
**HFMA & AAHAM Missouri Hawthorne
Winter Conference – Heartbeat of Heartland:
Seeking Financial Stability
Jan 15–16th , 2025**

Demystifying AI for Healthcare Users

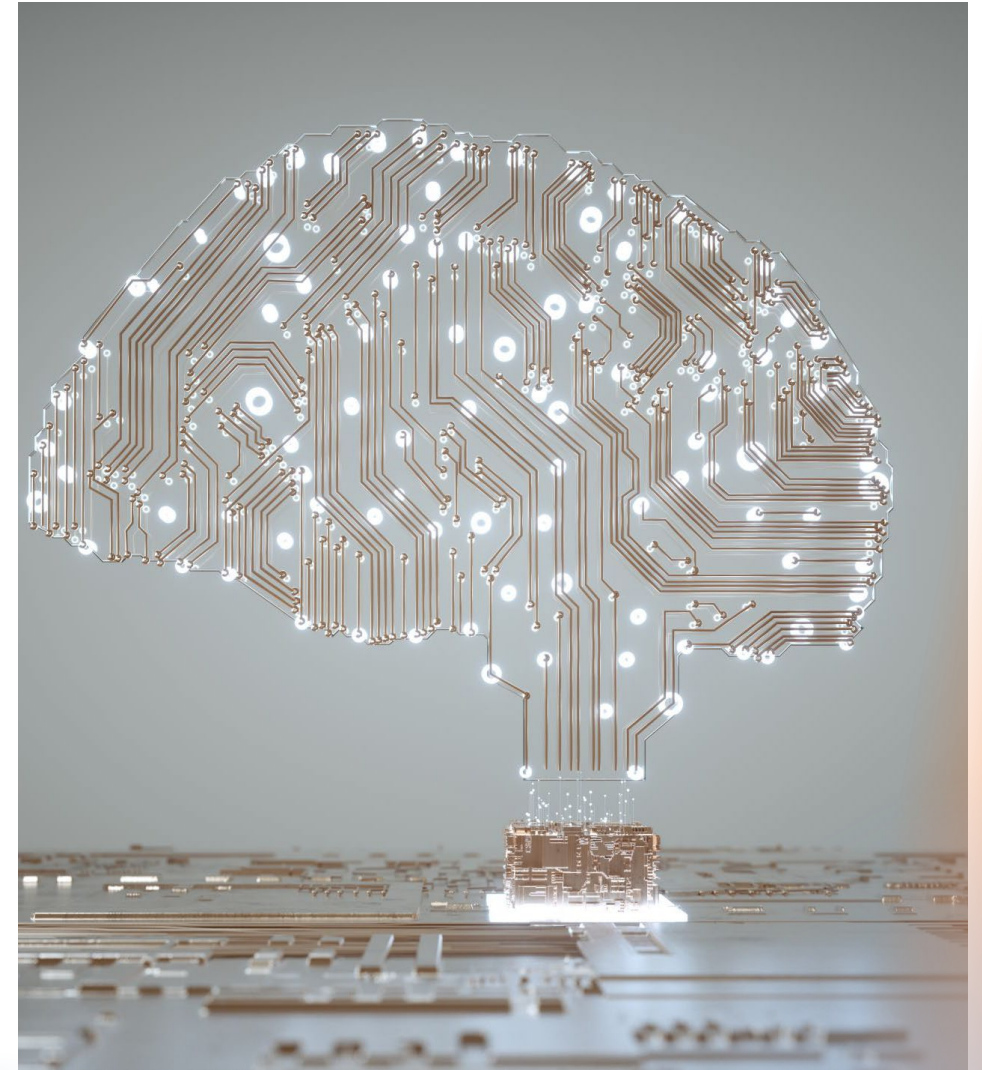


Pavani Munjuluri, CEO



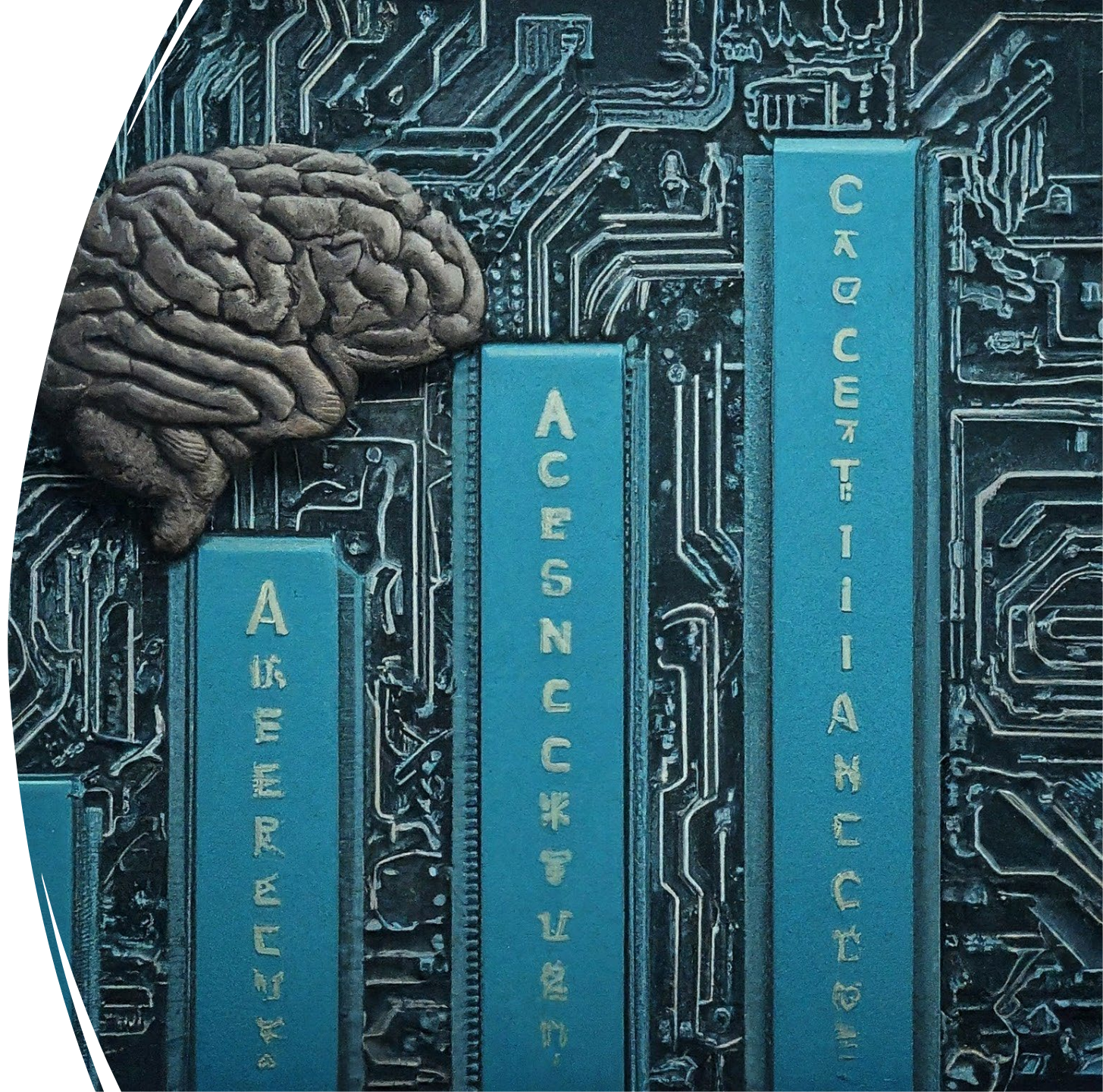
Agenda

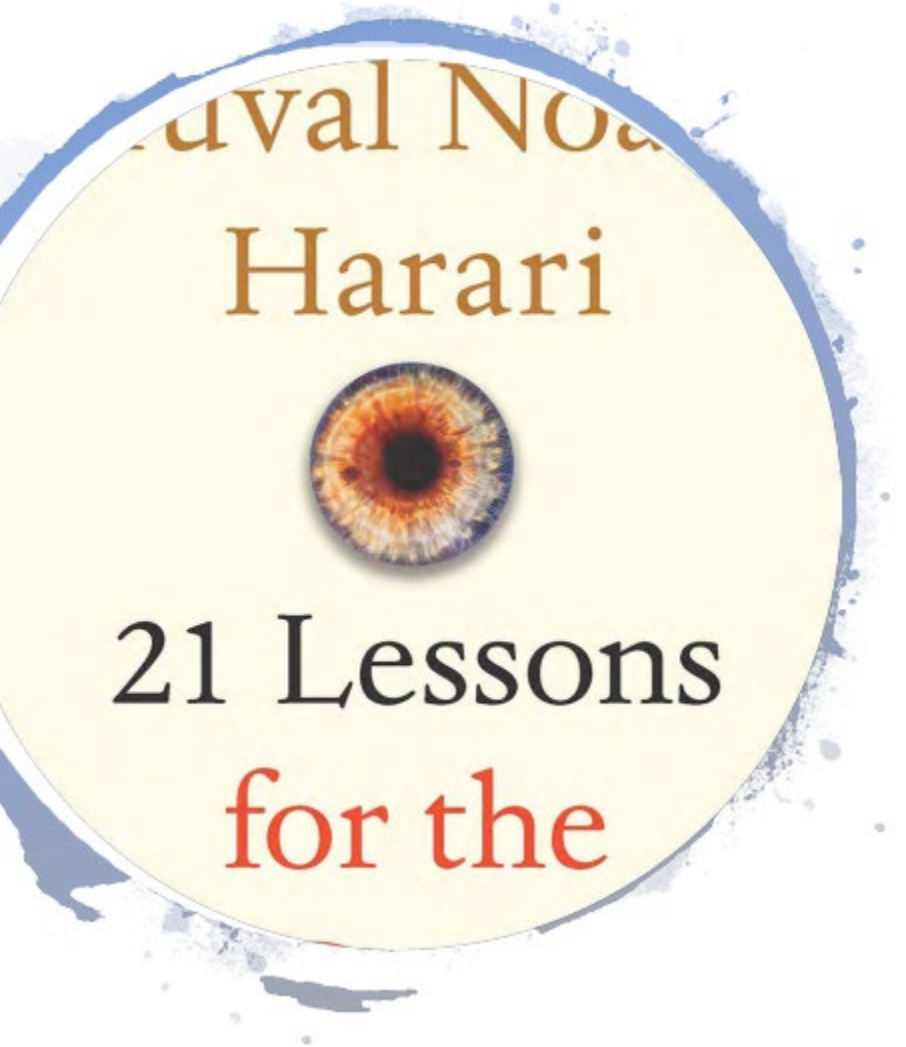
- **What is AI**
- **History of AI**
- **Why AI now?**
- **AI applications in Health care**
- **Current risks in AI**
- **Things to consider for successful implementation**
- **Future of AI**



Decisions we make in our daily life

- What Netflix show are you watching tonight?
- How do you make online purchasing decisions?
- Whom do you date / swipe left-right?
- How much do you pay for your health / auto insurance?
- What colleges do your kids get into?





"HUMANS WERE ALWAYS FAR BETTER AT INVENTING TOOLS
THAN USING THEM WISELY."

21 LESSONS FOR THE 21ST CENTURY BY YUVAL NOAH HARARI

```
#include <stdio.h>

int main() {
    printf(" Pls Subscribe \n");
    return 0;
}
```



?????

History of AI

Early indications in 19th century

First recorded algorithm for a computer which can do more than calculations

1940s-1950s- Official Birth of AI

WWII , founding figures like John McCarthy, Marvin Minsky, Allen Newell, and Herbert A. Simon. McCarthy coined the term ' Artificial Intelligence' at the Dartmouth conference in 1956

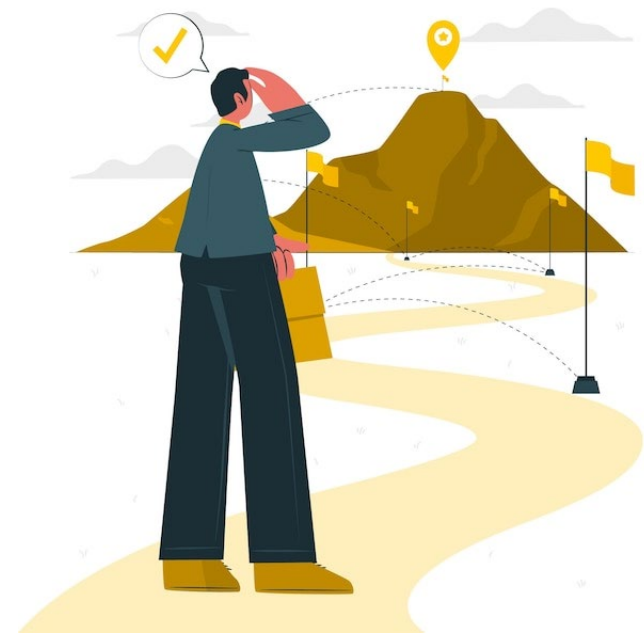
1960s-1990s- Rise and Fall of AI

Early success in chemical analysis and medical diagnosis , fraud detection, inventory management. High expectations. Lacked funding and large computing requirements



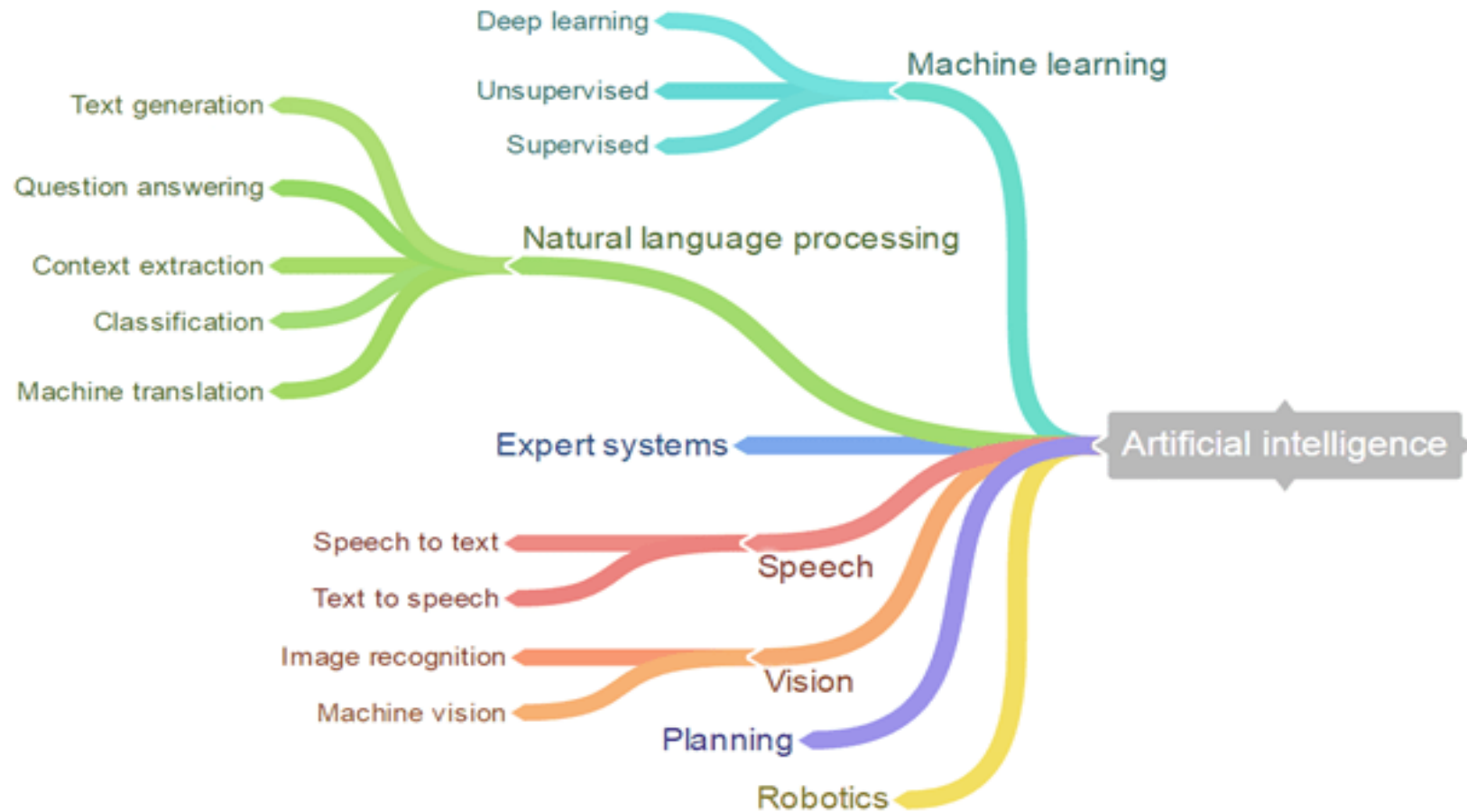
Significant milestones by AI over the years..

- ✓ In 1997, IBM's Deep Blue defeated world chess champion Garry Kasparov
- ✓ Early 2000s – Netflix used AI models into their recommendation system
- ✓ **2011 – IBM Watson won Jeopardy! Major breakthrough in AI and Natural Language Processing**
- ✓ Game of Go – Google DeepMind's AlphaGo defeated human reigning champions 2015–2017
- ✓ 2015 – OpenAI, a research organization advancing digital intelligence in a safe beneficial manner was founded
- ✓ **2020 – Pfizer and Moderna used AI models in development of Covid-19 vaccines**

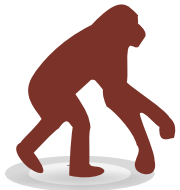


The Current AI Landscape

**Structured and
Unstructured Data
Data-Driven insights
Expanded and scalable**



Like humans, AI has evolved!



Rule-based coding
Example – EMR!



Algorithms
E.g., Payer Claim adjudication



Algorithms with
specific expertise

E.g., Computer Aided coding –
uses NLP



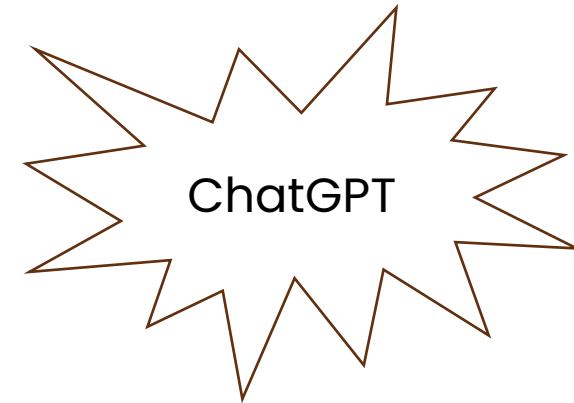
Machine Learning

E.g., Watson – Clinical decision
support



GenAI (Large
Language Models)

E.g., Automated correspondence
Electronic prior authorization



Where is AI being used in Healthcare?

01. Drug Discovery

02. Clinical Decision Support



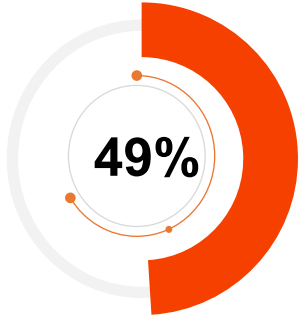
03. Health Administration

Healthcare AI Takes Center Stage

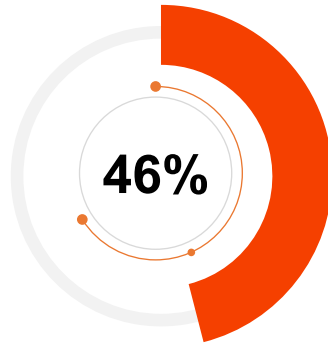
Why AI and why now??

- **Staffing shortages:** clinical as well as administrative staff challenges and increasing costs
- **Disparate systems and technologies:** distributed data and systems don't talk to each other
- **Vast amounts of complex data:** AI finds patterns, predicts medical outcomes, and supports clinical decision-making based on analysis often too much for any human to parse.
- **Streamlining and Improving Processes:** From diagnostic accuracy to optimizing surgical care, the promise is smarter systems aiding medical and health administrative services.
- **Personalization:** Applications range from tailored drug recommendations based on a patient's genome to flagging individual financial difficulties affecting the ability to pay.

Staffing shortages will continue.....



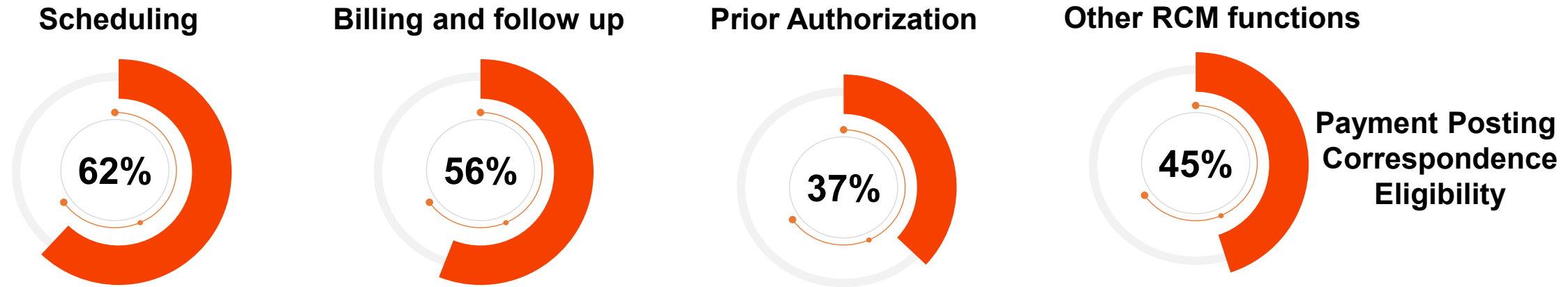
Respondents who say staff are leaving to other employers, both in and out of healthcare



Respondents who say there aren't enough people skilled in RCM and patient intake

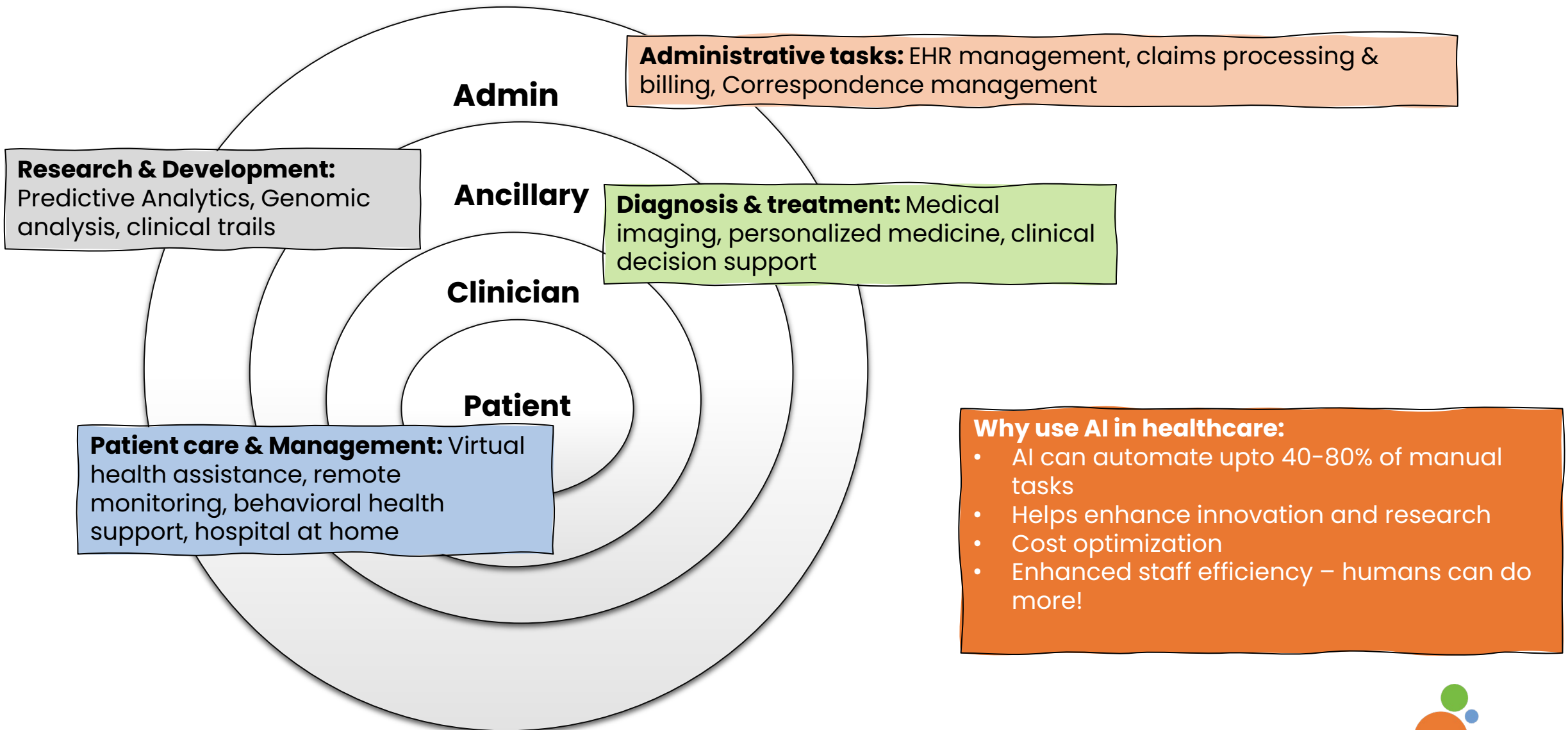
**All are facing the shortage, and it is taking a long time to fill the positions in RCM
84 to 207 days on average!**

Why AI in Healthcare Administration

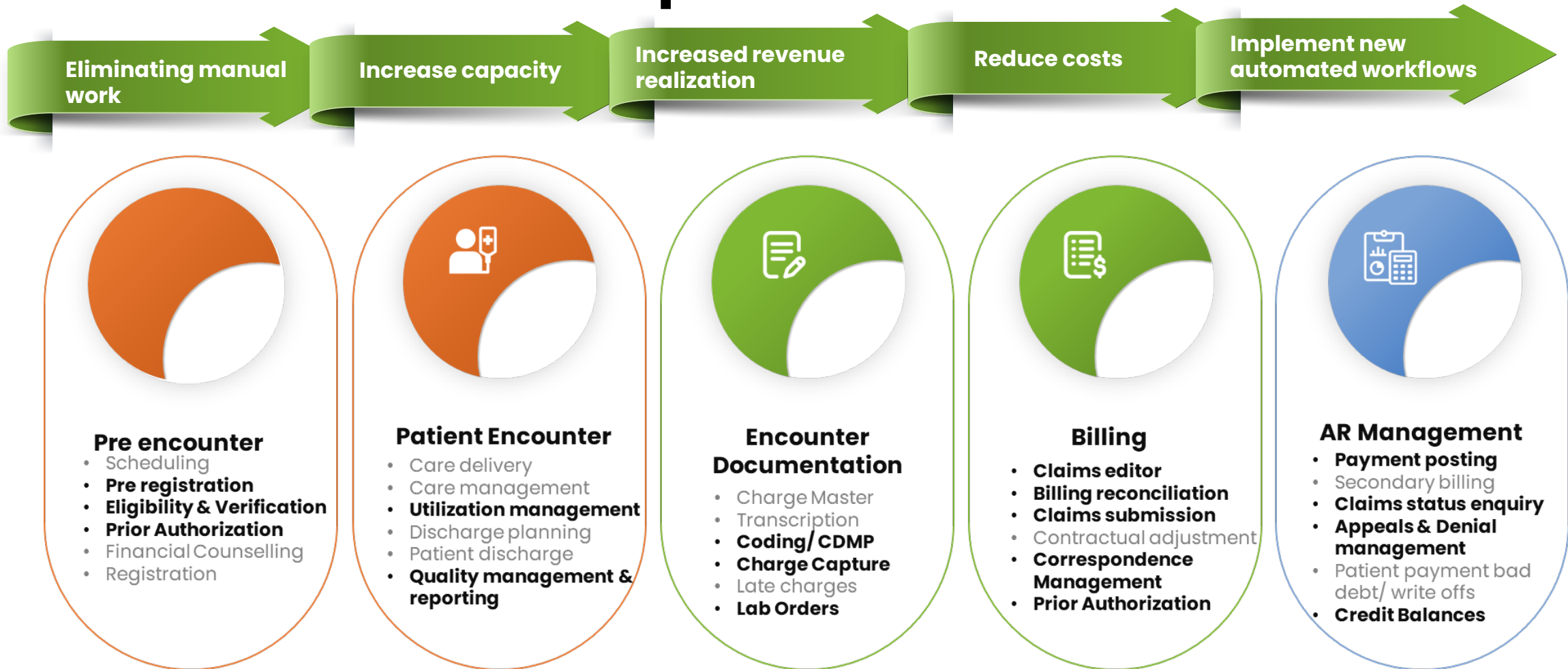


Short-staffed for a long time!
RCM Functions are the hardest hit

Where can I use AI in Healthcare? And Why?



AI driven automation for driving quick value for providers



Provider Revenue Cycle Operations

AI in Action : Healthcare Document Management

Problem Statement

Manual classification requires employees to read and analyze each document individually, and is prone to human misinterpretation or misclassification

Correspondence Management

Batches received and “read” using a combination of OCR, NLP and Machine Learning and LLMs

- **Letter Splitting**

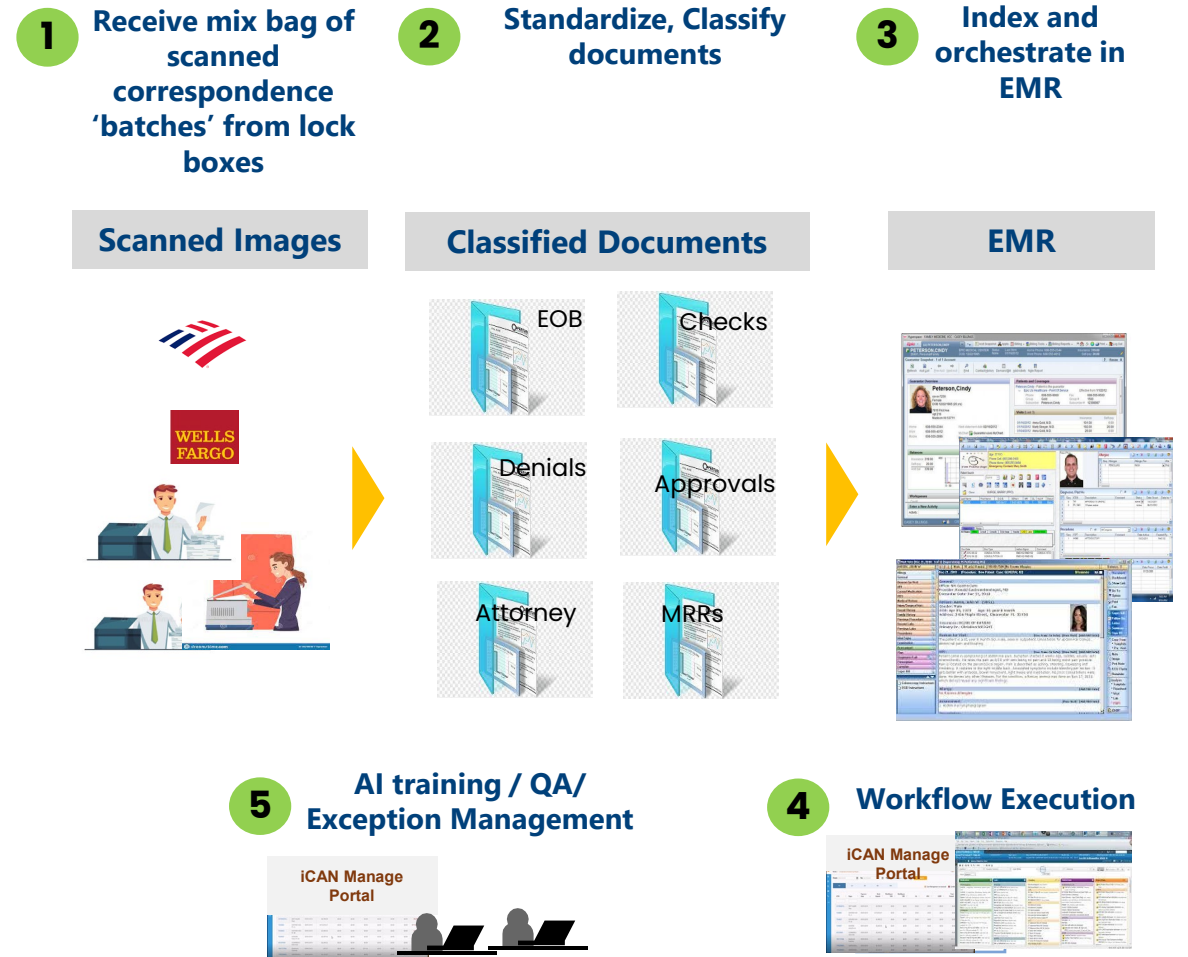
As the single file contains number of letters, to segregate individual letter, we have used the Vision based model LayoutLMv2

- **Letter Classification**

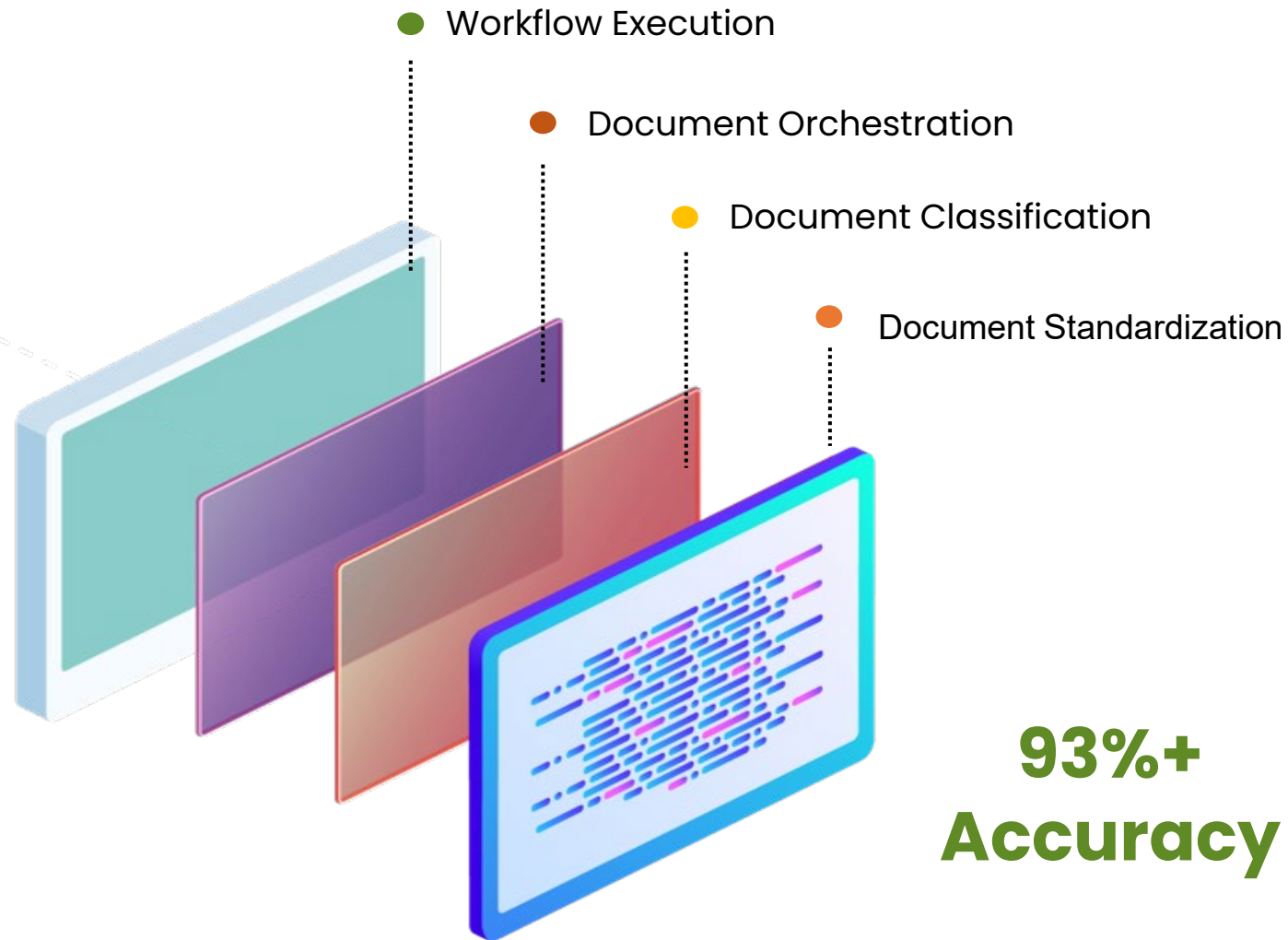
Model Selection and Model training on document classification. Multiple models used for final inferencing like BERT, Extra-Tree Classifier

- **Entity Extraction**

Extract the key entities from the letter like Patient Details , MRN number to attach them to further workflow, Used BERT capabilities to extract the entities



How does it work : Automated Correspondence



Four layered self learning solution

● Documentation standardization

- **Standardize** documents to **300+ DPI**
- Read the first and last page, **get rid of blank pages**
- Identify an individual letter, with attachments

● Document Classification

- Sort and classify individual letter type into various types
- **Classify** into EOBs, checks, denials, approval, bankruptcy, attorney letters, medical record requests
- **Deep Learning challenger algorithm** increases accuracy to 93% + with small data set ~1000 documents

● Document Orchestration

- **Extract** the relevant data fields like Patient name, DOB, Encounter #, Patient Insurance number, DX code and **index**
- Create a document repository based on the classification

● Workflow Execution

- Enable and trigger RCM and HIM workflows
- Workflow 1 : **First level appeals** for denied claims
- Workflow 2 : **Approval letters** are archived without human touch

AI- iCAN™ Manage Screens to showcasing expandability and QA on the model output and use the data to auto-retrain the model for better performance

Document classification

Feature Importance:

By analysing the importance of different features or words within the document, reveal which aspects of the text influenced the classification decision

Rule Extraction:

Explainable AI has extracted the decision rules or logical explanations from the trained model. This involves identifying patterns or conditions that the model uses to classify documents. These rules can be represented in a human-readable format, providing transparency into the decision-making process

Document Summarization

Post-hoc explainability

methods aim to explain the model's decisions after it has made them. SHAP (Shapley Additive Explanations) provided the explanations by perturbing the input document and observing the model's response. It has provided the weightage for each tokens, so that easily a human could visualize where the model is more emphasizing

The screenshot displays the iCAN Manage web application interface. The top navigation bar includes the CognitiveHealth™ logo and the title "Prediction". The main content area is divided into two sections: "iCAN Prediction" and "User Correction". The "iCAN Prediction" section shows a table with three rows of classification results:

Model	Document Type	Confidence Score
iCAN Classifier - Arbor	APPROVAL	64.5%
iCAN Classifier - Aptus	APPROVAL	89.28%
iCAN Classifier - Lignum	APPROVAL	87.61%

Below the table, the "OCR Words" section displays the extracted text from the document:

PHL F Leigus Road B Ba La Wallingford CT aall SpecialtyHealth
Anthem ow vw BlueCross BlueShield January eel pe etter ee
KAKA AKA AKA KK AKAKKKALL AADC AB GREENWICH
ASSOC ATION ATTENTION UM DEPARTMENT PIILLADELPHIA
PA eTOTOZOITEOOO Note Spanishspeaking recipients Si

The "Contributing Words" section lists the words that influenced the model's decision:

["independent", "whats", "coverage", "card", "covered", "accurate", "service", "pay", "look", "approved", "asked", "copays", "tool", "utilization", "customer", "required", "received", "adicional", "table",

On the right side of the interface, there is a "Batch Summary" section showing transaction details for Batch 0061, including the Lockbox (PHL 780317) and Deposit Account (4157738042). Below this, the "Front Image" section displays a scanned document from Anthem BlueCross BlueShield, dated January 24, 2020, with a reference number and a note for Spanish-speaking recipients.

Methodologies for actionable AI

Implementing explainable AI requires certain best practices to ensure effective results:



Collect high-quality and representative datasets for training AI models.



Perform thorough feature engineering to identify relevant features and representations for classification.



Choose appropriate explainable AI models, such as decision trees or rule-based systems, based on the specific requirements.



Design interpretable model architectures that provide transparent decision-making processes.



Employ post-hoc interpretability techniques like LIME or SHAP to provide explanations for black-box models.

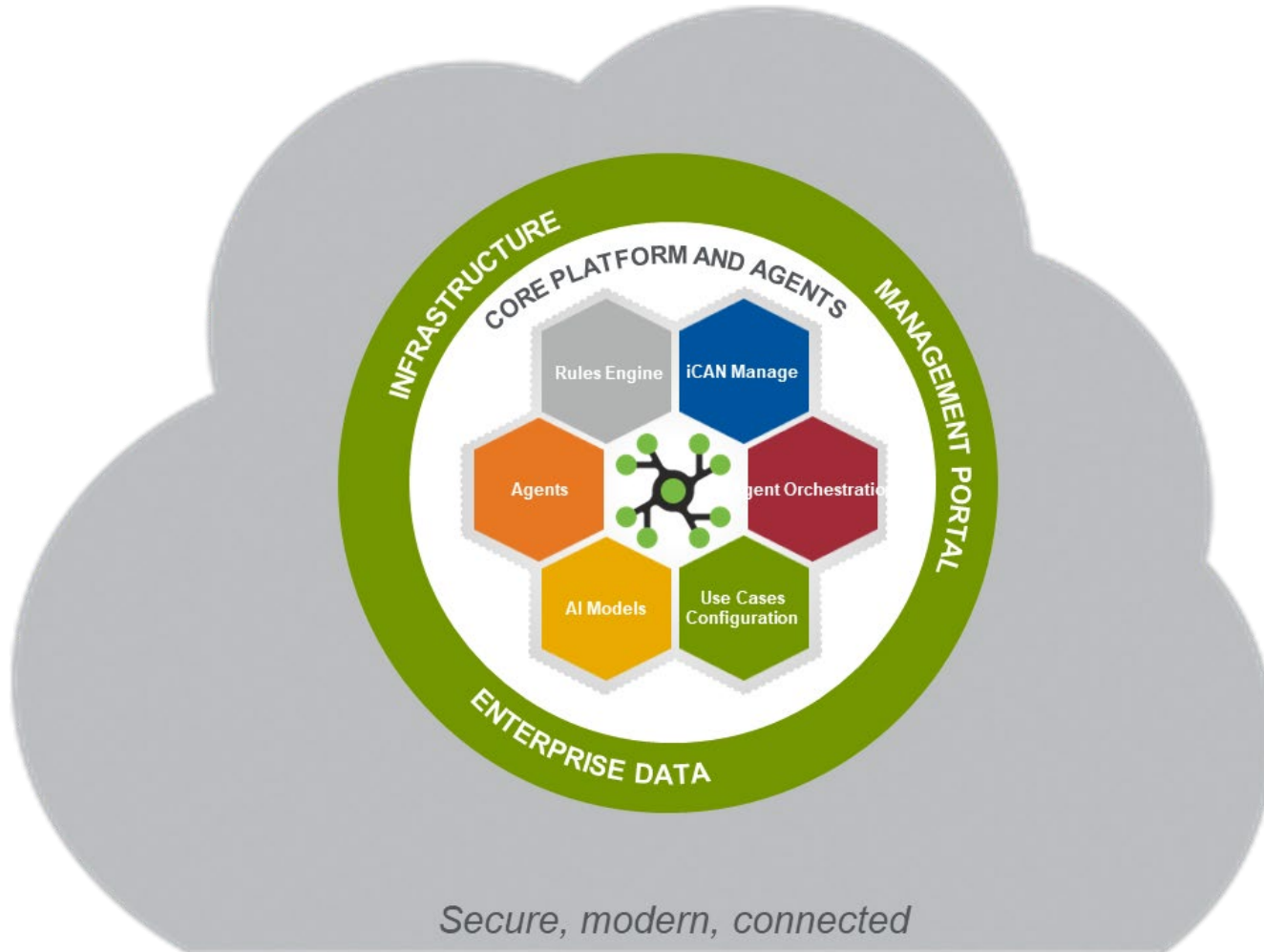


Continuously incorporate user feedback to refine the AI model and improve its performance.



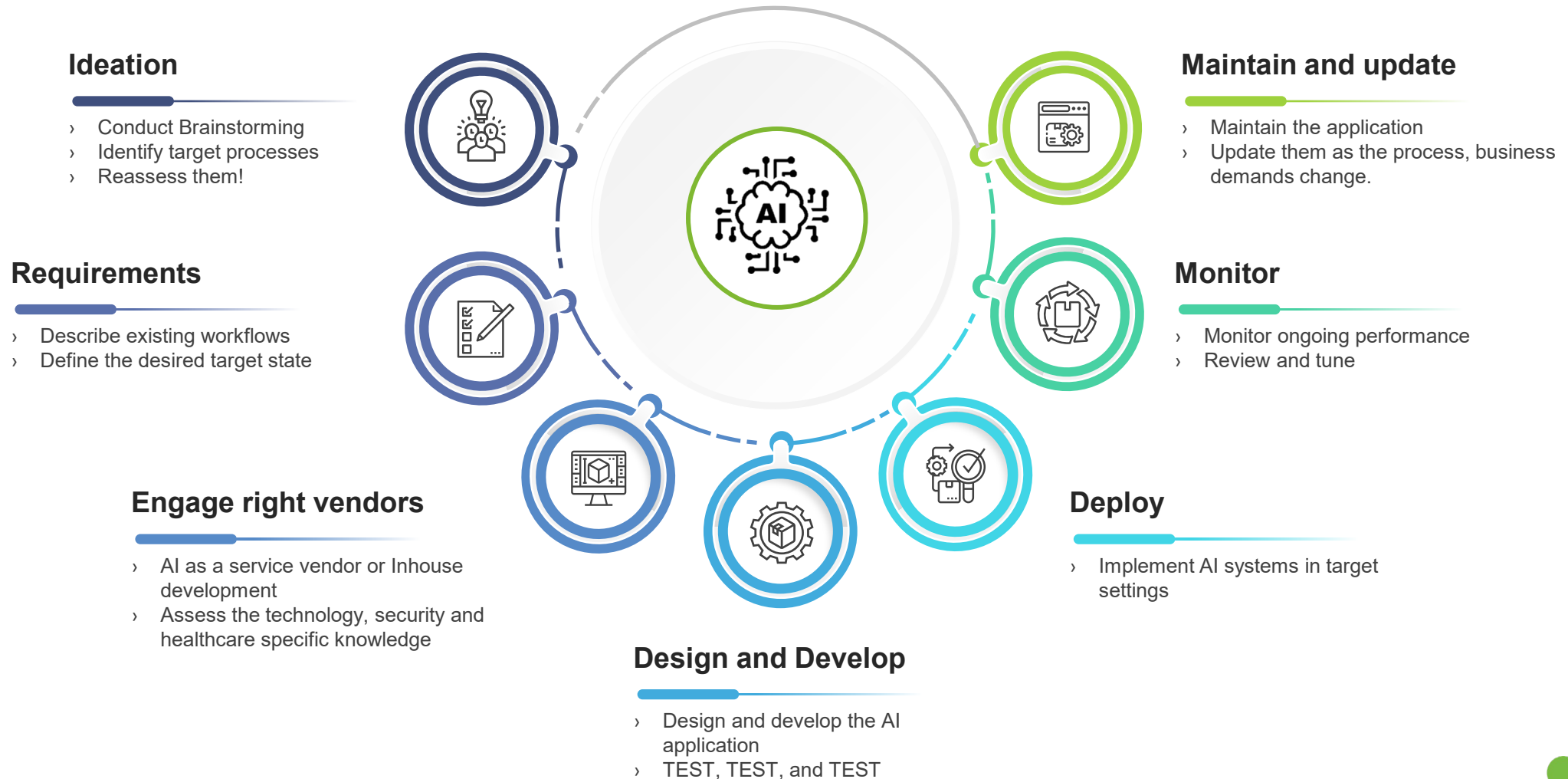
Look for AI as a Service Model (AaaSM) Purpose-built for Healthcare

AI As a Service solutions



Only a **healthcare-grounded approach** can solve **healthcare business problems**.

AI Deployment Life Cycle Model





AI isn't perfect – Key considerations

- Protecting patient privacy
- Not replacing but augmentation
- Leadership vision and human management
- Data Bias – Ongoing evaluation of the AI decisions
- Human oversight
- Learning curve
- The 'Black box' to 'Glass box' transparency and explainability
- Democratization of AI expertise
- Accountability

Regulatory frameworks / Initiatives for safe and Ethical AI



FDA Regulations –

Center for devices and radiological health(**CDRH**), Pre-Market Approval(**PMA**), AI/ML based Software as Medical Device(**SaMD**), Real World Evidence(**RWE**)

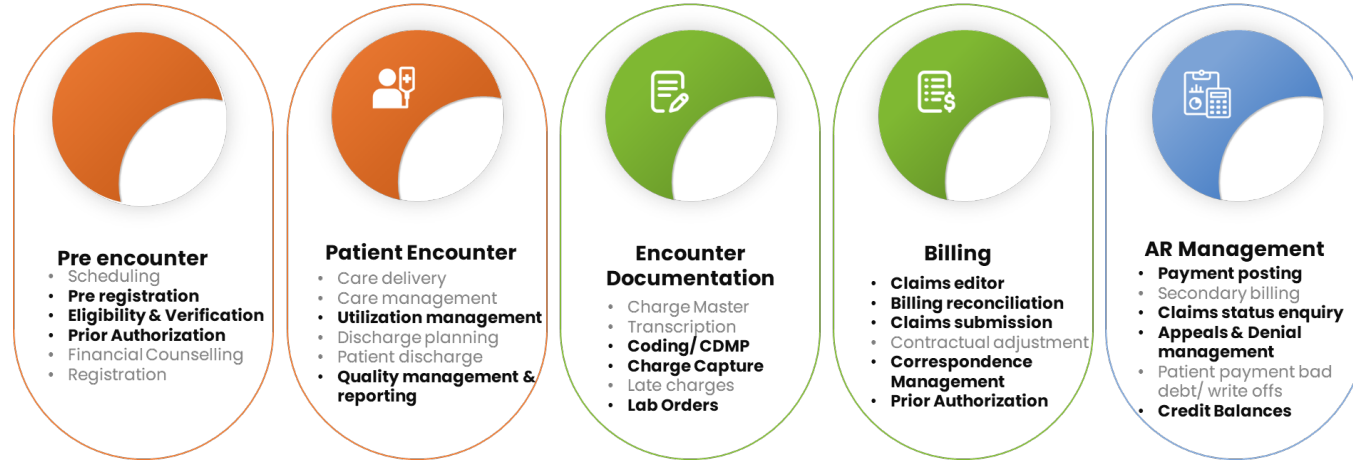
Digital Health Innovation Action Plan



Data Privacy and Security – HIPAA, HITECH Act, 21st Century Cures Act,



Legislative proposal and initiatives – Collaboration(Private-public partnerships) and standards development Organizations (IEEE, ISO)



Don't Wait, Automate

Questions?



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