Docs

🔍

- Welcome
- Installation
- Tutorials
- Use Cases
- Detect Potential Fraud in a Healthcare System

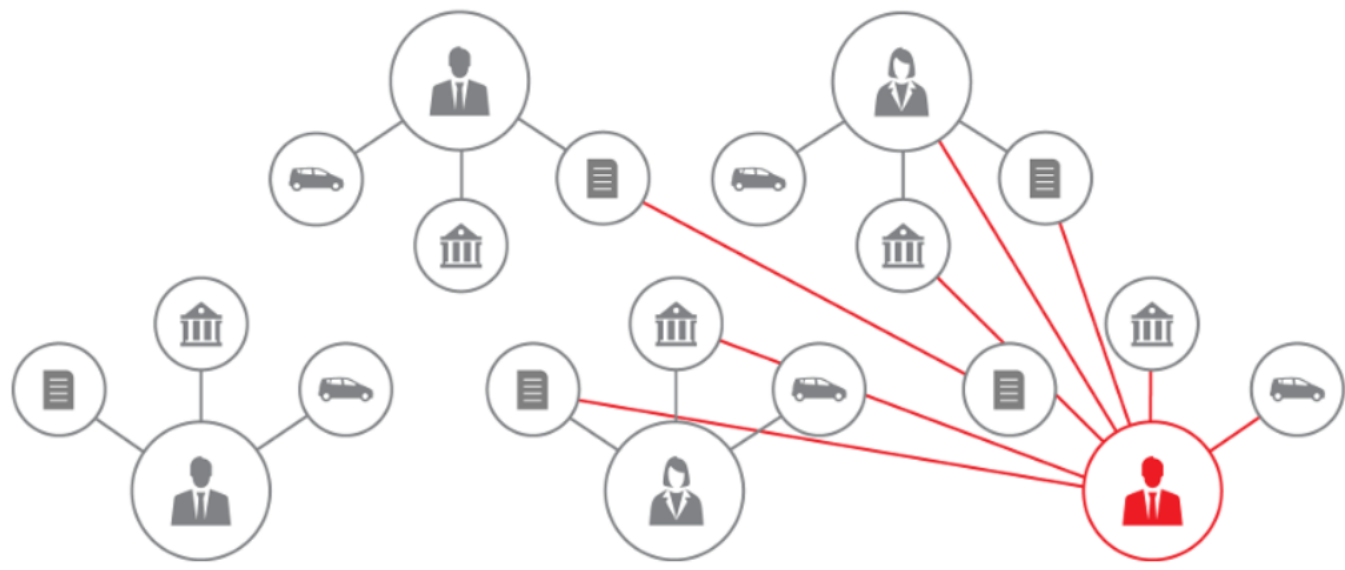
Detecting Anomalies

Detecting Anomalies (Advanced)
- Modeling an Electric Network with PGX
- Using PGX as a Recommendation Engine
- Analyzing Superhero Network with Patterns and Computations
- Reference
- About PGX
- Community 🌐
- Troubleshooting
- PGX on Oracle OTN 🌐

Detect Anomalies in a Healthcare System

In this example, we detect anomalies in medical transactions through a graph analysis procedure implemented with PGX. The result can be further investigated to identify potential fraud in the healthcare system. The example was inspired by this [article from Hortonworks](#).

Anomaly Detection



We use a public data set of medical transactions from CMS(the United States Center for Medicare and Medicaid Services) for the year 2012. The transactions are between over 880,000 medical providers and CMS where the total amounts to more than \$77B for the year. The data set can be downloaded from the CMS [Website](#).

Here, we first show how to convert the data into a graph representation. Then we discuss how to use PGX to analyze the graph data.

skater

SKATER

1.1.1b4

Search docs

Overview

What is Model Interpretation?

Skater

Algorithms supported by Skater

Install Skater

Tutorial

API Reference

Gallery

Docs » Overview

[View page source](#)



Overview

What is Model Interpretation?

The concept of model interpretability in the field of machine learning is still new, largely subjective, and, at times, controversial. Model interpretation is the ability to explain and validate the decisions of a predictive model to enable fairness, accountability, and transparency in the algorithmic decision-making (for a more detailed explanation on the definition of transparency in machine learning, see “Challenges of Transparency” by Adrian Weller). Or, to state it formally, model interpretation can be defined as the ability to better understand the decision policies of a machine-learned response function to explain the relationship between independent (input) and dependent (target) variables, preferably in a human interpretable way. Ideally, you should be able to query the model to understand the “what, why, and how” of its algorithmic decisions.



Self-Service Analytics

Provide a complete, end-to-end self-service environment that far surpasses data visualization.



Visualization and Dashboarding



Global Transformation Policies



Experience Continuity



Smart Collaboration



Integrated Data Science



Knowledge Fabric



KPI Management

Integrated Data Science

g and data science model consumption within Oracle Analytics.



Benefits of Data Science in the Cloud

Oracle Cloud Infrastructure Data Science brings the performance and security of Oracle Cloud, built specifically for data science teams, making data science collaborative, scalable, and powerful.



Collaborative

Finally, a platform designed for data science in the enterprise. Teams of data scientists can work together in a collaborative workspace with features for granular centralizing and organizing



Scalable

Leveraging the speed and scale of Oracle Cloud hardware, data scientists can scale up their data science workloads to tackle the big data challenges in their organizations. With no DevOps expertise, data scientists



Powerful

Designed with the needs of the modern data scientist in mind, Oracle Cloud Infrastructure Data Science brings together the latest open source machine learning toolkit with Oracle's proprietary technology. Data scientists can



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Integrated Cloud

Applications & Platform Services

ORACLE®