

Using Semantics, Machine Learning, & Data Science for Personalized Health Care Guidance

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Topics

- What is personalized healthcare guidance?
- Our data basics
- Challenges
- Summary and the future



Nice to see you again, Christina.

See what we can do for you as your personalized health assistant.

Take the tour



Wellbeing Programs

Get Active

Track your steps and earn 10 points daily.



Start

Sleep Well

Track your sleep and earn 5 points daily.



Start

Eat Smart

Track your calories and earn 10 points daily.



Start

Health Plans

Updated 5 minutes ago

Christina's summary

MEDICAL

Spent to date **\$0**

Plan phase **Deductible**

Rewards

Redeemable points **0 pts**



Earn 50 Points

Register for Engage

Meet your personalized health assistant!

Health info, in your pocket.

By clicking below, we'll text you a link to install our mobile app.

Standard messaging rates apply.



Text Me

Available on



Popular Programs



Telemedicine
LiveHealth Online



Health savings account (HSA)
Spending Account (HSA)

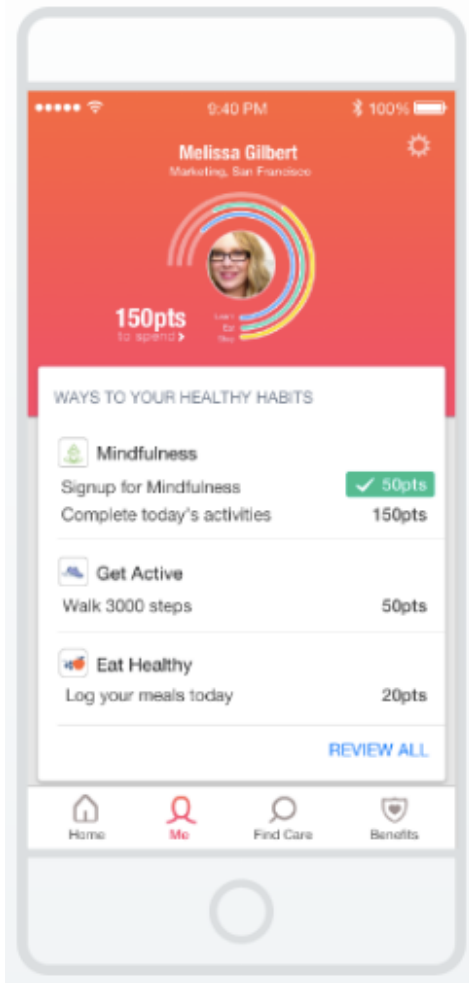


Prescription plan
Pharmacy

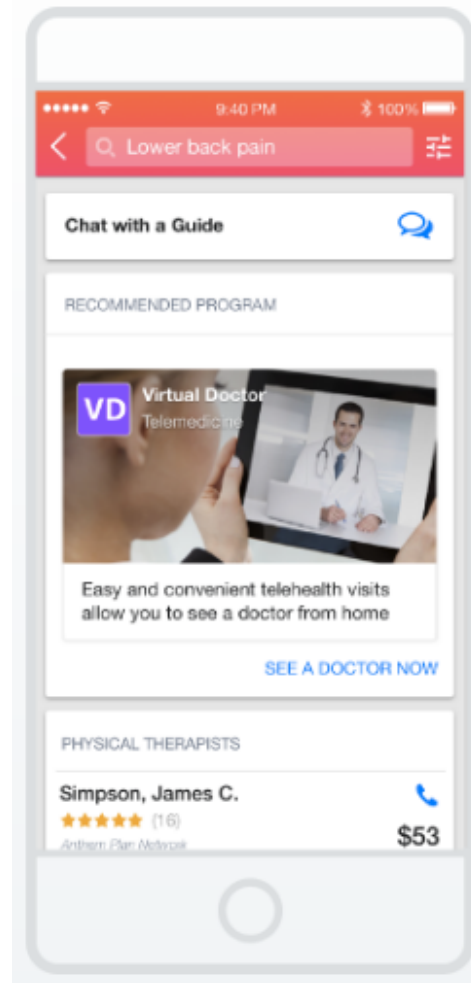
Need Help?

[Click here to start the tour](#)

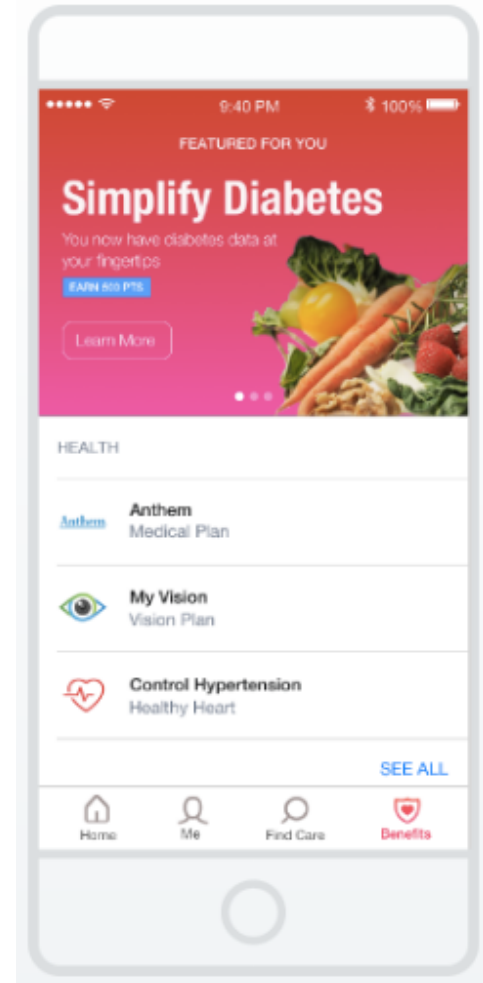
Personalized healthcare guidance



Stay Healthy



Access Care



Manage Conditions

Castlight Genius

Predicts which people are likely to:

- consider back surgery,
- get diagnosed with diabetes,
- suffer from anxiety,
- consider pregnancy,
- And other.

We reach out with helpful messaging.

Examples

Segment: New low back pain

Goal: Avoid unnecessary MRI, consider physical therapy if appropriate

The screenshot shows the Castlight Health website interface. At the top, there is a search bar with the text "Find doctors, services, conditions, or medicines" and a location dropdown set to "San Francisco, CA". Below the search bar is a navigation menu with options: Home, Care center, Find care, Past care, Your plan, Benefits, and Recommendations. The main content area features an article titled "Low back pain: which treatment is best?" with a photograph of a woman helping a child on a grassy hill. Below the image is a short paragraph and a "LEARN MORE" link. To the right of the article is a "BROWSE FOR CARE" section with links for Doctors, Primary Care, myStrength, Tests, Medicines, and More... Below this is a feedback prompt: "We value your opinion. We have an internal effort, Castlight for Castlight, to improve our product. Please share your feedback about the Castlight experience here." with a "Share your thoughts" button.

Segment: Uncontrolled diabetes, at risk for complications

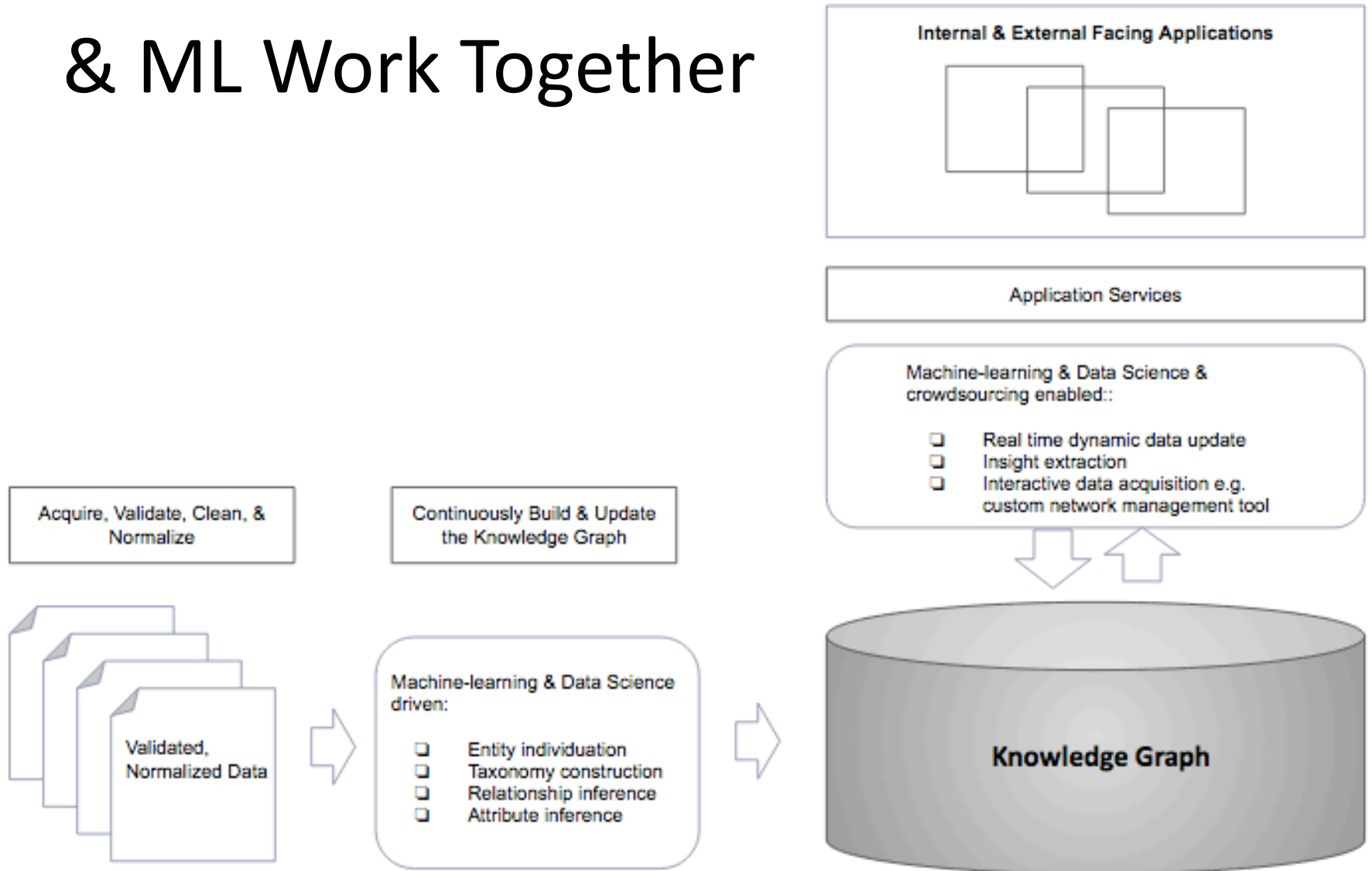
Goal: Find a high-quality PCP add to care team, if particularly hard to manage, consider endocrinologist

The screenshot shows a quiz on the Castlight Health website. The quiz title is "Quiz: Find out which types of experts you need on your health care team". The introductory text reads: "Managing diabetes and navigating care options is complicated. It's important to enlist the right experts for your care team, but how do you know which specialists or resources you need? Castlight can help. Just answer a couple of quick questions to get personalized recommendations that are right for you." The quiz is presented in a modal window with a dark header and a blue navigation bar. The question is: "Do you find it difficult to meet diabetes management goals your doctor may have recommended (e.g. keeping your blood pressure low or quitting smoking)?" Below the question are two buttons: "Yes" and "No or not sure".

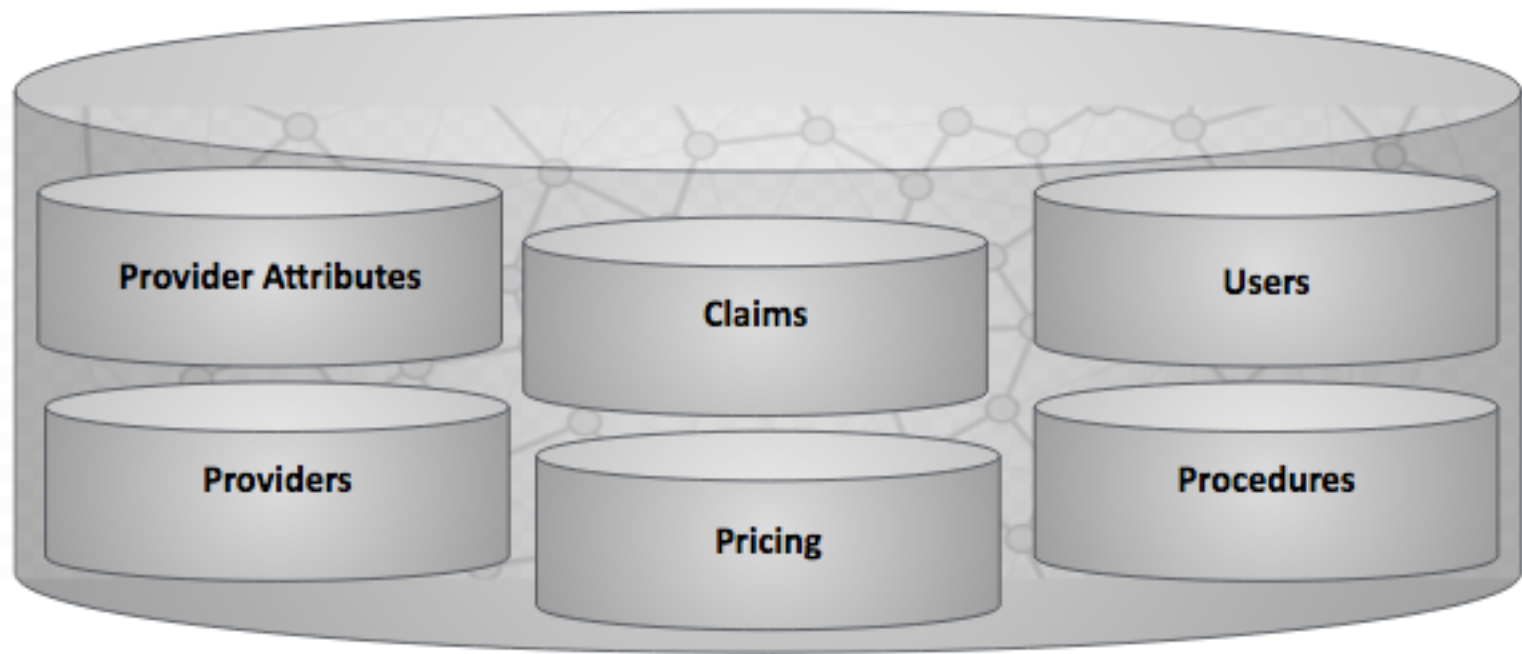
Disclaimer

All statements about technologies used at Castlight are conceptual and visionary --

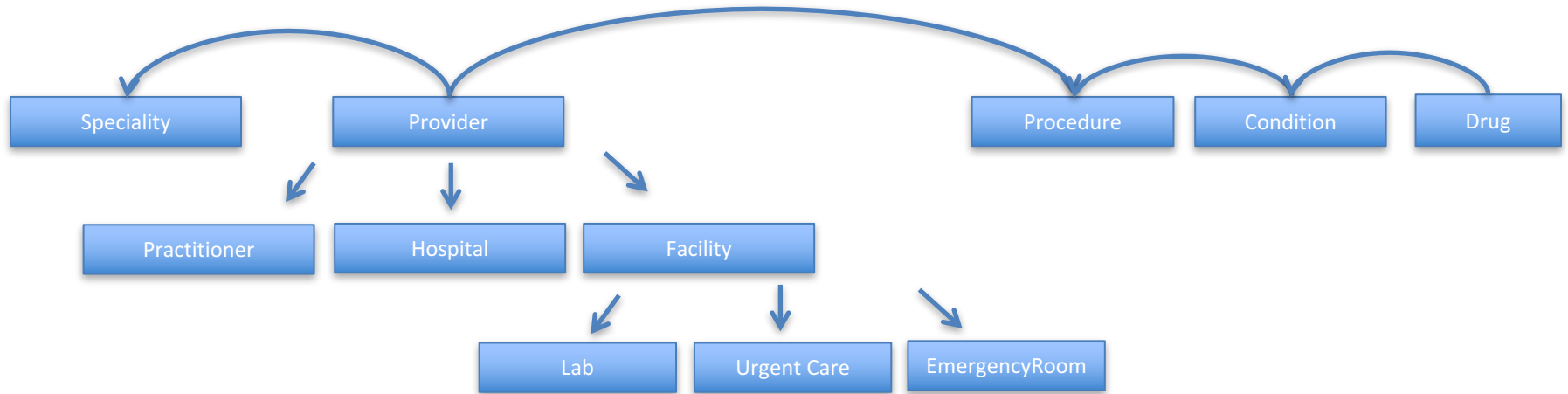
How Structured Data & ML Work Together



Data Basics: Types of Data



Data Basics: How they all relate



Example Rules

subclassOf Practitioner Provider

subclassOf Hospital Provider

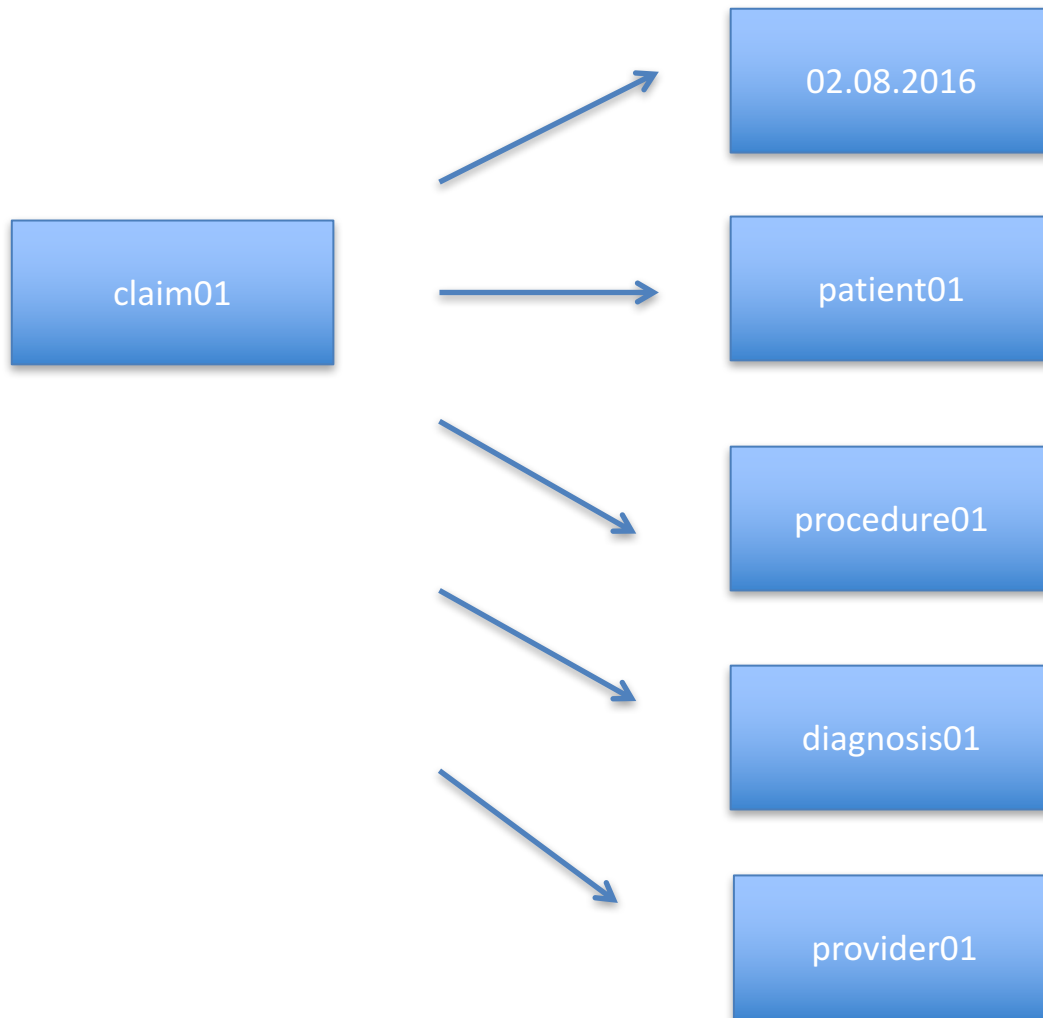
implies (and (performsProcedure ?pract ?proc) (isa ?proc Neurosurgery)) (hasSpecialty ?pract Neurosurgeon)

Example learning (or inferred data)

Every claim for a certain type of procedure at a certain type of lab is evidence that that type of lab performs that procedure (in general).

The amount paid in the past for a certain type of procedure at a certain type of provider can be used to predict how much you would pay for a similar procedure at a similar provider

Data Basics: Anatomy of a Claim



Challenges

Entity disambiguation

- Which provider is mentioned on the claim?
- Which patient is the claim for?

Provider networks

- Which providers are associated with supplemental data?
- Which providers are in which networks?
- Complex network definitions



Example: Provider Entity Resolution

Search results for "Mary Washington" Before:


✓ Compare 1-2 of 2

- Mary Washington Hospice**
Home Health Services
In-Network
2300 Fall Hill Ave, Suite 401
Fredericksburg, VA 22401 (1 mi)
- Mary Washington Home Health Age**
Home Health Agency
In-Network
2300 Fall Hill Ave, Suite 401
Fredericksburg, VA 22401 (1 mi)

✓ Compare 1-2 of 2

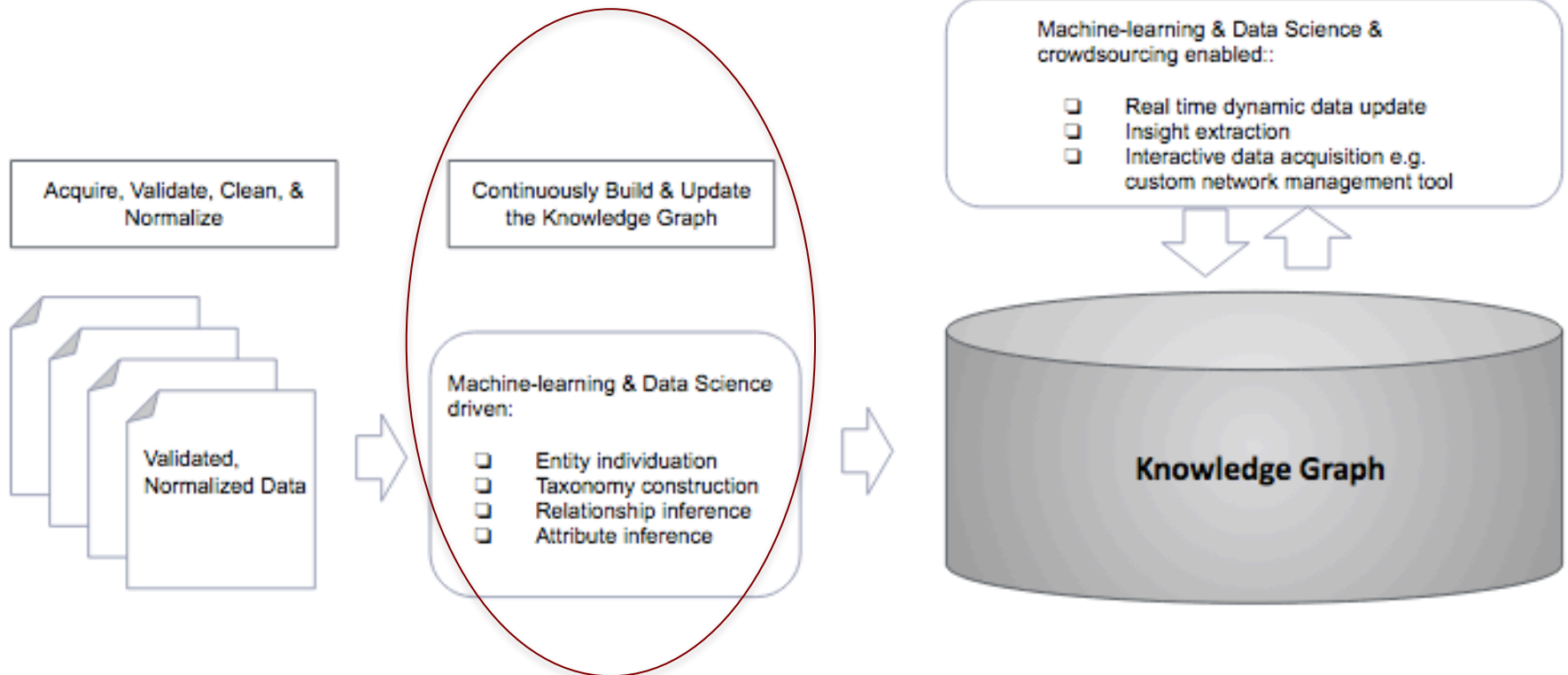
Search results for "Mary Washington" After:

✓ Compare 1-3 of 3

- Mary Washington Hospice**
Home Health Services
In-Network
2300 Fall Hill Ave, Suite 401
Fredericksburg, VA 22401 (1 mi)
- Mary Washington Hospital Inc**
Acute Care Hospital, Independent Lab
Blue Distinction Center+ |
In-Network
1001 Sam Perry Blvd
Fredericksburg, VA 22401 (1 mi)
 Overall surgical quality
★ patient ratings (100+)
- Mary Washington Home Health Age**
Home Health Agency
In-Network
2300 Fall Hill Ave, Suite 401
Fredericksburg, VA 22401 (1 mi)

✓ Compare 1-3 of 3

How Structured Data & ML Work Together



Questions?