



Introduction to John Snow Labs Ecosystem, Product Portfolio & Medical Language Models

State-of-the-Art Healthcare AI with Best-in-Class Performance

Certification Trainings | October, 2025



Applied Generative AI for Data Scientists

4-Day Certification Training Program – Comprehensive Hands-On Workshop



Day 1 – Monday

Foundations of Medical LLMs & JSL Offerings

Introduction & Intro to Medical LMs – John Snow Labs ecosystem, available models, benchmarking, comparison to medical and general-purpose LMs/ LLMs, deployment and running

Deploy LLMs as private endpoints – hands-on deployment on SageMaker, Azure, Databricks, Snowflake, OCI with integrations

Gen AI Lab Part 1 – annotation projects, custom taxonomies, pre-annotations with LLM/models/rules, project management

Gen AI Lab Part 2 – analytics and HIPAA-compliant human-in-the-loop validation workflows with hands-on access



Day 2 – Tuesday

Clinical Data & Patient Journeys

Healthcare-specific Language Models – information extraction (NER, RE, pipelines) and use of small Medical LLMs in Healthcare NLP

Building Patient Journeys & Cohorts – automated harmonization of multimodal clinical data into OMOP using generative and agentic AI

Medical Terminology Server – mapping and normalizing concepts across 30+ vocabularies (ICD-10, SNOMED CT, RxNorm, LOINC, UMLS)

Automated Risk Adjustment & HCC Coding with Martlet.ai – streamline patient risk workflows using medical LLMs with compliance



Day 3 – Wednesday

Healthcare NLP in Practice

De-Identify & Obfuscate PHI Part 1 – fully automate anonymization of clinical data using LLM-powered pipelines and Healthcare NLP guardrails

De-Identify & Obfuscate PHI Part 2 – patient and document-level extraction, ensuring HIPAA-compliant, auditable outputs for analytics

Oncology Research & Treatment with Healthcare NLP – real-world oncology use cases and treatment planning applications

Accelerating Rare Disease Diagnosis – automated HPO code extraction from clinical notes to support earlier diagnosis and treatment



Day 4 – Thursday

Visual & Multimodal AI & Open Source

Visual NLP Classic Use Cases – OCR, object detection, signature matching, and document layout analysis

Visual Document Understanding with Small VLMs – leveraging state-of-the-art Visual LMs for advanced document parsing at scale

De-identification of Medical Images – anonymize structured and unstructured medical images in DICOM, SVS, and pathology formats

Open Source Spark NLP – latest features including Reader2X for faster data ingestion, new annotators, and benchmarks

John Snow Labs - 10+ yrs of Excellence in Healthcare AI

Unique Approach to Solving Customer's Challenges

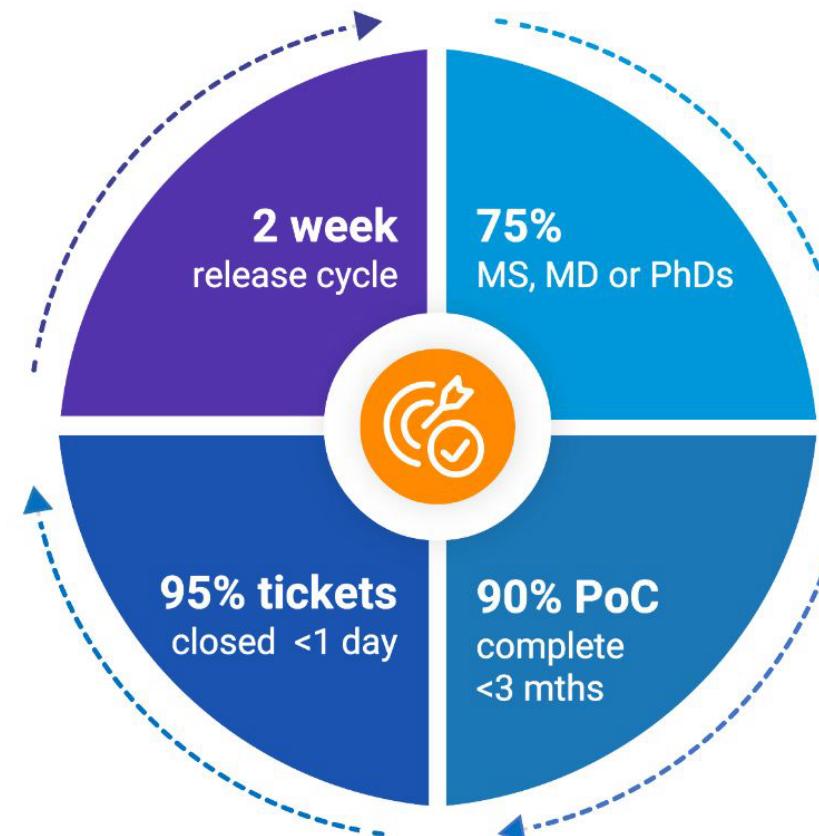
State-of-the-Art Healthcare AI Models

Continuous AI Adoption

Customer consultation supporting evaluation of new AI innovations from research to adoption

End-to-End Integration

Production ready development and deployment from raw data to end users leveraging State-of-the-Art Software



Dedicated Research team

Continuous innovation by PhDs and MDs in most impactful healthcare AI problems working with academics

Rapid prototyping and PoC

PoC in weeks with benchmark and scalable plans for production development

John Snow Labs - 10+ yrs of Excellence in Healthcare AI

Healthcare Industry Impact

2,600+

Pre-trained Medical AI Models
Deployed

200+

Languages Supported

100+

Major Healthcare
Organizations Trust JSL

Trusted Healthcare Partners

Kaiser
Permanente

AWS

Roche

Providence
Health

Memorial
Sloan
Kettering

Intel

Oracle
Health

Databricks

DocuSign

Novartis

Mayo
Clinic

Dana
Farber

Industry Recognition



2025 Oracle Excellence Award for AI
Innovation



Best Healthcare AI Application - Global Generative AI
Awards 2025



Global 100 Award for Best Medical Application of
LLMs

Healthcare Industry Impact



Maximizing Patient Care through AI-Enhanced HCC Code Discovery



Building Oncology Patient Timelines and Recommend Clinical Guidelines



GE Healthcare

Extracting what, when, why, and how from Radiology Reports in Real World Data



Identifying mental health concerns among children with Cerebral Palsy on EHR data



Empowering Healthcare through NLP: Harnessing Clinical Document Insights



U.S. Department of Veterans Affairs



De-Identify Doctor Notes in German Language



Lessons Learned De-Identifying 700 Million Patients Notes with Spark NLP



Understand Patient Experience Journey to Improve Pharma Value Chain



Maximizing Patient Care through AI-Enhanced HCC Code Discovery



Deidentifying Free-Text Patient Notes: No Need for Tradeoffs



Leveraging Medical Generative AI & Agents to Help Clinicians Provide Evidence-Based Care



Lessons Learned De-Identifying 700 Million Patient Notes with Spark NLP



Using Healthcare-Specific LLM's for Data Discovery from Patient Notes & Stories



Spark NLP in Action: Improving Patient Flow Forecasting at Kaiser Permanente



Identifying mental health concerns, subtypes, temporal patterns, and differential risks among children with Cerebral Palsy



RAG on FHIR: Using FHIR with Generative AI to Make Healthcare Less Opaque



Empowering Healthcare through NLP: Harnessing Clinical Document Insights at Intermountain Health



Extracting what, when, why, and how from Radiology Reports in Real World Data acquisition projects



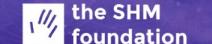
Matching Patients and Answers to the Largest Clinical Guidelines Library in the World



How CARE-CONNECT and Spryfox use NLP in Making Patient-level Decisions



Accelerating clinical risk adjustment through Natural Language Processing



Deep6 accelerates clinical trial recruitment with Spark NLP

Applying advanced analytics to help improve mental health among HIV positive adolescents in South Africa



Using NLP to Identify the Emotional State of Patients at Different Stages of a Disease Journey



Using Real-World Data to Better Understand Inflammatory Bowel Disease (IBD)



Introducing the MultiCaRe Dataset: A Multimodal Case Report Dataset of Clinical Cases, Images, Labels and Captions

John Snow Labs Tools & Libraries Ecosystem

v6.1.x

Comprehensive NLP Platform with 140,000+ pretrained models
(2600+ models in healthcare)

Python Libraries

Spark NLP

OPEN SOURCE (163M download)

Production-grade text processing

Healthcare NLP

LICENSED

Clinical & biomedical text

Visual NLP

LICENSED

Images, PDFs, DICOM

Finance NLP

LICENSED

Financial documents

Legal NLP

LICENSED

Legal documents

Medical Large/ Small Language Models in production

100+ task-specific Medical LLMs at various sizes for local use



Healthcare NLP Annotator Modules

Named Entity Recognition

- NerModel - Neural network-based NER
- ZeroShotNerModel - RoBERTa zero-shot NER
- NerConverterInternal - IOB to chunk format

Relation Extraction

- RelationExtractionDL - Deep learning RE
- ZeroShotRelationExtractionModel - BERT NLI
- REChunkMerger - Merge relation chunks

Entity Resolution

- SentenceEntityResolver - ICD-10, RxNorm, SNOMED
- ChunkMapper - Code mapping with dictionaries
- DocMapper - Clinical code to code mapping

Assertion Status Detection

- AssertionDL - Deep learning assertion status
- BertForAssertionClassification - BERT-based
- ContextualAssertion - Negation & uncertainty

De-Identification

- Dedentification - PHI masking/obfuscation
- FhirDedentification - FHIR privacy rules

Classification

- BertForSequenceClassification - Multi-class
- FewShotClassifier - Limited labeled data

Supporting Utilities

- ChunkMerge, ChunkFilterer, DateNormalizer



Notebooks

github.com/JohnSnowLabs/spark-nlp-workshop

Medical Data De-Identification & Obfuscation

Medical Language Models Implementation

Medical Terminology Mapping & Standardization

Oncology Information Extraction from Reports

Patient Risk Adjustment & HCC Coding

Regulatory-Grade Data Abstraction

Clinical Entity Recognition & Resolution

Relation Extraction from Medical Documents

Medical Summarization & Question Answering

Custom Model Training & Fine-Tuning



Spark NLP: English

- Medical Large Language Models
- Detect Entities in Clinical Text
- Information Extraction in Oncology

Spark NLP: World Languages

- Explore the use of Medical Large Language Models for tasks like Text Summarization, Generation, and Question Answering.

Clinical NLP

- Live Demo Colab
- Live Demo Colab
- Live Demo Colab

Voice of Patients

- De-identify Clinical Notes in Different Languages
- Adverse Drug Event Detection
- Voice of the Patients

Medical NLP: World Languages

- De-identify and redacts protected health information (PHI) in English, Spanish, French, Italian, Portuguese, Romanian, and German texts.

Medical Large Language Models

- Live Demo Colab
- Live Demo Colab
- Live Demo Colab

Biomedical NLP

- Social Determinants of Health
- Calculate Medicare HCC Risk Score
- Recommend Available Models for Your Text

Visual NLP

- Extract Social Determinants of Healthcare such as employment, education, social support, housing, financial hardship, substance abuse,

Finance NLP

- Live Demo Colab
- Live Demo Colab
- Live Demo Colab

Legal NLP

- Live Demo Colab
- Live Demo Colab
- Live Demo Colab

Language Models Hub

A place for sharing and discovering language models

Search models and pipelines

Show All models & pipelines in All Languages for All versions

107,963 Models & Pipelines Results:

Supported models only

Assigned tags Entities Annotator class Marketplace Sort by: Date Views Downloads Show recommended first

Minimal Dicom de-identification Date: 02.2025 task: Dicom De-identification Language: English Edition: Visual NLP 5.5.0

Pseudonym Dicom de-identification Date: 02.2025 task: Dicom De-identification Language: English Edition: Visual NLP 5.5.0

Full Dicom de-identification Date: 02.2025 task: Dicom De-identification Language: English Edition: Visual NLP 5.5.0

Llama-2 text-to-text model Date: 05.2024 task: Text Generation Language: English Edition: Spark NLP 5.3.0

Llama-2 text-to-text model Date: 05.2024 task: Text Generation Language: English Edition: Spark NLP 5.3.0

M2M100 Multilingual Translation L2B Date: 05.2024 task: Text Generation Language: Multilingual Edition: Spark NLP 5.3.0

JohnSnowLabs / spark-nlp-workshop

Code Issues Pull requests Discussions Actions Projects Wiki Security Insights

spark-nlp-workshop Public

master 83 Branches 7 Tags Go to file Add file Code

dceccini Re-upload audio file (#1578) 16thFeb2 - 11 hours ago 2,835 Commits

Spark_NLP_Udemy_MOOC Add & Update Notebooks 3 months ago

data add files 2 years ago

databricks Updated Databricks Notebooks (#1523) 2 months ago

finance-nlp Bump streamlit in finance-nlp/platforms/docker/zeroshot... 11 months ago

generative-ai notebook updated last year

healthcare-nlp Create AutoGUF Notebook (#1554) 5 days ago

java-healthcare add java examples 4 years ago

jupyter SparkNLP_offline_installation.ipynb revised (#1227) last year

legal-nlp Fixed InLeg notebooks 5 months ago

niu Updated niu folder and add colab link for notebook to ... 3 years ago

open-source-nlp Create AutoGUF Notebook (#1554) 5 days ago

platforms Bump pillow from 4.0 to 10.3.0 in /platforms/sagemaker... 11 months ago

products MKT: Update Marketplace Artifacts (#1566) yesterday

scala Add SBT project example 3 years ago

tutorials Re-upload audio file (#1578) 11 hours ago

visual-nlp Merge branch 'master' of https://github.com/JohnSnowLa... last year

zeppelin clean notebook 7 years ago

.gitattributes Ignore html from linguist-vendored 6 years ago

.gitignore Changes load to pretrained 3 years ago

ISSUE_TEMPLATE.md Create ISSUE_TEMPLATE.md 6 years ago

LICENSE Initial commit 7 years ago

README.md Update README.md 4 years ago

colab_setup.sh Update colab_setup.sh 4 years ago

! colab_setup.sh Add files via upload 3 years ago

Spark NLP 3.0 ScalaDoc

com.johnsnowlabs.nlp.annotators

MedicalNerApproach Companion object MedicalNerApproach

class MedicalNerApproach extends AnnotatorApproach[MedicalNerModel] with NerApproach[MedicalNerApproach] with Logging with ParamsAndFeaturesWritable with CheckLicense

Linear Supertypes

Filter all members

anno

```
val inputAnnotatorTypes: Array[String]
Input annotator types : DOCUMENT, TOKEN, WORD_EMBEDDINGS
```

```
val outputAnnotatorType: String
Input annotator types : NAMED_ENTITY
```

getParam

```
def getBatchSize: Int
Batch size
```

```
def getConfigProtoBytes: Option[Array[Byte]]
ConfigProto from tensorflow, serialized into byte array.
```

```
def getDropout: Float
Dropout coefficient
```

```
def getEnableMemoryOptimizer: Boolean
Memory Optimizer
```

```
def getEnableOutputLogs: Boolean
Whether to output to annotators log folder
```

```
def getIncludeAllConfidenceScores: Boolean
```

John Snow Labs NLP Documentation

Python Libraries

- John Snow Labs
- Healthcare NLP Visual NLP

Large Language Models

- Medical LLMs
- Medical Chatbot

Applications

- Generative AI Lab
- Terminology Server

Open-Source Libraries

- Spark NLP
- LangTest

Getting Started API Reference

sparknlp_jsl.annotator

Classes

AssertionDLApproach Train a Assertion Model algorithm using deep learning.

AssertionDLModel AssertionDL is a deep Learning based approach used to extract Assertion Status from extracted entities and text.

AssertionFilterer Filters entities coming from ASSERTION type annotations and returns the CHUNKS.

AssertionLogRegApproach Train a Assertion algorithm using a regression log model.

AssertionLogRegModel This is a main class in AssertionLogReg family. Logarithmic Regression is used to extract Assertion Status

AverageEmbeddings

BertSentenceChunkEmbeddings BERT Sentence embeddings for chunk annotations which take into account the context of the sentence the chunk appeared in.

Chunk2Token

ChunkConverter Convert chunks from regexMatcher to chunks with a entity in the metadata.

ChunkFilterer Model that Filters entities coming from CHUNK annotations. Filters can be set via a white list of terms or a regular expression.

ChunkFiltererApproach Model that Filters entities coming from CHUNK annotations. Filters can be set via a white list of terms or a regular expression.

ChunkMergeApproach

ChunkMergeModel

CommonResolverParams

ContextualParserApproach

ContextualParserModel

DateNormalizer

Delidentification

DocumentLogRegApproach

DrugNormalize

GenericClassifierApproach

GenericClassifierModel

JBagger

MedicalNerApproach

MedicalNerModel

John Snow Labs Tools & Libraries Ecosystem

Optimized, Tested, Supported Integration
with partner technology ready for production



SNOWFLAKE CORTEX AI



Microsoft Fabric



kubernetes



Cloud
Dataproc



John Snow Labs - 10+ yrs of Excellence in Healthcare AI

Publication Statistics & Research Impact

Comprehensive metrics from Google Scholar and peer-reviewed publications

60+

PUBLICATIONS *

2K+

CITATIONS

21

H-INDEX

35

I10-INDEX

* David Talby, PhD, CEO
* Veysel Kocaman, PhD, CTO

Research Areas Breakdown



■ Clinical De-ID ■ Medical NLP & NER ■ LLM Evaluation ■ Assertion Detection
■ Healthcare AI

Top Publication Venues

- AAAI, ECIR, ACL, ICPR (Top-tier AI/NLP Conferences)
- JMIR AI, Nature Machine Intelligence (Medical Journals)
- ML4H, ClinicalNLP, TrustNLP (Specialized Workshops)
- Software Impacts (Industry Applications)
- Clinical Research Informatics, ISPOR Europe

John Snow Labs - 10+ yrs of Excellence in Healthcare AI

Peer-Reviewed Research Publications

Researchers and developers at John Snow Labs, has published extensively in medical NLP, achieving state-of-the-art results in clinical de-identification, LLM evaluation, and biomedical entity recognition

 Clinical De-Identification

 LLM Evaluation

 Medical NLP

 Information Extraction

CLEVER: Clinical LLM Evaluation by Expert Review

JMIR 2025

Domain-specific small LLMs **outperform GPT-4o by 45-92%** in factuality and clinical relevance

Exploring NER Potential in Clinical Decision Support

JMIR AI 4 (2025)

Achieved **0.989 F1 precision** for procedures using specialized NER models

Can Zero-Shot APIs Deliver Regulatory-Grade De-Identification?

Text2Story Workshop at ECIR 2025

JSL achieves **96% F1-score**, outperforming Azure (91%), AWS (83%), GPT-4o (79%)

Beyond Negation Detection: Comprehensive Assertion Models

Text2Story Workshop at ECIR 2025

Fine-tuned LLM achieves **96.2% accuracy**, outperforming GPT-4o by 6.1%

Beyond Accuracy: Automated De-Identification at Scale

Machine Learning for Health (ML4H) 2023

System used to de-identify **1 billion+ clinical notes**, certified for production use

Automated De-Identification of Arabic Medical Records

Association for Computational Linguistics 2023

First automated Arabic medical de-identification with **F1 scores 0.94-0.98**

Biomedical Named Entity Recognition at Scale

CADL 2020 (ICPR)

New SOTA on 7 benchmarks: BC4CHEMD **93.72%**, Species800 **80.91%**

Accurate Clinical and Biomedical NER at Scale

Software Impacts, July 2022

Outperforms AWS Medical Comprehend by **8.9%** and Google Cloud by **6.7%**

Full list available at: johnsnowlabs.com/peer-reviewed-papers/

Healthcare NLP for Data Scientists

Unlock your NLP power with Healthcare NLP, the most popular NLP library in the healthcare industry

Created by [Ace Vo](#)

Last updated 09/2024 English English [Auto]



Premium

Access this top-rated course, plus 26,000+ more top-rated courses, with a Udemy plan. [See Plans & Pricing](#)

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★★

16 r

Spark NLP for Data Scientists

Unlock your NLP power with Spark NLP, the most popular NLP library in enterprises

Created by [Ace Vo, David Talby, Jiri Dobes, Veysel Kocaman](#)

Last updated 06/2023 English English [Auto]



Premium

Access this top-rated course, plus 26,000+ more top-rated courses, with a Udemy plan. [See Plans & Pricing](#)

4.7

★★★★★

66 ratings



318

learners

What you'll learn

- ✓ Utilize 20,000+ State-of-the-Art NLP models that specialize in solving healthcare problems in 200+ languages
- ✓ Perform popular NLP tasks like clinical entity recognition, entity resolution (mapping entities to medical codes), assertion status detection
- ✓ Train & tune leveraging the classifier architecture
- ✓ Deploy models as Docker containers with all NLP capabilities

What you'll learn

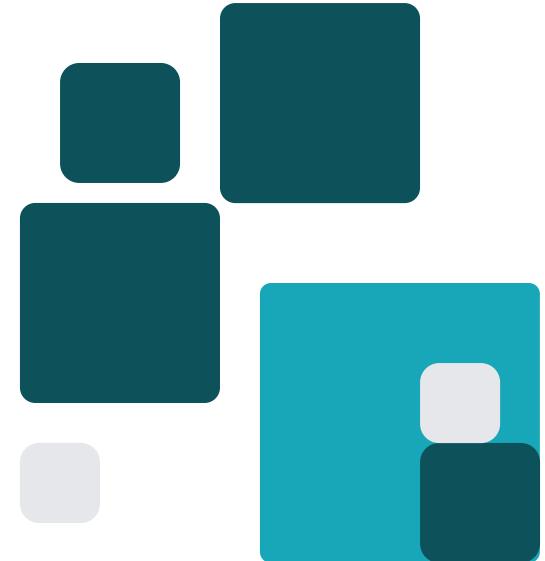
- ✓ Utilize 20,000+ State-of-the-Art NLP models in 200+ languages
- ✓ Train & tune your own NLP models by leveraging the Spark NLP's pre-defined classifier architecture on your own datasets
- ✓ Perform popular NLU tasks in one line of code - like generate texts, summarize texts, answer questions
- ✓ Deploy models as API's with NLP Server, a Docker container that contains all Spark NLP's capabilities

<https://www.udemy.com/course/healthcare-nlp-for-data-scientists>

<https://www.udemy.com/course/spark-nlp-for-data-scientists>



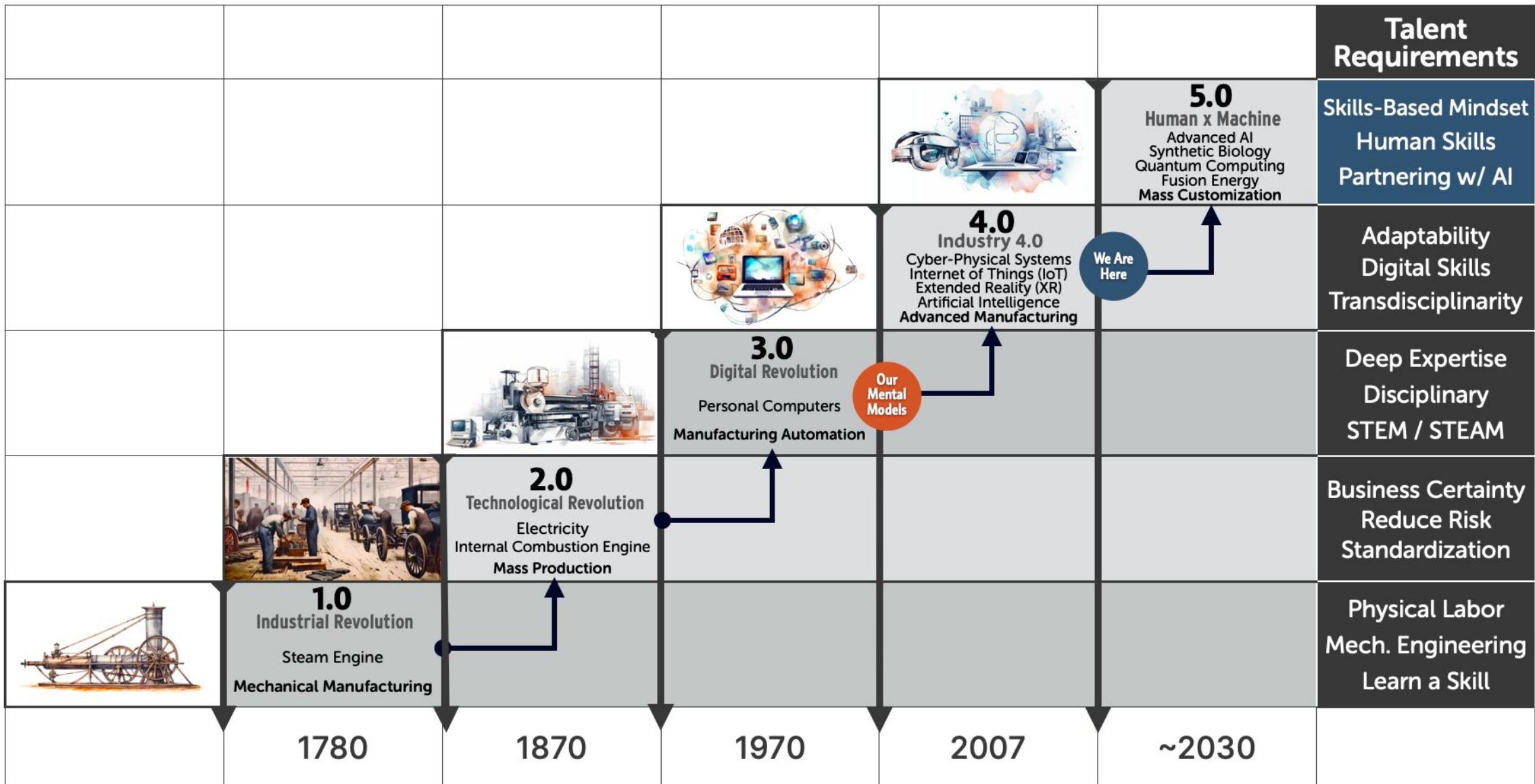
Intro to Healthcare AI



State-of-the-Art Healthcare AI with Best-in-Class Performance

Certification Trainings | October, 2025

A Workforce Inflection Point: The Human x Machine Era



The Evolution of AI and Healthcare: A Parallel Journey

Age of early AI	Age of machine learning	Age of neural networks	Age of Transformers	Age of AI alignment
1950–1980s Rule-based and expert systems	1990–2000s Statistical machine learning	2010s Deep learning and CNNs for imaging	2020 Transformers for language understanding (e.g., GPT-3)	2024 and beyond Multimodal LLMs, agent-based healthcare assistants

Early Days

- Manual diagnosis using clinical guidelines
- Early expert systems (e.g., MYCIN for infections)
- Digitization of patient records begins
- 1980s – HL7 standard for health data exchange introduced

Internet Era

- 1990s – Rise of EHR systems
- Predictive analytics for patient readmissions
- Online access to medical databases
- Remote consultations begin
- 2000s – Telehealth infrastructure grows

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Cloud and Imaging AI Era

- 2010 – Deep learning in radiology (e.g., tumor detection)
- AI for pathology slide analysis
- Cloud-based health record platforms
- Clinical decision support tools emerge
- FDA approval for AI diagnostic tools (e.g., IDx-DR for eye disease)

Transformers & Healthcare NLP Era

- 2020 – Use of GPT-like models for summarizing patient notes
- Voice assistants in clinical workflow (e.g., ambient scribe AI)
- NLP for automated coding and documentation
- Real-time triage assistants and symptom checkers

The Evolution of AI and Healthcare: A Parallel Journey

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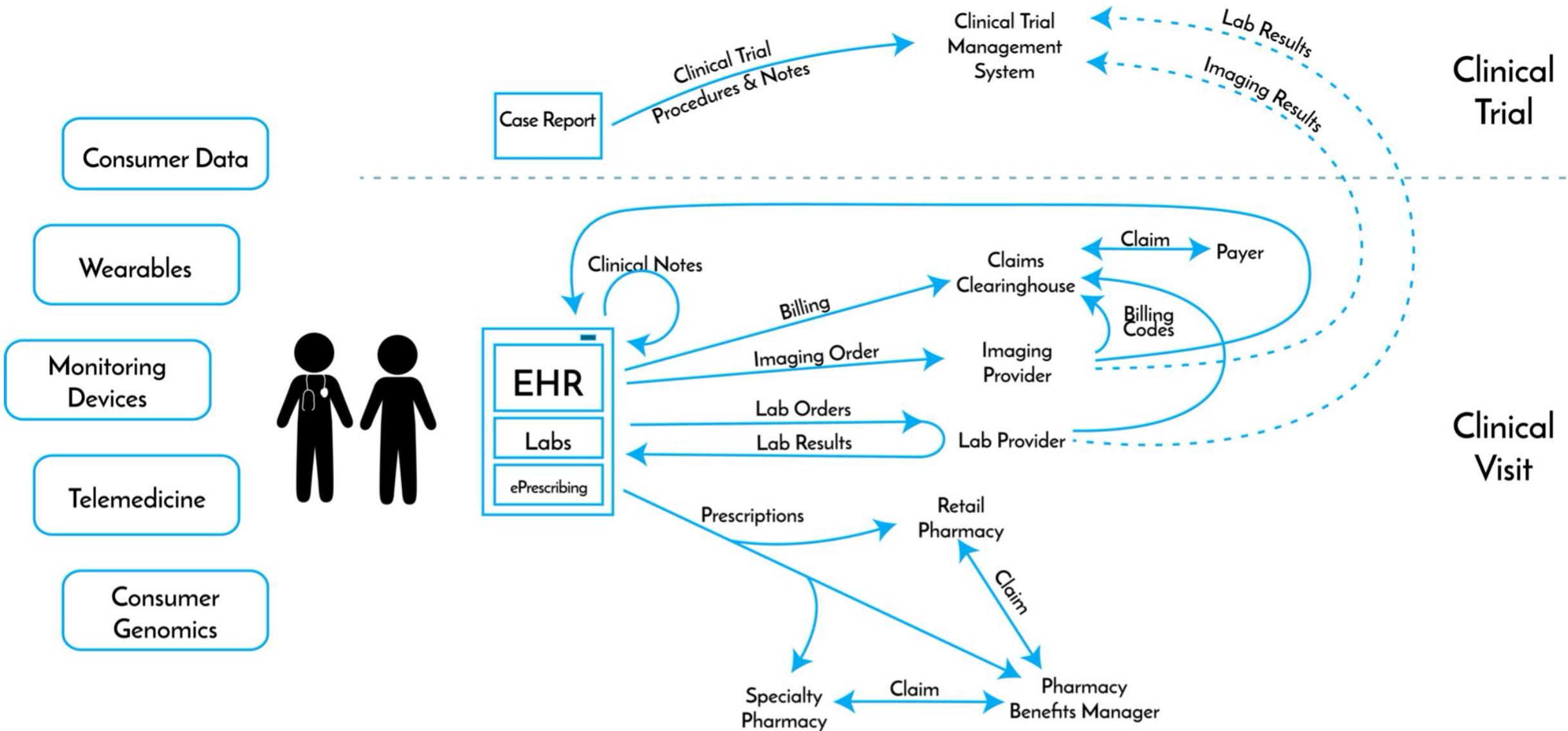
Generative AI Era & Alignment

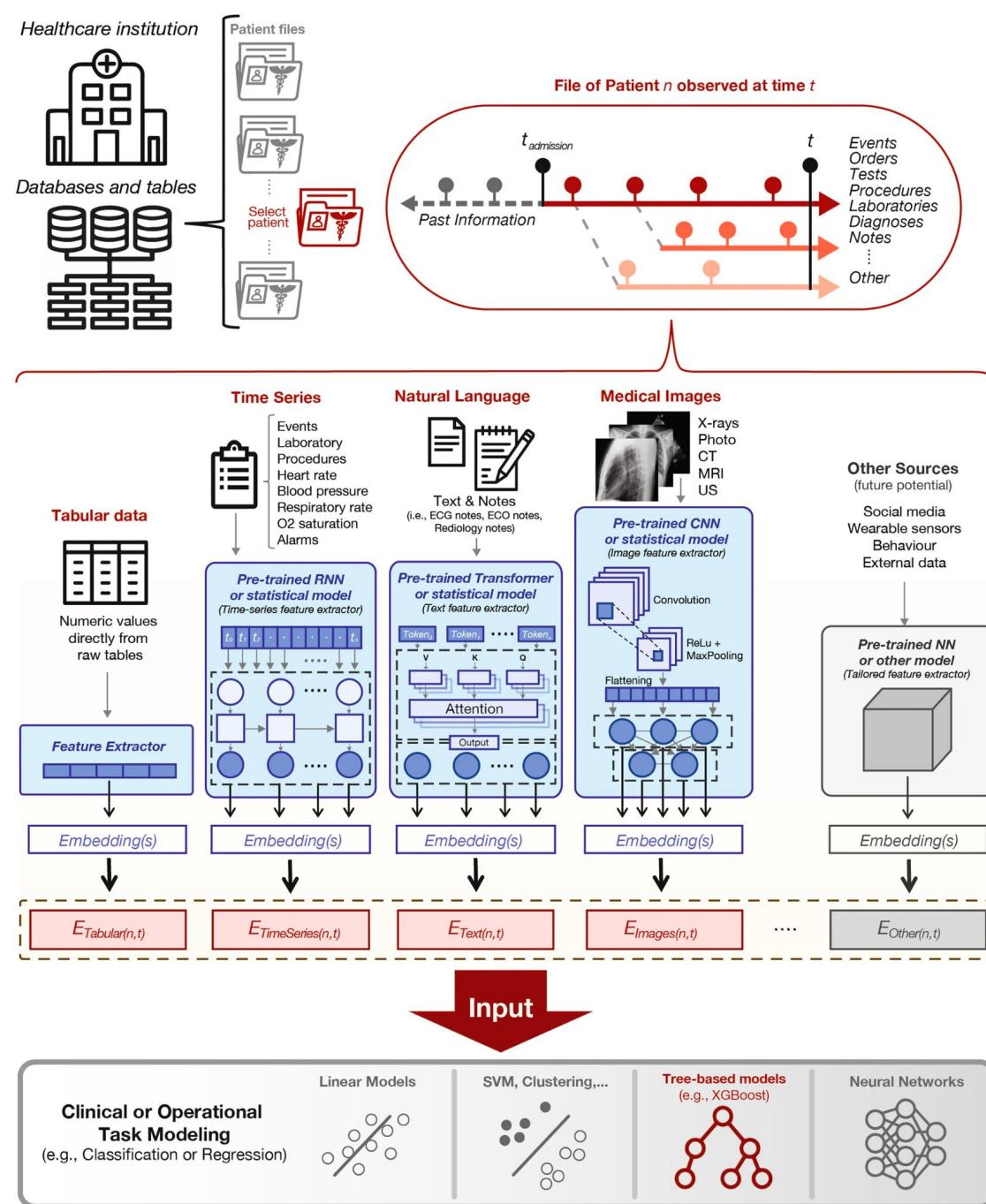
- 2023–Present – LLMs like Med-PaLM and GPT-4 used in diagnosis support
- Multimodal AI integrating images, notes, labs
- Personalized treatment recommendations
- Autonomous AI agents assisting in prior authorization and care coordination
- Focus on explainability, trust, and regulatory alignment in AI

Future of AI in Healthcare

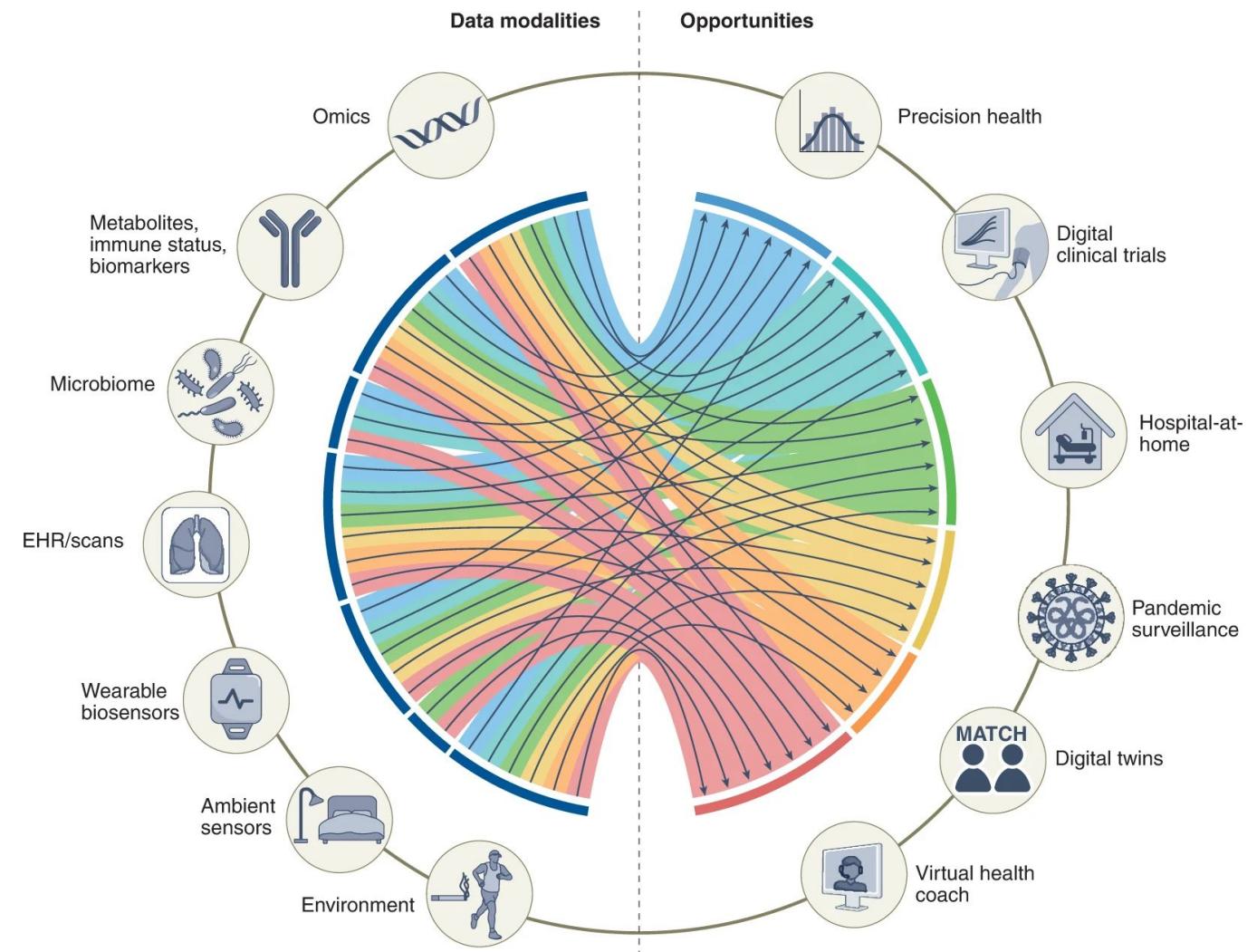
- AI co-pilots for physicians
- Patient-AI shared decision-making
- Predictive models for population health
- Fully integrated, conversational EHRs
- Ethical frameworks guiding AI deployments in care

Data Origination and Exchange

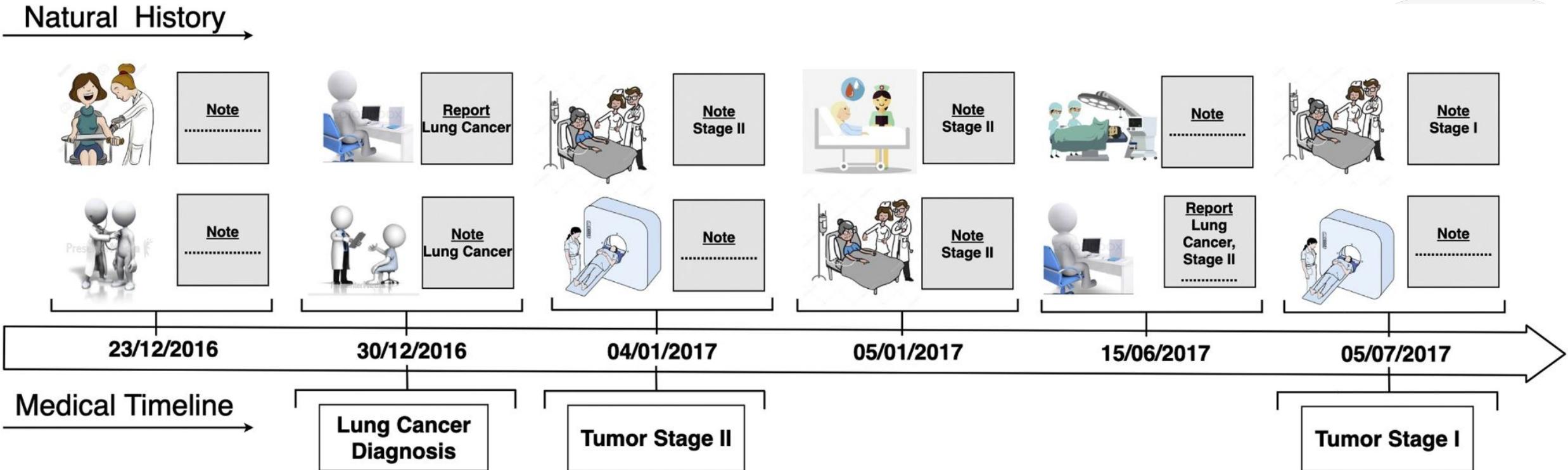




Multimodality in Healthcare



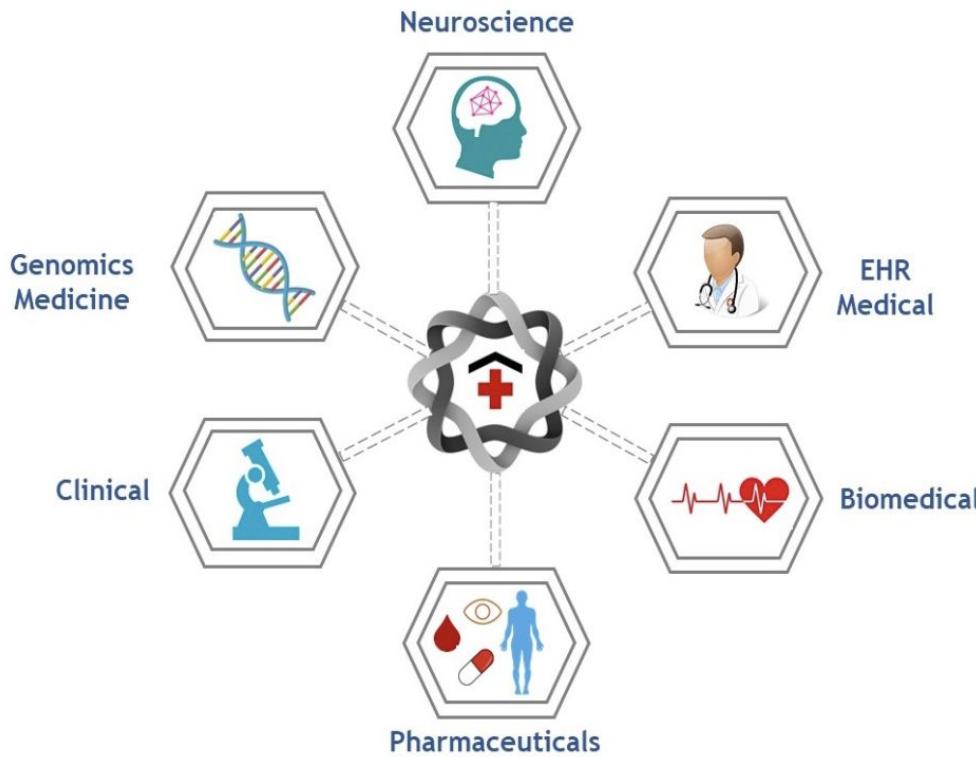
Putting the clinical facts on a timeline





>> “Systems used to generate health data are designed for operations, not to organize data effectively for research or analytics.”

No LLM application can answer this question alone !



>> *Give me all the patients who have type 2 diabetes, using metformin for the last 3 years, and also recently diagnosed stage-IV lung cancer?*

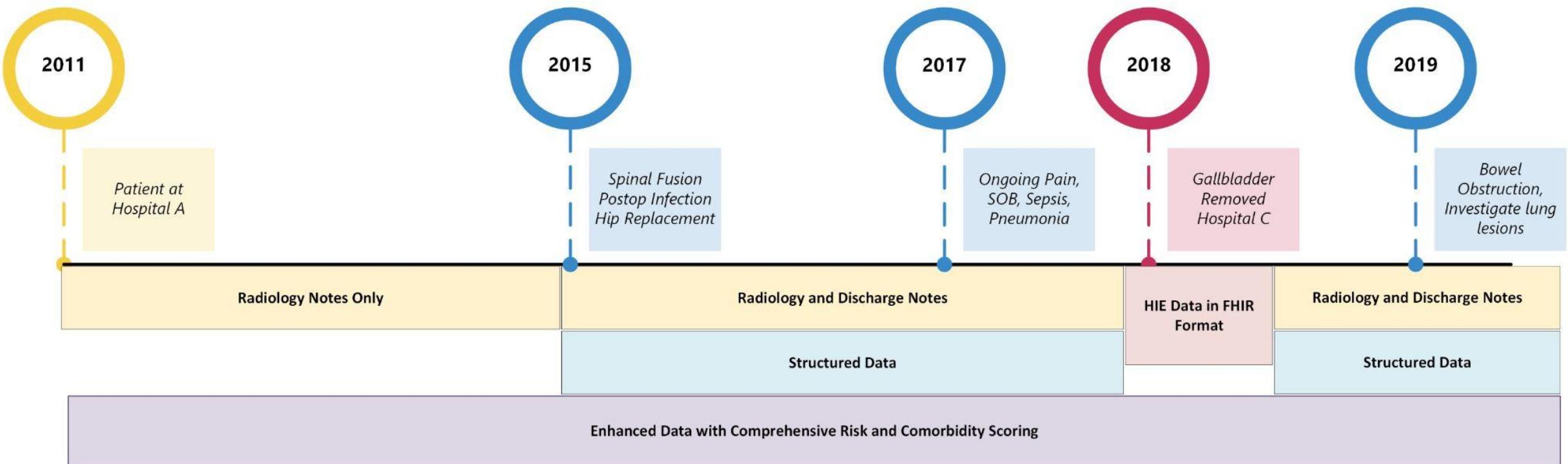
Unstructured EHR data



Patient Profiling

(building a patient journey using available resources)

“a boy < 12 yrs old, with BP < 112, vomiting, infrequent seizures, ...”



Only a small fraction of AI system/solutions is the Model itself

“Hidden Technical Debt in Machine Learning Systems,” Google NIPS 2015

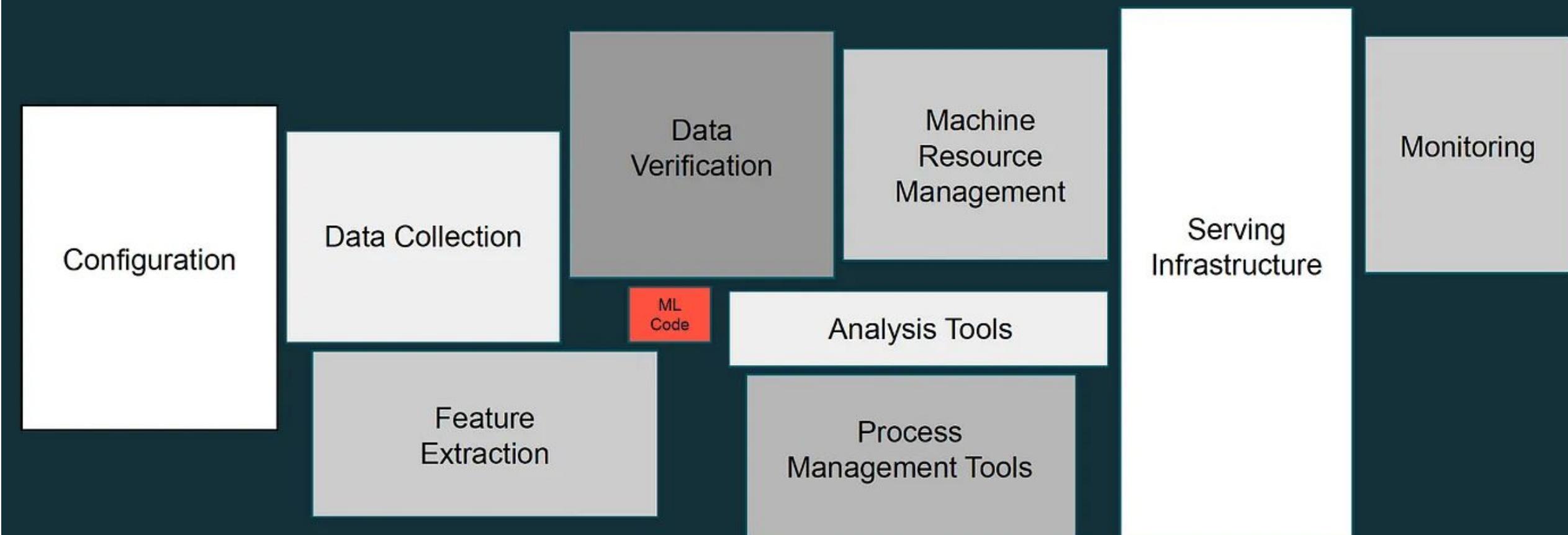
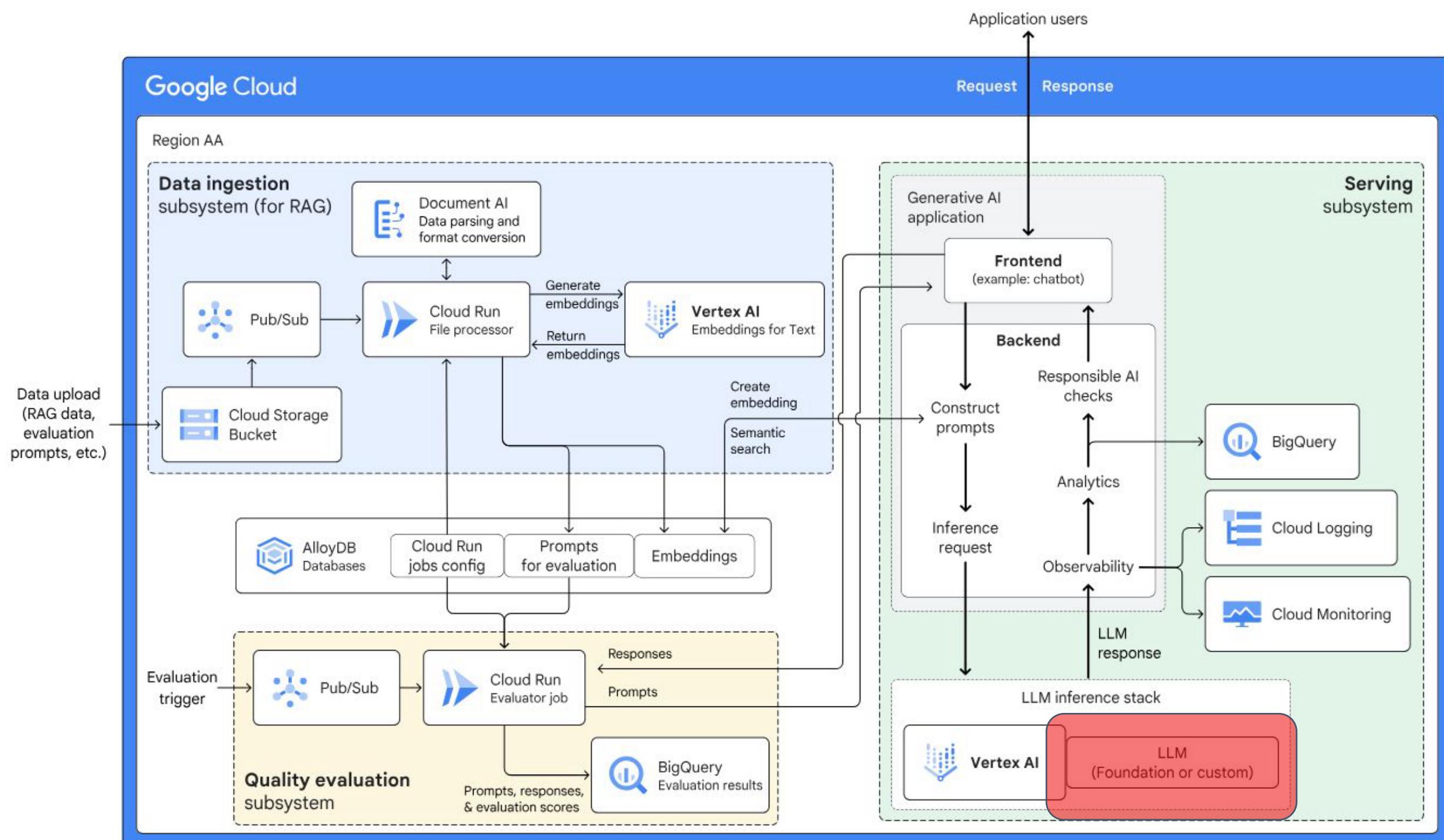


Figure 1: Only a small fraction of real-world ML systems is composed of the ML code, as shown by the small box in the middle. The required surrounding infrastructure is vast and complex.



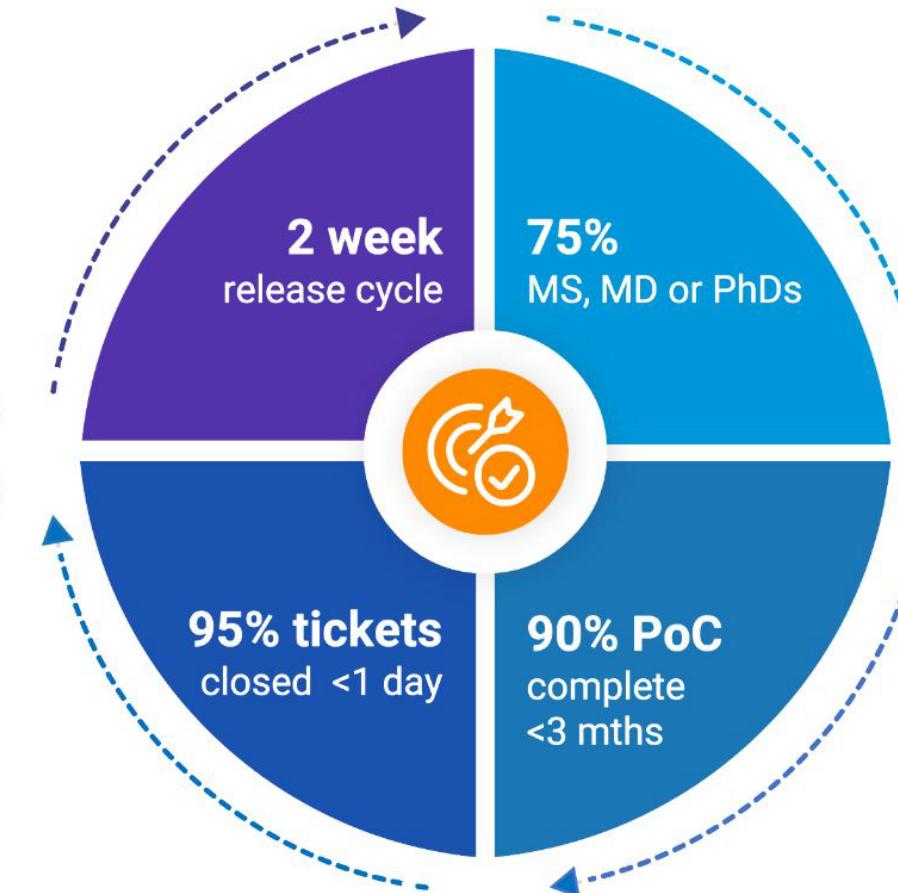
Unique Approach to Solving Healthcare Challenges

Continuous AI Adoption

Customer consultation supporting evaluation of new AI innovations from research to adoption

End-to-End Integration

Production ready development and deployment from raw data to end users leveraging State-of-the-Art Software



Dedicated Research team

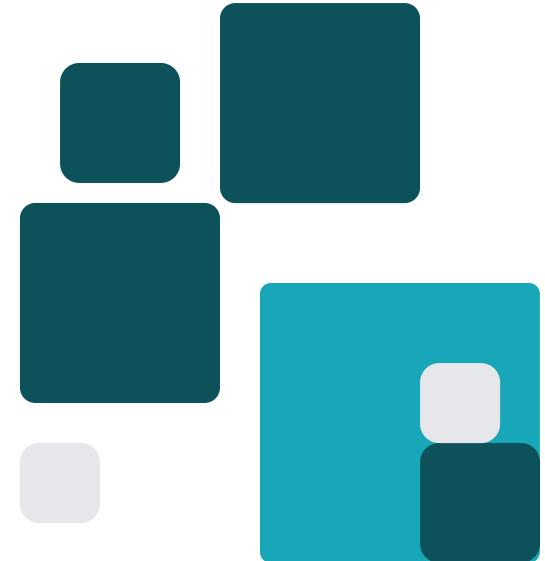
Continuous innovation by PhDs and MDs in most impactful healthcare AI problems working with academics

Rapid prototyping and PoC

PoC in **weeks** with benchmark and scalable plans for production development



Intro to Healthcare NLP/ LLMs



State-of-the-Art Healthcare AI with Best-in-Class Performance

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Medical LLMs and GenAI Products

MedS (<10B)

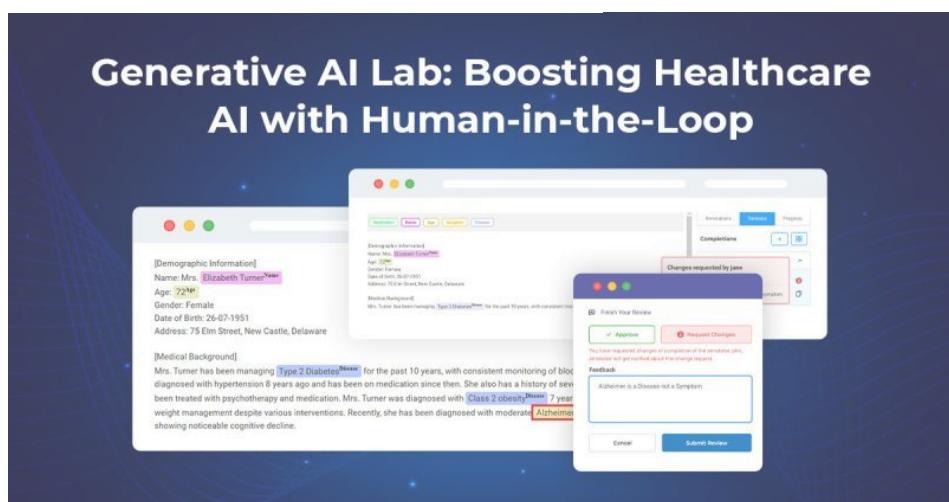
MedM
(14-80B)

Agents

Specialized
SLMs (<10B)

MedNER (<3B)

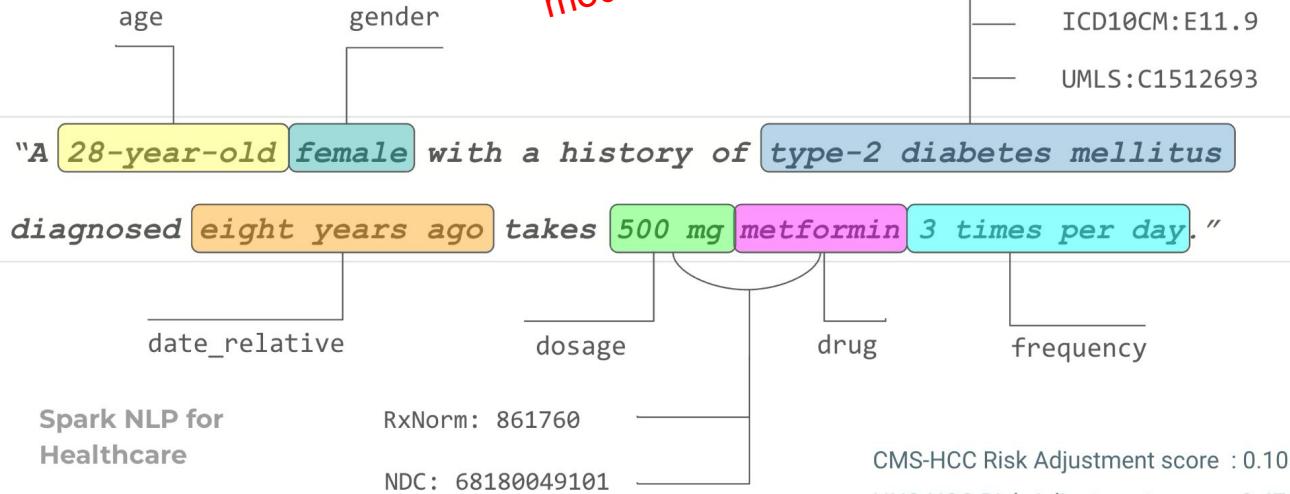
Total
Patient Journey
John Snow LABS



Healthcare NLP

(what we have been doing & excelling so far ...)

2,500+ pretrained
model and pipelines



CMS-HCC Risk Adjustment score : 0.105
HHS-HCC Risk Adjustment score : 2.473

Medical LLMs and GenAI Products

MedS (<10B)

MedM
(14-80B)

Specialized
SLMs (<10B)

- Modified versions of modern LLMs architectures
- Finetuned on in-house curated medical datasets
- Task specific (summ., QA, assistant, RAG, etc.)
- Performing better than generalised LLMs
- Can be deployed in various means/ quantization
- Can be used via `llm_loader()` in Healthcare NLP library

Medical Summarization

Question Answering

Biomedical Research

Text Generation

- Encoder-only (Bert-family) and encoder-decoder (T5, Bart) architectures
- Finetuned on in-house curated medical datasets
- 200+ pretrained versions for various use cases
- Seamlessly work within Spark NLP pipelines

GenAI Products (in-browser apps deployed on-prem)

- Medical Chatbot
- Generative AI Lab
- Terminology Server
- Total Patient Journey
- Patient Registry (Oncology)

Out-of-the-box Solutions

- HCC/ Risk adjustment score calculation
- Medical Text-to-Speech and Text Translation
- Text-to-OMOP, Text-to-FHIR, Text-to-SQL, Text-to-KG (Knowledge Graph)
- Turnkey Deployment of Medical Language Models as Private API Endpoints
- Automated Testing of Bias, Fairness, and Robustness of Language Models
- Multi-modal LLM solutions for Visual Document Understanding/ OCR
- Medical terminology mapping across 20 medical vocabularies (ICD10, Snomed, MedDRA, CPT, ...)

Information Extraction

2500+
pretrained
clinical models

age

gender

"A **28-year-old** **female** with a history of **type-2 diabetes mellitus**

diagnosed **eight years ago** **takes** **500 mg metformin** **3 times per day.**"

date_relative

dosage

drug

frequency

Spark NLP for
Healthcare

RxNorm: 861760

NDC: 68180049101

CMS-HCC Risk Adjustment score : 0.105
HHS-HCC Risk Adjustment score : 2.473

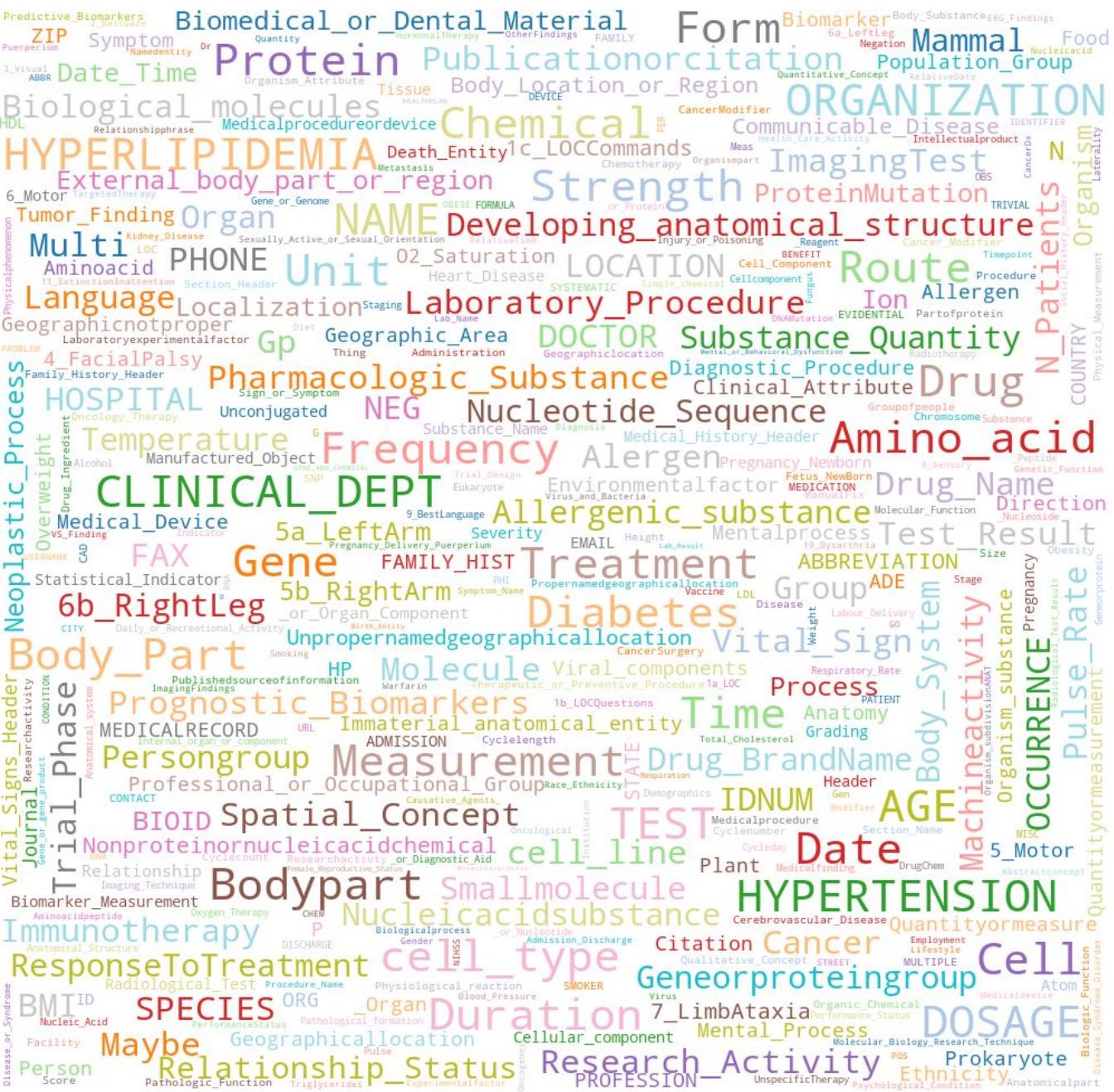
clinical_finding
assertion: past
Snomed: 44054006
ICD10CM:E11.9
UMLS:C1512693

Pretrained NER Models (500+)

ner_ade_clinical
ner_posology_greedy
ner_risk_factors
jsl_ner_wip_clinical
ner_human_phenotype_gene_clinical
jsl_ner_wip_greedy_clinical
ner_cellular
ner_cancer_genetics
jsl_ner_wip_modifier_clinical
ner_drugs_greedy
ner_deid_sd_large
ner_diseases
nerdl_tumour_demo
ner_deid_subentity_augmented
ner_jsl_enriched
ner_genetic_variants
ner_bionlp
ner_measurements_clinical
ner_diseases_large
ner_radiology
ner_deid_augmented
ner_anatomy
ner_chemprot_clinical

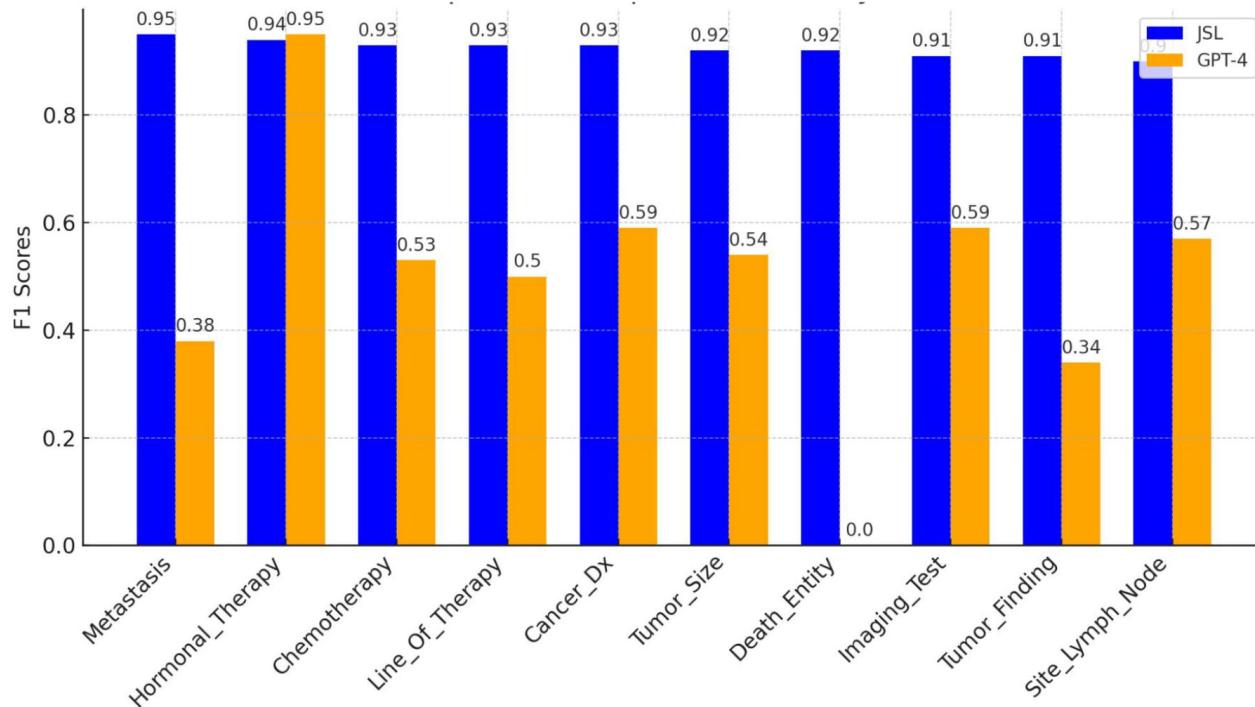
ner_posology_experimental
ner_drugs
ner_deid_sd
ner_posology_large
ner_deid_large
ner_posology
ner_deidentify_dl
ner_deid_enriched
ner_bacterial_species
ner_drugs_large
ner_clinical_large
jsl_rd_ner_wip_greedy_clinical
ner_medmentions_coarse
ner_radiology_wip_clinical
ner_clinical
ner_chemicals
ner_deid_synthetic
ner_events_clinical
ner_posology_small
ner_anatomy_coarse
ner_human_phenotype_go_clinical
ner_jsl_slim
ner_jsl
ner_jsl_greedy
ner_events_admission_clinical

500+ entities from 300+ NER models

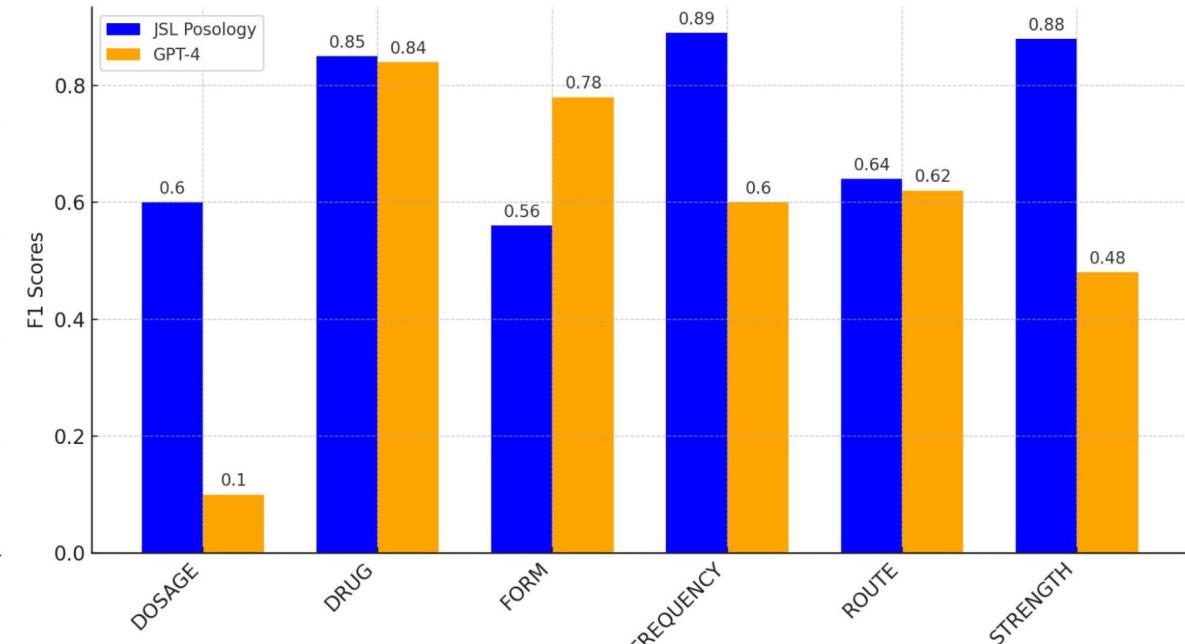


Healthcare NLP Performance Metrics

Oncology NER (JSL vs GPT-4)



Medication NER (JSL vs GPT-4)



Spark NLP Clinical Models

Entity	Sample	Precision	Recall	F1
Problem	4891	0.726	0.585	0.648
Test	5903	0.782	0.662	0.717
Drug	10284	0.946	0.882	0.913
Avg. F1		0.759		0.670

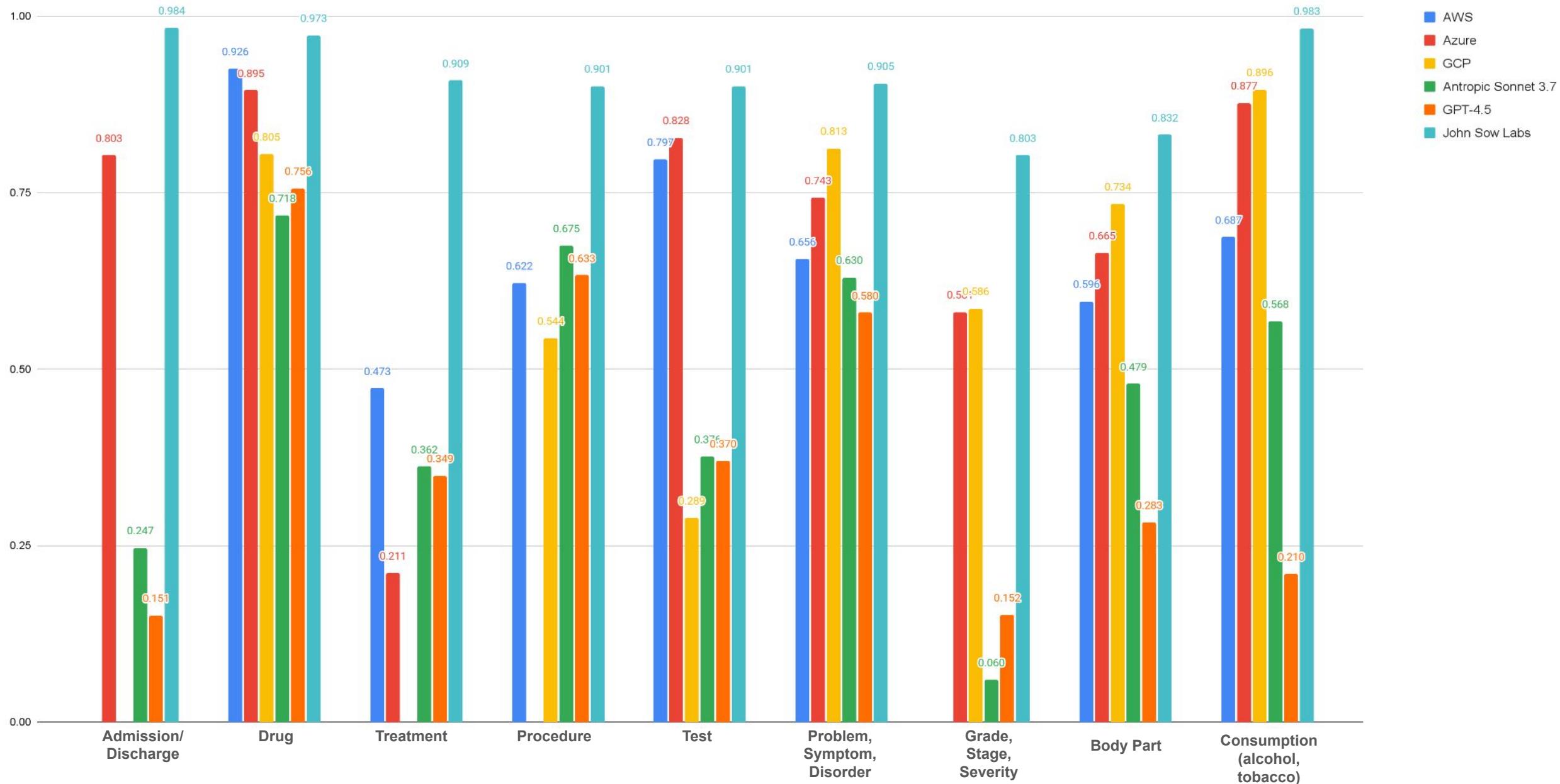
AWS Medical Comprehend

	Precision	Recall	F1
Problem	0.539	0.478	0.507
Test	0.594	0.703	0.644
Drug	0.815	0.910	0.860

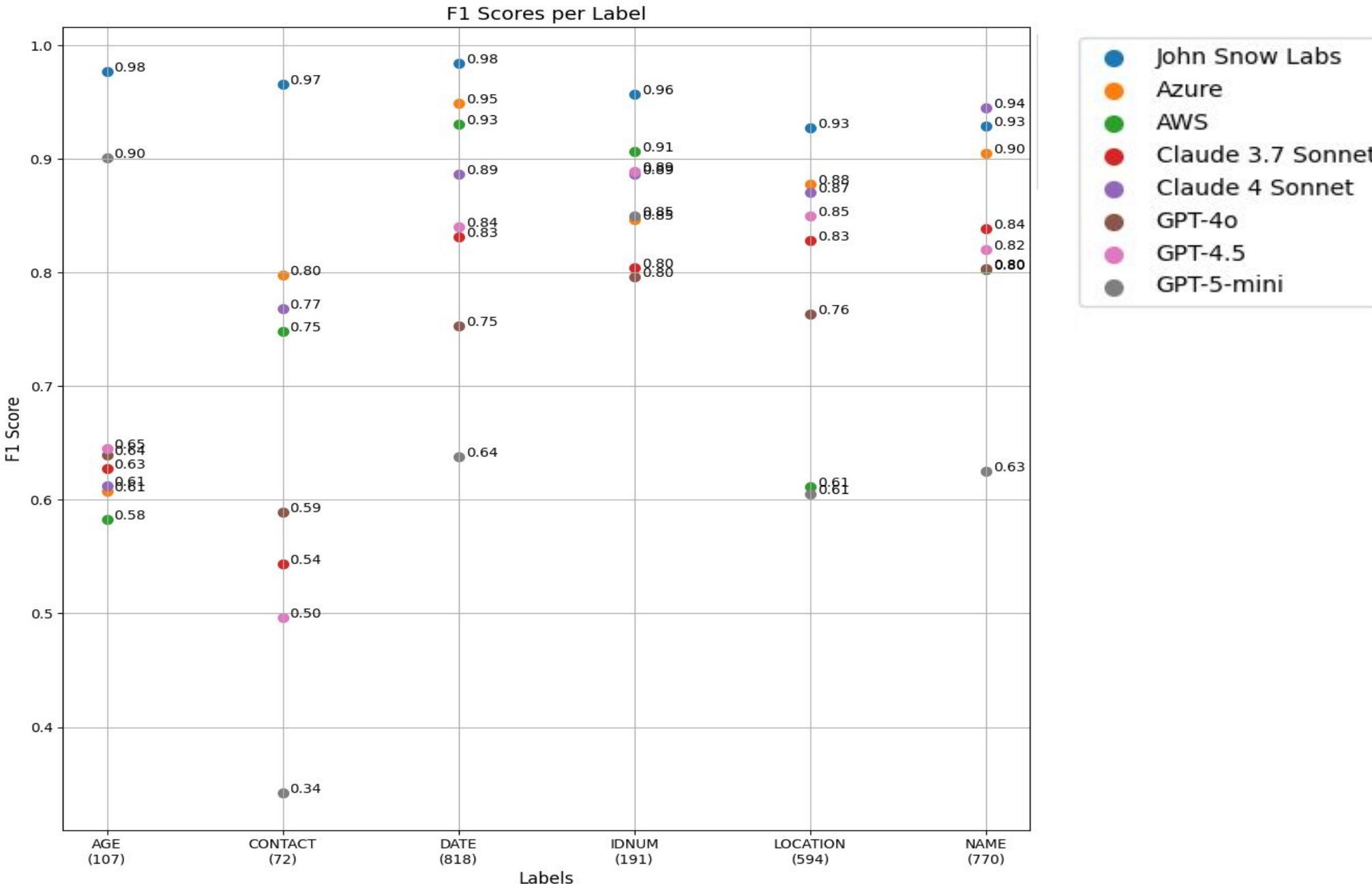
GCP Healthcare API

	Precision	Recall	F1
Problem	0.850	0.516	0.642
Test	0.576	0.461	0.512
Drug	0.962	0.885	0.922
Avg. F1		0.670	
		0.692	

John Snow Labs vs Cloud Providers on NER



John Snow Labs vs Cloud Providers on Deidentification



Medical LLM Evaluation Frameworks

The research community has established rigorous evaluation frameworks for medical LLMs, focusing on real-world clinical utility rather than just raw accuracy. Domain-specific models consistently outperform general-purpose LLMs when evaluated on healthcare-specific benchmarks.

💡 Clinical Documentation

MTSamples, ACI-Bench, Medec EM - Evaluate treatment planning, procedural documentation, and error detection in clinical narratives

❓ Medical Q&A & Reasoning

MedicationQA, MediQA, PubMedQA - Test accurate responses to patient questions and biomedical reasoning

💬 Clinical Dialogue

MedDialog - Evaluates summarization of doctor-patient conversations into concise clinical notes

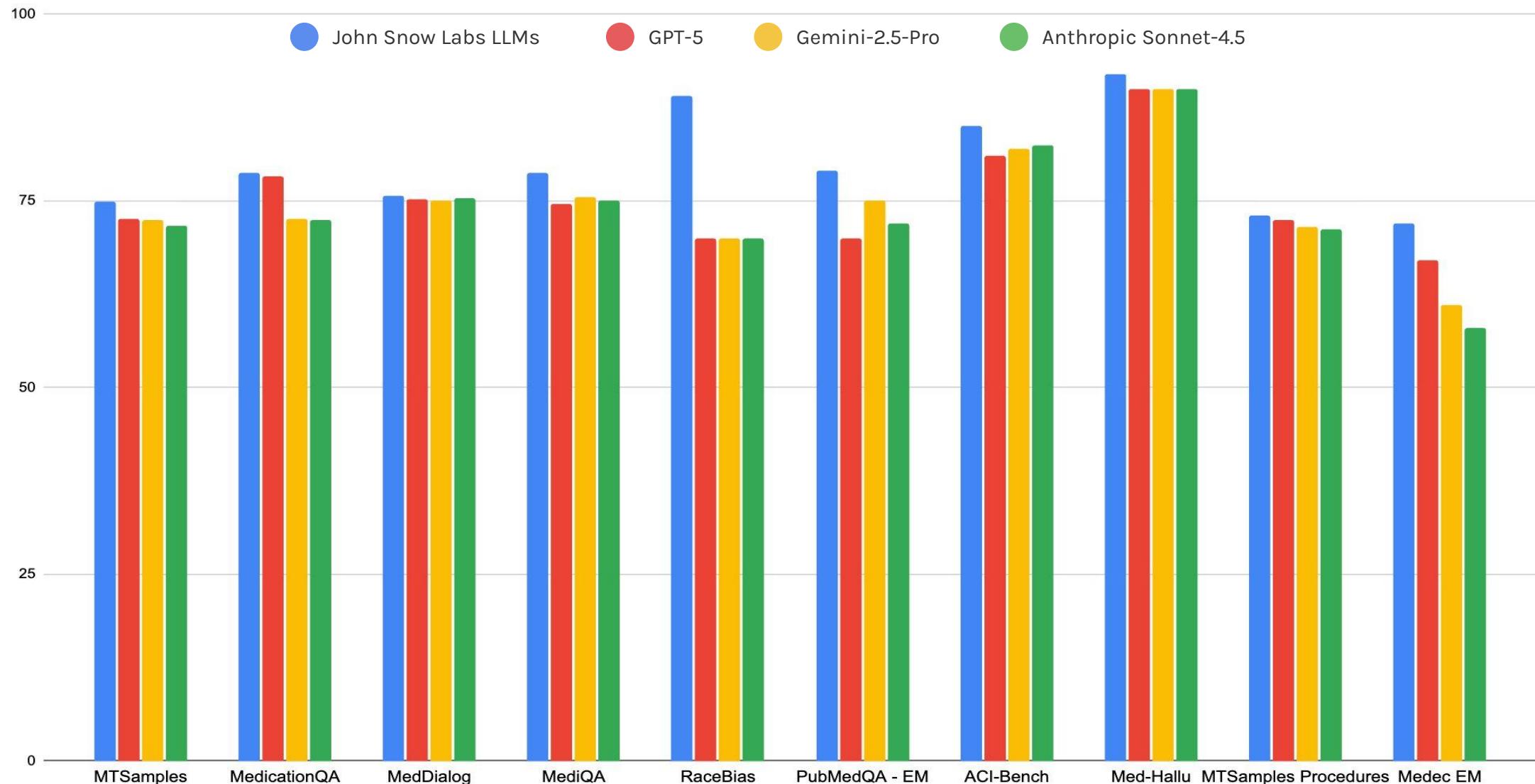
🛡 Safety & Bias

RaceBias, Med-Hallu - Assess models for harmful content, hallucinations, and equitable healthcare representation

💡 Key Insight: Fine-tuned, domain-specific SLMs deliver ~10% better quality than prompted general LLMs while achieving regulatory-grade accuracy at a fraction of the cost

JSL Medical LLMs Outperform Frontier Models

Comprehensive benchmark evaluation across 10+ medical domain tasks



Medical LLM Deployment & Testing Options

Hosted Demo Apps

Access password-protected demo UIs hosted by JSL. Test models with non-PHI data through secure web interfaces. No infrastructure setup required.

Containerized Deployment

Deploy containerized applications with embedded models on your cloud VMs or local machines. Full control over infrastructure and data.

Databricks Integration

Access VLMs as Databricks container service. Work directly within your Databricks notebooks for seamless data pipeline integration.

AWS SageMaker

Deploy via AWS Marketplace and SageMaker. Call endpoints from your notebooks or codebase with enterprise-grade scalability.

</> Healthcare NLP Library - Local Deployment

Run Small LLMs locally without hassle using Healthcare NLP library. Use LLM loader just like any other NLP models.

Available Small LLMs for Local Use (Healthcare/ Visual NLP)

JSL_MedS (14B)

Q4/Q8/Q16 • Summ, QA, RAG, Chat

JSL_MedS (3.5-8B)

Q4/Q8/Q16 • Summ, QA, RAG

JSL_MedS_NER (3.5B)

Q4/Q8/Q16 • Entity extraction

JSL_MedS_VLM (2-3B)

Q4/Q8/Q16 • Multimodal OCR

JSL_MedS_RAG (3B)

Q4/Q8/Q16 • RAG workflows

JSL_Text2SOAP

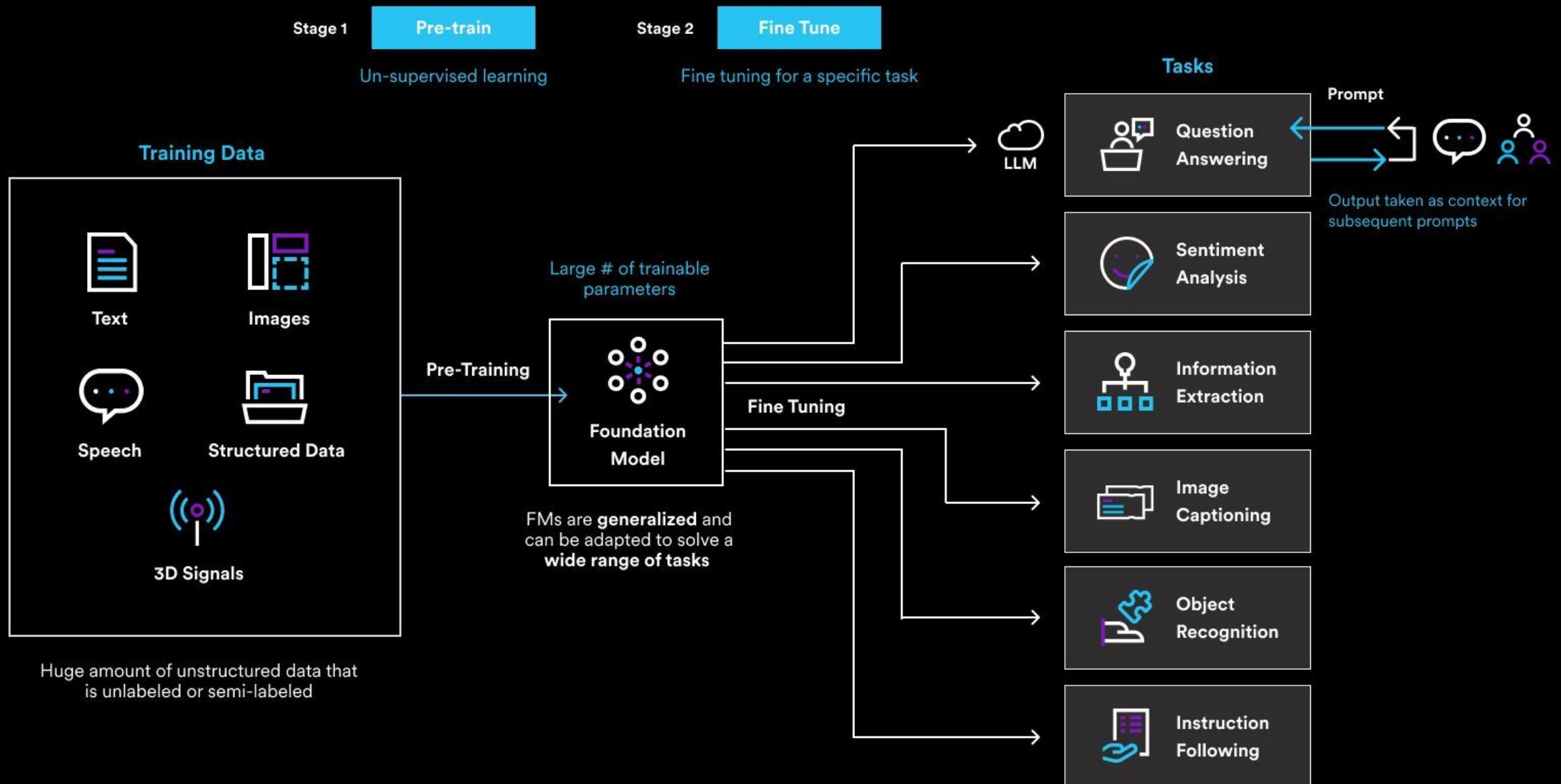
3B • SOAP summaries

20+ models available with q4/q8/q16 quantization. We recommend q8 versions for optimal quality-performance balance.

API Endpoints (Coming Soon)

Access JSL-served LLM APIs wrapped around medical KBs with secure tokens. Make API calls from your codebase, similar to ChatGPT or commercial APIs.

How is a Foundation Model Built?



Technical Resources & Documentation

Navigate JSL's comprehensive ecosystem to accelerate your medical AI implementation

Documentation & APIs

Official Documentation

Complete guides covering annotators, pipelines, transformers, and installation

nlp.johnsnowlabs.com/docs

Getting Started Guide

Step-by-step installation, license activation, and first-time setup

nlp.johnsnowlabs.com/docs/en/license_getting_started

Python & Scala APIs

Detailed API references with class methods, parameters, and examples

nlp.johnsnowlabs.com/licensed/api/python

nlp.johnsnowlabs.com/licensed/api/

Models Hub

2,500+ pre-trained models: NER, embeddings, LLMs with benchmarks

nlp.johnsnowlabs.com/models

Medical LLMs & Deployment

Medical LLMs Documentation

Complete guide to deploying JSL Medical LLMs with quantization options

nlp.johnsnowlabs.com/docs/en/LLMs/medical_llm

AWS Deployment

Deploy JSL Medical LLMs on AWS SageMaker

nlp.johnsnowlabs.com/docs/en/LLMs/on_aws

Azure Deployment

Deploy JSL Medical LLMs on Microsoft Azure

nlp.johnsnowlabs.com/docs/en/LLMs/on_azure

Snowflake Deployment

Native integration with Snowflake data cloud

nlp.johnsnowlabs.com/docs/en/LLMs/on_snowflake

On-Premises Deployment

Air-gapped and secure on-prem deployment configurations

nlp.johnsnowlabs.com/docs/en/LLMs/on_prem_deploy

Learning & Community

GitHub Workshops

Hundreds of ready-to-run Jupyter notebooks for Healthcare NLP

github.com/JohnSnowLabs/spark-nlp-workshop

github.com/JohnSnowLabs/.../healthcare-nlp

Official Blog

Technical deep dives, product updates, and customer success stories

johnsnowlabs.com/blog/

Medium Publications

In-depth technical articles and case studies from JSL engineers

medium.com/john-snow-labs

NLP Summit

Conference presentations showcasing real-world implementations

nlpsummit.org

Community & Support

Slack community, GitHub issues, and direct technical support

johnsnowlabs.com/contact

When to use Healthcare NLP Models vs Private LLMs (API)

Accuracy



Healthcare NLP models are trained with much granular tasks (NER, RE, assertion status etc.) on curated datasets that are annotated by domain experts for certain specialties (oncology, radiology, SDOH) and perform better.

Speed



Healthcare NLP is designed to handle big data and is optimized for distributed computing, which makes it significantly faster than private LLMs in processing large volumes of data.

Customization



Healthcare NLP allows for more customization in terms of feature selection, pipeline configuration, and model tuning. This is especially useful when working with domain-specific language or specific use cases that require customizations.

Transparency



Healthcare NLP models are more transparent and interpretable than private LLMs and it allows for more control over the training process and model selection.

On-prem/ air gapped Deployment



Healthcare NLP can be installed in air-gapped environments with no internet connection while private LLMs might require calling a cloud API – and sharing your data with the company providing it.

Cost



Healthcare NLP license is not token or character based. Once you have the license, you can parse unlimited number of documents, while private LLMs requires a subscription to access and charges per token via API.



Thank you !

Stay at the Cutting Edge of Medical AI

 **Book a Demo:** Schedule a call with our experts

 **Website:** www.johnsnowlabs.com

 **Contact:** Visit johnsnowlabs.com/schedule-a-demo

For live demos, partnership opportunities, and tailored deployment options