



Delivering
SNOMED CT

[Insert Title]

SNOMED AI Symposium

Building Foundations

Atlanta, USA
October 2023



Don Sweete
Chief Executive Officer
SNOMED International

SNOMED AI Symposium

Today's Agenda

Keynote presentation - Paula Braun

VCR - Dr. Halamka

Panel Discussion: SNOMED CT and the Role of 3 Terminologies

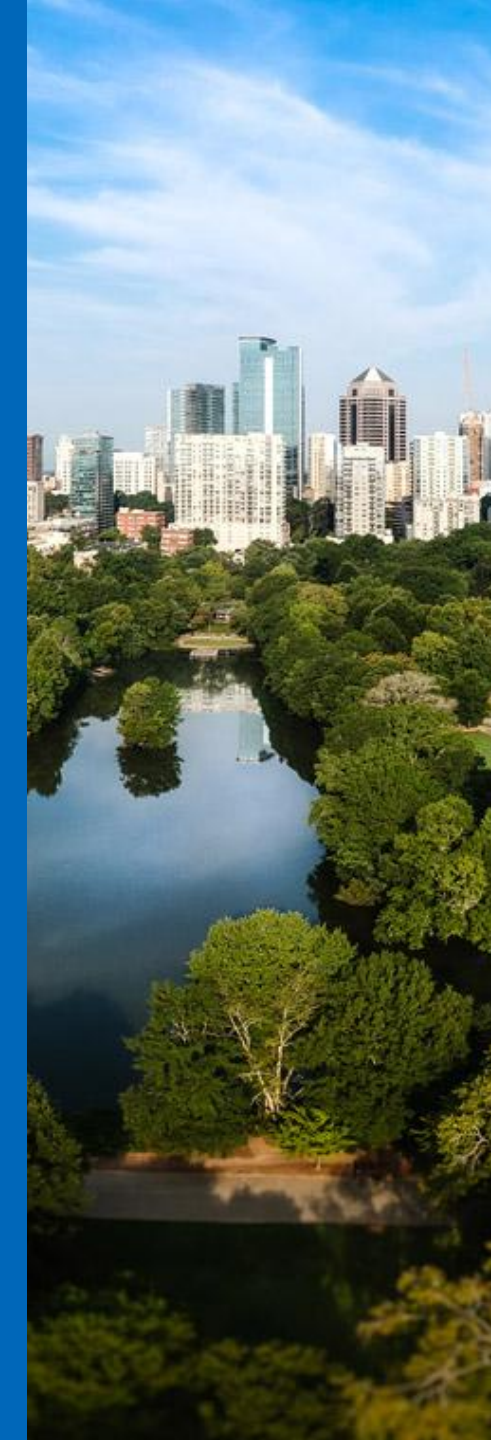
- Will Hardman
- Anthony Shek
- Igor Couto
- Christian Reich

BREAK

VCR - 3Data (novie)

Presentation - Charlie Harp

Entity Linking Challenge - Rory Davidson



Paula Braun
Entrepreneur in Residence
CDC/ONC

SNOMED
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Delivering
SNOMED CT

[Insert Title]

Standards + AI = :-)

It's Not an Either / Or Situation

Paula Braun
October 2023

Why We Do What We Do

Help Deliver Care That Is

- ❑ Proactive
- ❑ Collaborative
- ❑ Highly Personalized

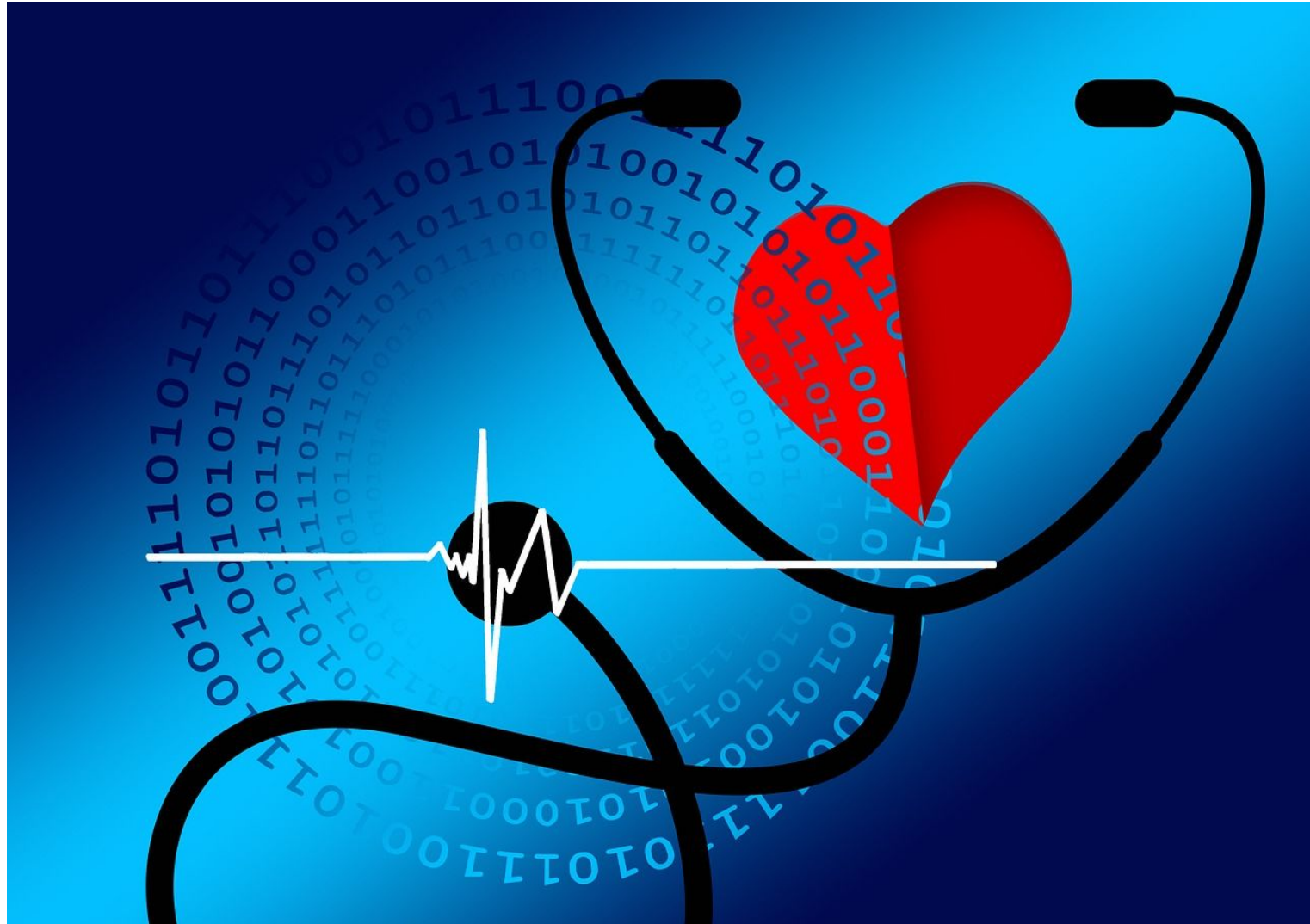
Learning Health Systems



Systematically gather and create evidence.

Apply the most promising evidence to improve care.

Standards Help Make Data Retrievable, Understandable, and Actionable



United Federal Action Supports Standards Health Data, Technology, and Interoperability: Certification Program Updates, Algorithm Transparency, and Information Sharing (HTI-1) Proposed Rule

ONC's HTI-1 proposed rule seeks to implement provisions of the [21st Century Cures Act](#) and make updates to the [ONC Health IT Certification Program](#) (Certification Program) with new and updated standards, implementation specifications, and certification criteria. Implementation of the proposed rule's provisions will advance interoperability, improve transparency, and support the access, exchange, and use of electronic health information.

Key provisions of the proposed rule include:

- Implementing the Electronic Health Record Reporting Program as new Condition and Maintenance of Certification requirements (Insights Condition) for developers of certified health information technology (health IT) under the Certification Program.
- Modifying and expanding exceptions in the [information blocking](#) regulations to support information sharing and certainty for regulated actors.
- Revising several Certification Program certification criteria, including existing criteria for clinical decision support (CDS), patient demographics and observations, electronic case reporting, and application programming interfaces for patient and population services.
- Raising the baseline version of the United States Core Data for Interoperability (USCDI) from Version 1 to Version 3.
- Updating standards adopted under the Certification Program to advance interoperability, support enhanced health IT functionality, and reduce burden and costs.

[Health Data, Technology, and Interoperability: Certification Program Updates, Algorithm Transparency, and Information Sharing \(HTI-1\) Proposed Rule | HealthIT.gov](#)

Predictive Decision Support Interventions

Objective: Enable improved information transparency on the trustworthiness of predictive DSIs to support their responsible and widespread use in health care.

Improve Transparency



Regarding how a predictive DSI is designed, developed, trained, evaluated, and should be used

Enhance Trustworthiness



Through transparency on how certified health IT developers manage potential risks and govern predictive DSIs that their certified Health IT Modules enable or interface with

Support Consistency



In the availability of predictive DSI information to users, so that users may determine the DSI's quality and whether its recommendations are fair, appropriate, valid, effective, and safe (FAVES)

Advance Health Equity by Design



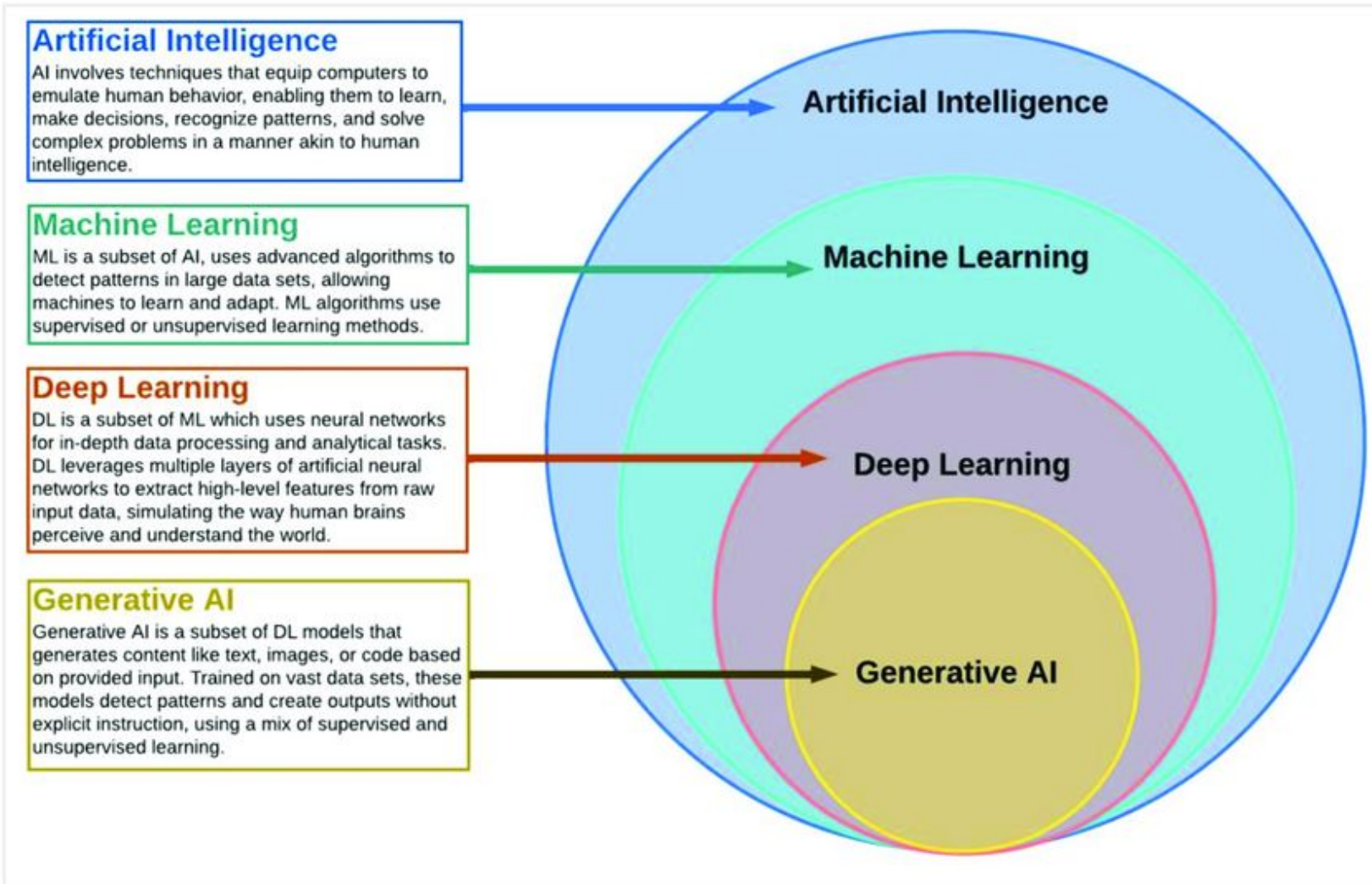
By addressing bias and health disparities, potentially propagated by predictive DSIs, to expand the use of these technologies in safer, more appropriate, and more equitable ways

New Frontiers for AI

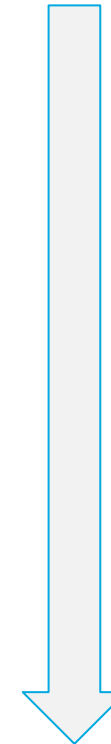


**Learn
Complex
Patterns
Faster
Across
Larger and
More Diverse
Data**

New Models Unleash New Possibilities



One Model, One Task

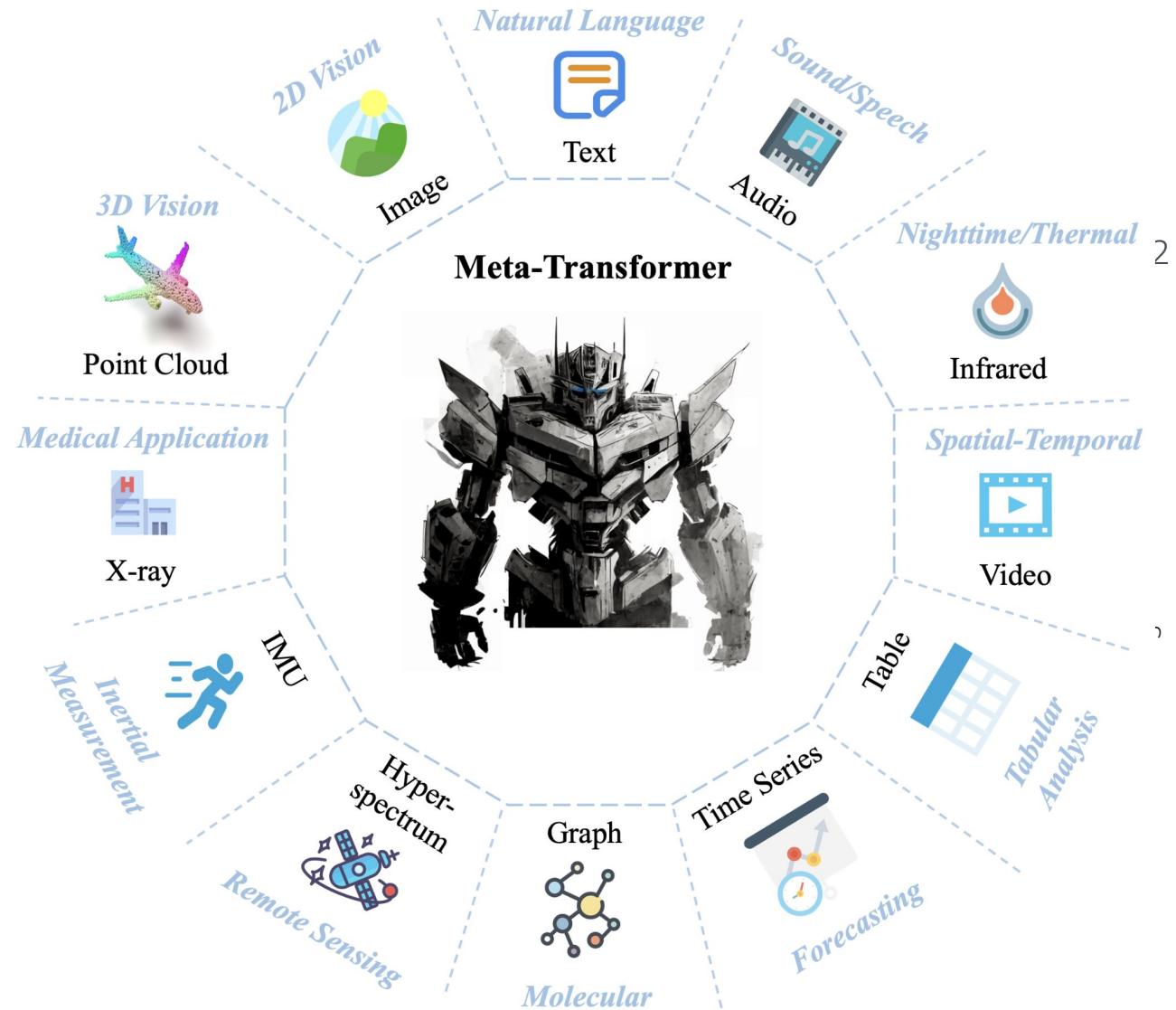


Models Learn, Adapt, & Generate New Content

TLDR: It's All About Transformers & Attention

**What data do you
need to focus on?**

**What data distract or
are less important?**



Models, Models Everywhere - Example Use Cases

Generative AI Models in Healthcare

Language Models (Notes / Papers)		Medical Models (Codes / Concepts)		Audio Models (Waveforms)		Image Models (Path / Radiology)		Chemical Models (RNA, DNA, Protein)	
Prior Auth Rules Standardization	Personalized Prior Auth Logic	Prior Auth Rules Standardization	Personalized Prior Auth Logic	Prior Auth Rules Standardization	Personalized Prior Auth Logic	Prior Auth Rules Standardization	Personalized Prior Auth Logic	Prior Auth Rules Standardization	Personalized Prior Auth Logic
Chatbots	Call Center Automation	Chatbots	Call Center Automation	Chatbots	Call Center Automation	Chatbots	Call Center Automation	Chatbots	Call Center Automation
Clinical Decision Support / Next Best Action	Claims Processing / Revenue Cycle Automation	Clinical Decision Support / Next Best Action	Claims Processing / Revenue Cycle Automation	Clinical Decision Support / Next Best Action	Claims Processing / Revenue Cycle Automation	Clinical Decision Support / Next Best Action	Claims Processing / Revenue Cycle Automation	Clinical Decision Support / Next Best Action	Claims Processing / Revenue Cycle Automation
Formulary Design	Fraud Detection and Prevention	Formulary Design	Fraud Detection and Prevention	Formulary Design	Fraud Detection and Prevention	Formulary Design	Fraud Detection and Prevention	Formulary Design	Fraud Detection and Prevention
Provider Referral and Leakage Management	Drug Discovery and Development	Provider Referral and Leakage Management	Drug Discovery and Development	Provider Referral and Leakage Management	Drug Discovery and Development	Provider Referral and Leakage Management	Drug Discovery and Development	Provider Referral and Leakage Management	Drug Discovery and Development
Pharmacovigilance and Adverse Events	Digital Twins	Pharmacovigilance and Adverse Events	Digital Twins	Pharmacovigilance and Adverse Events	Digital Twins	Pharmacovigilance and Adverse Events	Digital Twins	Pharmacovigilance and Adverse Events	Digital Twins
Medical Imaging and Diagnostics	Automation of Provider Notes	Medical Imaging and Diagnostics	Automation of Provider Notes	Medical Imaging and Diagnostics	Automation of Provider Notes	Medical Imaging and Diagnostics	Automation of Provider Notes	Medical Imaging and Diagnostics	Automation of Provider Notes
Patient Matching	Episodes of Care	Patient Matching	Episodes of Care	Patient Matching	Episodes of Care	Patient Matching	Episodes of Care	Patient Matching	Episodes of Care
Education and Content Creation	Language Translation	Education and Content Creation	Language Translation	Education and Content Creation	Language Translation	Education and Content Creation	Language Translation	Education and Content Creation	Language Translation

Help People Understand What Drives their Health, with Guidance from their Physicians and Care Team

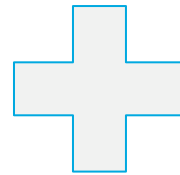


Navigating Choices About One's Health Can be Hard and Confusing; Available Options Have Limitations



"OpenAI's models are not fine-tuned to provide medical information," a company spokesperson said. "You should never use our models to provide diagnostic or treatment services for serious medical conditions."

Imagine If . . .



What if every patient had access to a digital ally – like a mix of Waze and WebMD – solely dedicated to navigating their healthcare journey and improving their health outcomes?

Tailored, Trustworthy Information in the Pocket of Every Patient



Deliver patients a better understanding¹⁷ of what their doctors recommend and what their insurance covers, to help improve their care regime and increase their quality of life.

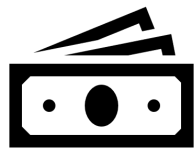
Leverage Existing Platforms and Standardized APIs that Help People Access and Organize their Data

Fetch Data via APIs + Make it Understandable using AI

EHR



Claims



Sensors



Imaging



Molecular



Patient
Contributed



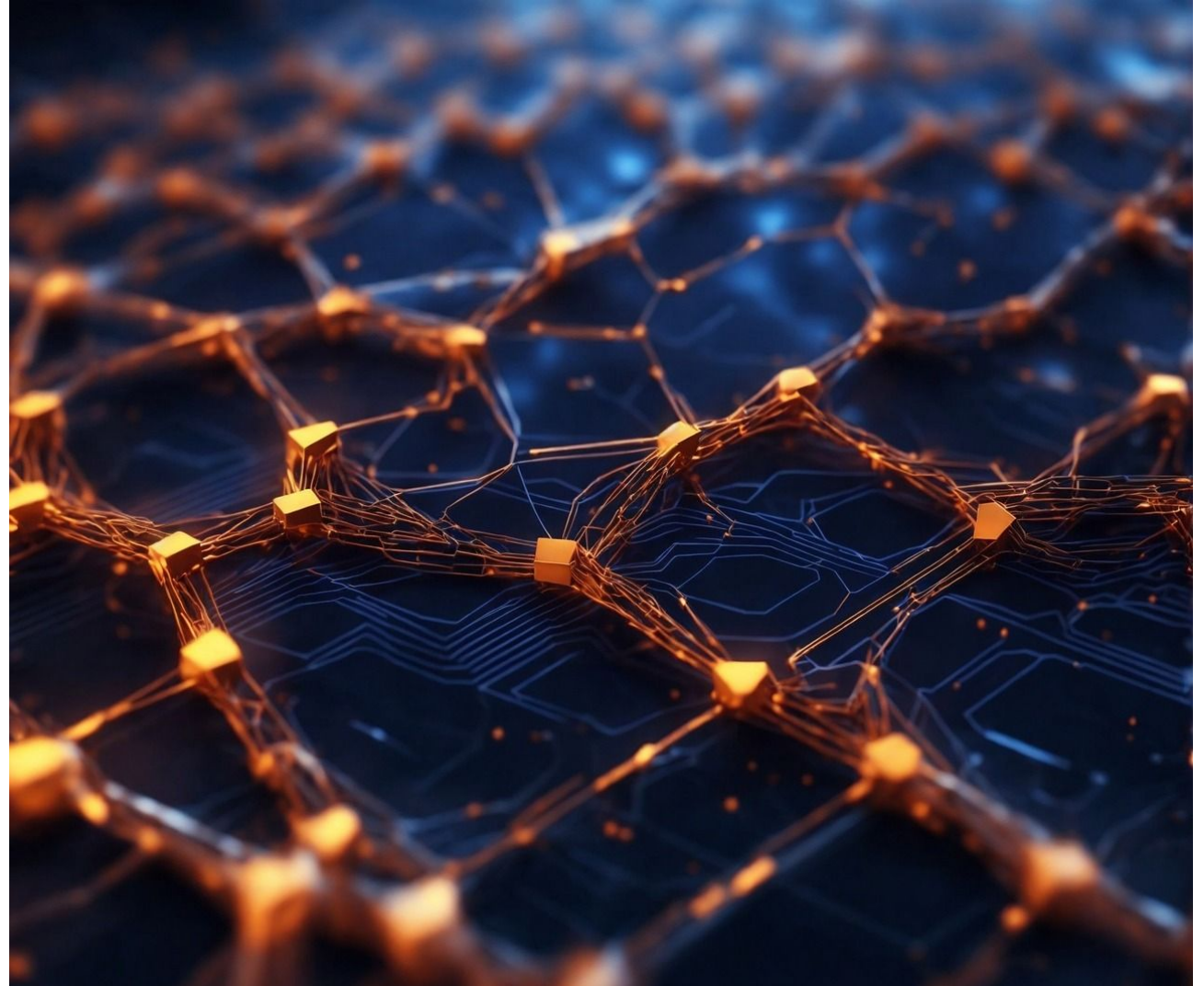
Step 1: Ensure Secure Access to Sensitive Data



Keep data secure from unauthorized access and tampering while also granting patients (and others they trust) access to their own data (and AI acting on their behalf).

Step 2: Train AI Across Larger and More Diverse Patient Profiles

Train generative AI models across these “honeycombs” to learn patterns and make discoveries across more representative, complex patient profiles.



Step 3: Assess AI's Potential to Increase Patients' Understanding and Improve Their Health Outcomes

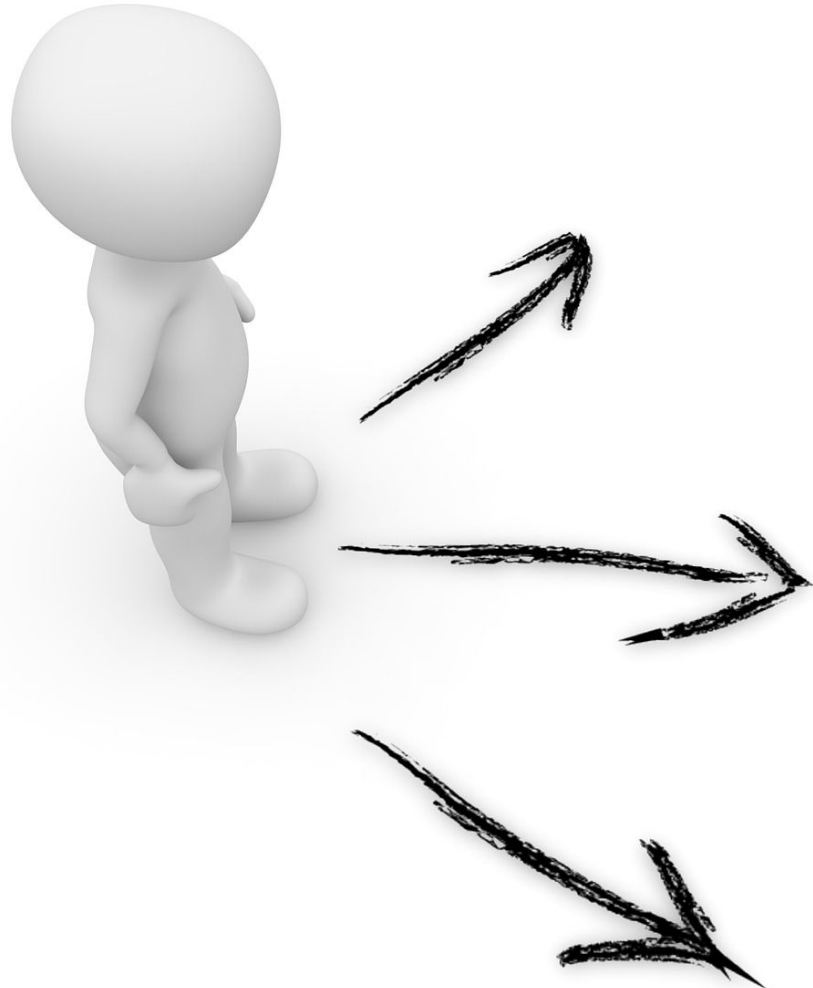


Assess how safely, accurately, and reliably AI trained across the “honeycombs” can help communicate vital information about disease progression, treatment options, odds of success, and risks across diverse patient subpopulations.

Put Patients at the Center

- ❑ A more complete picture of what happening in your body – both during and in between doctors visits.
- ❑ Clear explanations and action steps that are tailored to your needs and are accessible to you.
- ❑ A care plan that makes sense and is based on your input. It spells out what's happening, what'll likely work, and what likely won't based on your unique biology, personal situation, and real-world results from people like you.
- ❑ Reminders and feedback to help you see your progress, stay on track, and pivot when things change.
- ❑ Immediate and insightful responses to your questions, from credible sources.

What Role(s) Will Standards Play in AI?



"Let your hopes, not your hurts, shape your future." ~
Robert H. Schuller

Questions and Discussion

The logo for SNOMED International, featuring the text "SNOMED International" in white on a blue square background.

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John Halamka on AI's Future



Panel Discussion: SNOMED CT and the Role of Terminologies



Will Hardman
Data Scientist
Veratai



Anthony Shek
Clinical Data
Scientist
Guy's and St Thomas'
NHS Foundation Trust &
King's College



Igor Couto
CEO
Sofya



Christian Reich
CEO
Odysseus

The logo for SNOMED International, consisting of the text "SNOMED" above "International" in white, set against a blue square background.

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Break

We will return shortly

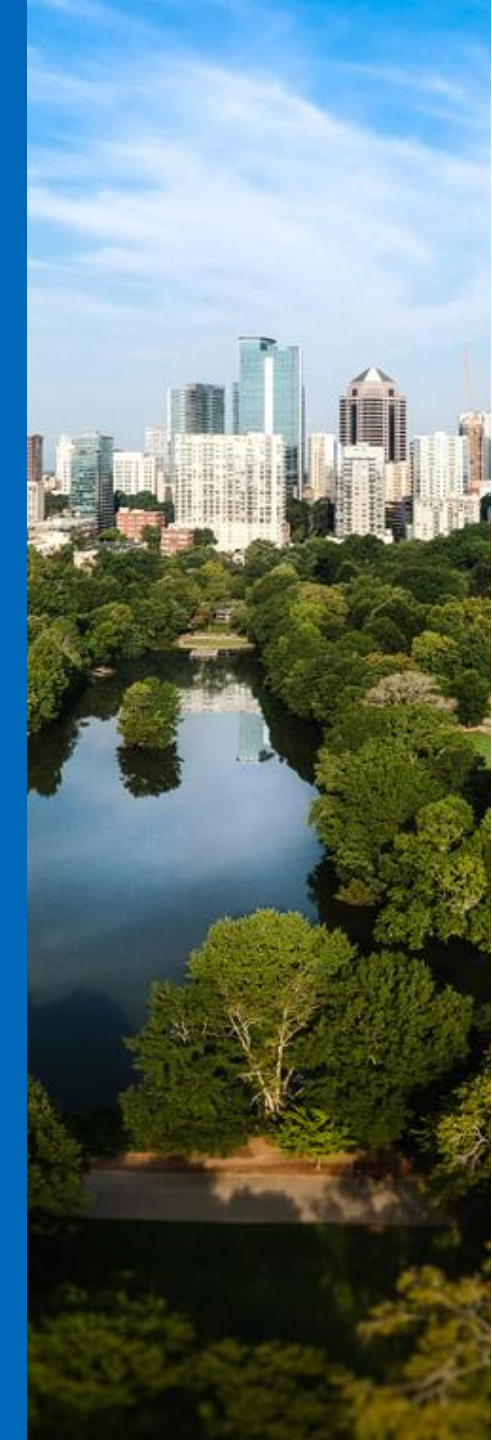
A3Data - nuvie



<https://a3data.com.br/>
www.nuvie.ai

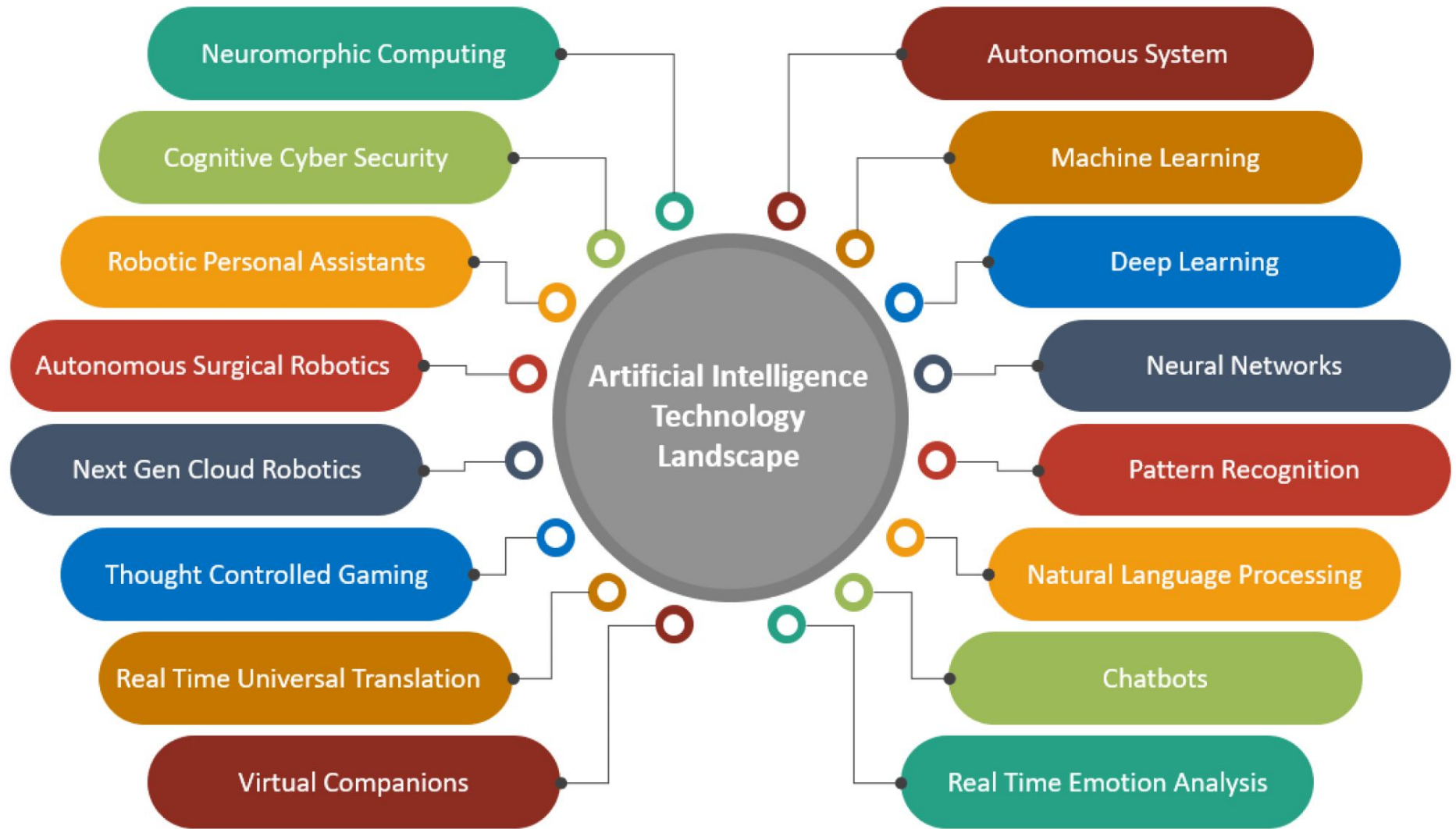


Charlie Harp
*Chief Executive Officer
Clinical Architecture*





Rory Davidson
Chief Information Officer
SNOMED International



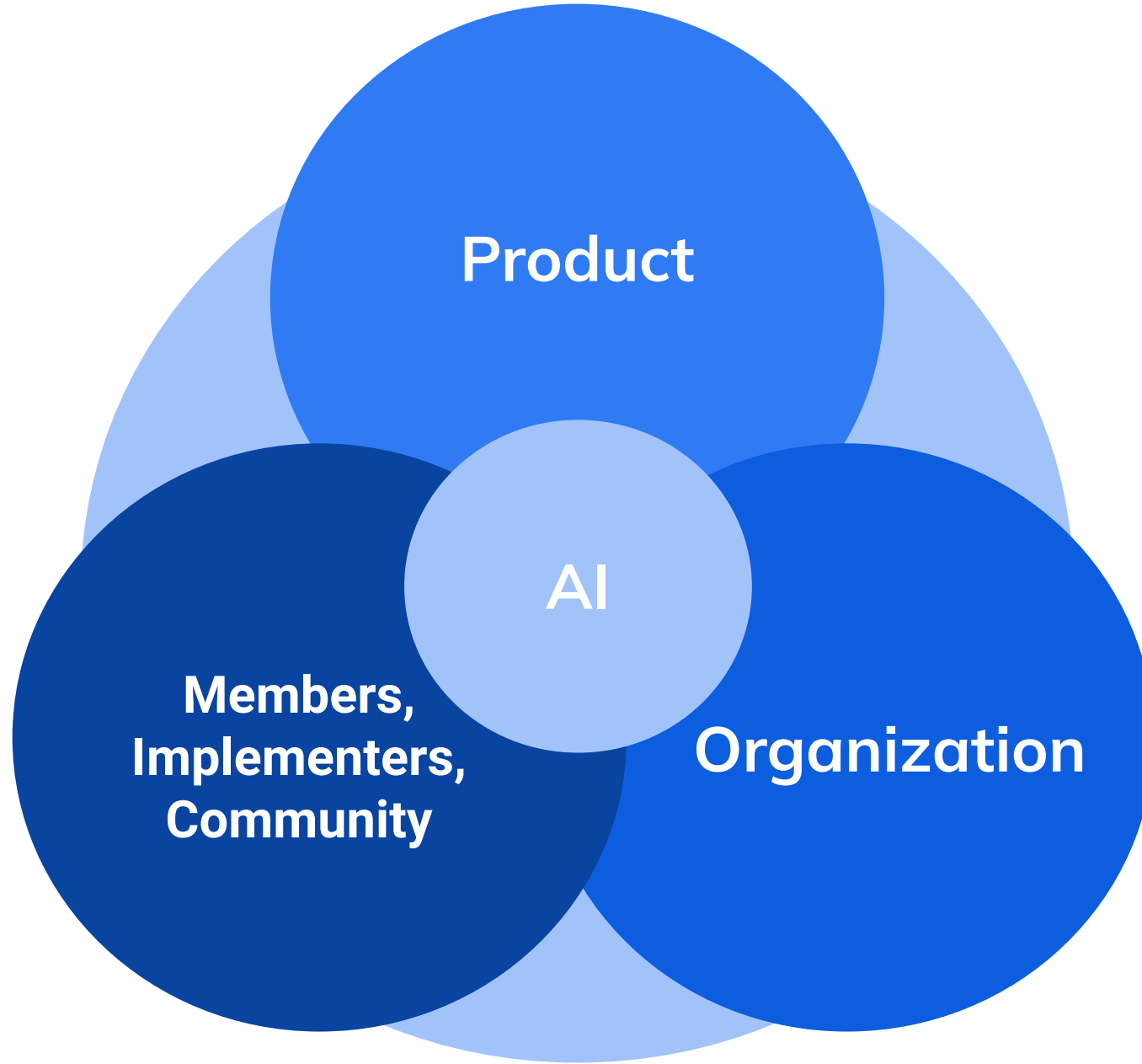
Hype Cycle for Artificial Intelligence, 2023



[gartner.com](https://www.gartner.com)

Source: Gartner
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Gartner



Explore how AI can be used
to support implementation:

**Translation
Generated Extension Content**

Promote the incorporation of
SNOMED CT in AI models:

**SNOMED CT providing “guardrails”
for an LLM.**

Show how AI can enhance
the “End User Experience”:

**LLM improved contextual
search**

Use AI to support
modelling and Quality
Assurance:

QA models & templates

Drive improvements in
machine-assisted clinical
coding:

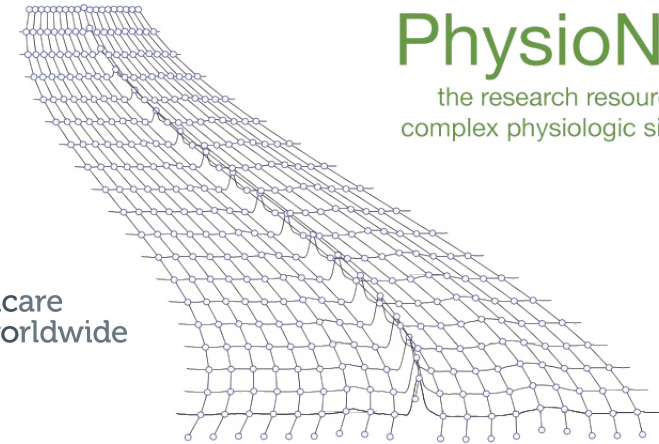
Entity Linking

The SNOMED CT Entity Linking Challenge



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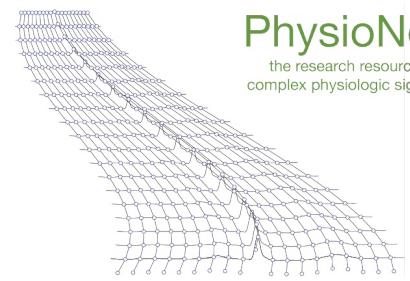
Leading healthcare
terminology, worldwide



PhysioNet

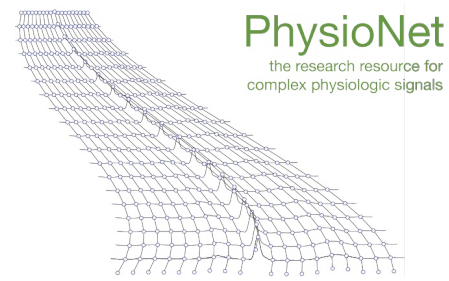
the research resource for
complex physiologic signals

Hosted by
DRIVENDATA



Help uncover how entity linking models can improve healthcare delivery

The SNOMED CT Entity Linking Challenge will provide an opportunity to advance the development of efficient and reliable tools for **automating the coding of patient data**, facilitating **interoperability, decision support**, and **improving healthcare delivery**.



PhysioNet

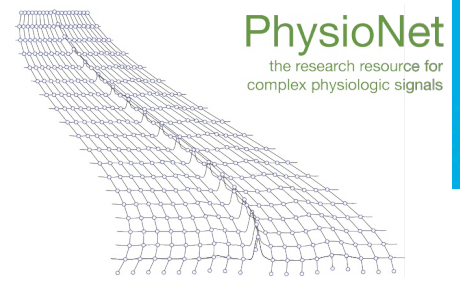
- Data publishing platform at MIT
- Established in 1999
- Funded by NIH as an outreach arm of a research project
- Rebuilt in 2019
 - give datasets equal standing to the articles that they underpin
- <https://physionet.org/>

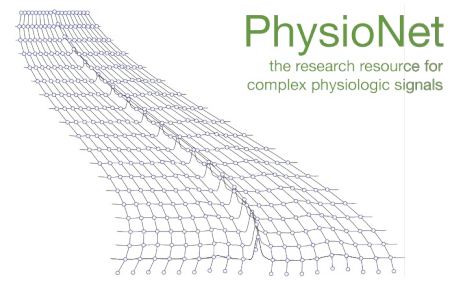
MIMIC-IV

- Highly-detailed critical care database
- >40k patients admitted to Beth Israel Medical Center
 - ECGs, waveforms
 - Vital signs, medications, labs tests
 - Free text notes
 - Chest X-rays
 - Echocardiograms
- Extensively used across education, research, and industry

The Dataset

- Using MIMIC-IV in cooperation with PhysioNet
- Annotation completed with:
 - 6 annotators from the SNOMED community
 - **70,599** annotations across **272** documents
 - Estimated the overall inter-annotator agreement (IAA) – as measured by the Jaccard Similarity score – of **0.83** over the entire annotation dataset.
 - Annotation results document produced with lessons learnt
 - **SNOMED CT Annotation Guideline** also produced
- This was an ambitious and challenging annotation project, more complex than either of the nearest comparators from the literature.
- To our knowledge, this is the **largest openly available clinical annotation dataset**, with SNOMED CT used as the target terminology





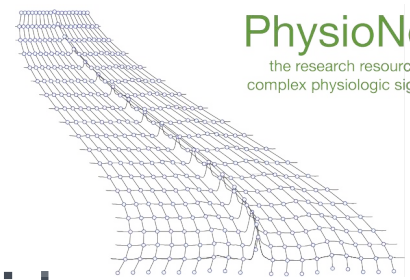
The algorithms that perform best on additional real-world data will be publicly recognized on the challenge leaderboard, and **\$25,000 USD in cash prizes** will be awarded to the top teams!



Timeline

- Registration opens on DrivenData.org: **Today, October 25, 2023**
 - snomed.org/entity-linking-challenge
- Register for access competition data through **PhysioNet**.
 - Real-world patient data is highly sensitive and difficult to share safely. The data for this competition has identifying factors removed, but still details the care of vulnerable and still-living people.
 - To access the competition data, each participant will need to register with PhysioNet under MIT's agreement and complete a short online training course. Then you will have access to the world's largest publicly available repository of patient data for this challenge and more!

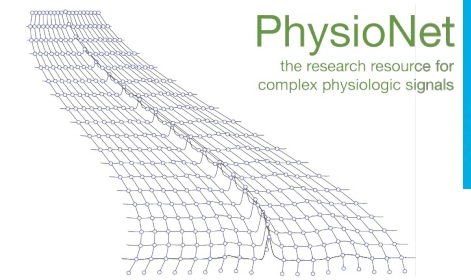
Timeline



- Live challenge period: **Starts early December, 2023 until mid February, 2024**
 - Data scientists, researchers, and engineers from around the world will use their skills to build accurate predictive models using cutting-edge approaches in data science.
 - Participants will build ML models and submit containerized code for executing inference on the cloud. The results of the inference will be compared against real-world data.
- Post-challenge prize awarding at the SNOMED International April Business meetings in London, **April 13-17, 2024**
- At the end of the challenge, all prize-winning solutions will be shared under **an open source license for anyone to use and learn from.**
- The annotated dataset will also be **donated to PhysioNet to be part of the MIMIC-IV dataset.**

And... Go

snomed.drivendata.org



Thank You for Attending

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