

# Autonomous Medical Coding

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# Current State of Medical Coding

# Evolution Of Medical Coding

1980s → 2010s → Today

## MANUAL CODING

Documents were often handwritten or created and stored in early personal computers



Superbill or chargemaster were used for coding, and surgical procedures would be entered into computer software billing systems



Printed claims were mailed to insurers for billing and payment

## COMPUTER ASSISTED CODING (CAC)

With growing use of EMRs, CAC software recommends codes by analyzing medical records



A coder reviews and validates the codes are correct with assistance from the documentation in the medical record



Coders submit the medical codes into the billing system for claims submission

## AUTONOMOUS MEDICAL CODING

New technologies such as OCR engines, NLP, AI, and ML enable clinical terms extraction

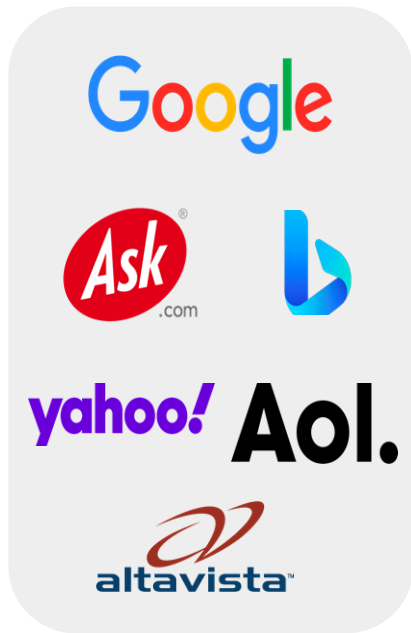


Autonomous coding solutions derive ICD, CPT, E/M levels, HCPCS codes etc. by understanding the narrative of the medical record

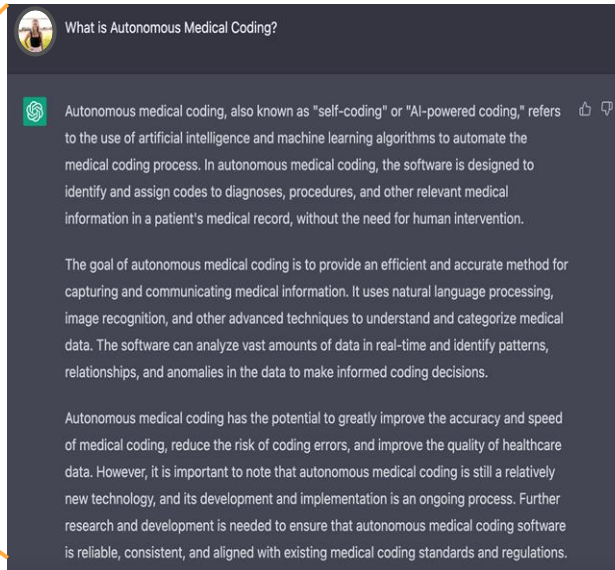


An audit confirms the code for submission into billing systems or sends for manual review

# NLP Models in Everyday Life



ChatGPT



# Current Coding Technologies

	EMR Coding Functionality	CAC Solutions	Autonomous Coding Solutions
HUMAN INTERACTION	Exception Based	Required (for every chart!)	Not Required
INTEGRATION & USAGE	Embedded into workflow Coders need to review exceptions	Requires workflow changes Coders must review each chart section and select final codes based on CAC suggestions	No workflow changes Coders only need to review complex charts flagged by software
ACCURACY	Known for assigning non-specific codes and symptoms	Known for suggesting inaccurate codes	Accuracy consistently over 95%
CODE EXPLANATION	No NLP, pulling from orders, registration or previous encounters; very specific rule sets	No visibility into coding rationale	Clear rationale and full transparency (for every code assigned!)
TIME	Within seconds	Within minutes	Within seconds

# Autonomous Medical Coding

# Underlying Technology

Definition

## Artificial Intelligence (AI)



...the practice of utilizing machines to mimic human intelligence to perform tasks, solve problems and autonomously achieve goals.



Example

- AI is like the coach of the team, who tells the players what to do and when to do it.
- AI is like the brain of the team, making decisions and giving orders.

## Machine Learning (ML)



...is a type of artificial intelligence model that can “learn” from data patterns.



- ML is like the players on the team, who learn from their mistakes and improve over time.
- ML is like the muscles of the team, getting stronger and more skilled as they practice and play.

## Natural Language Processing (NLP)

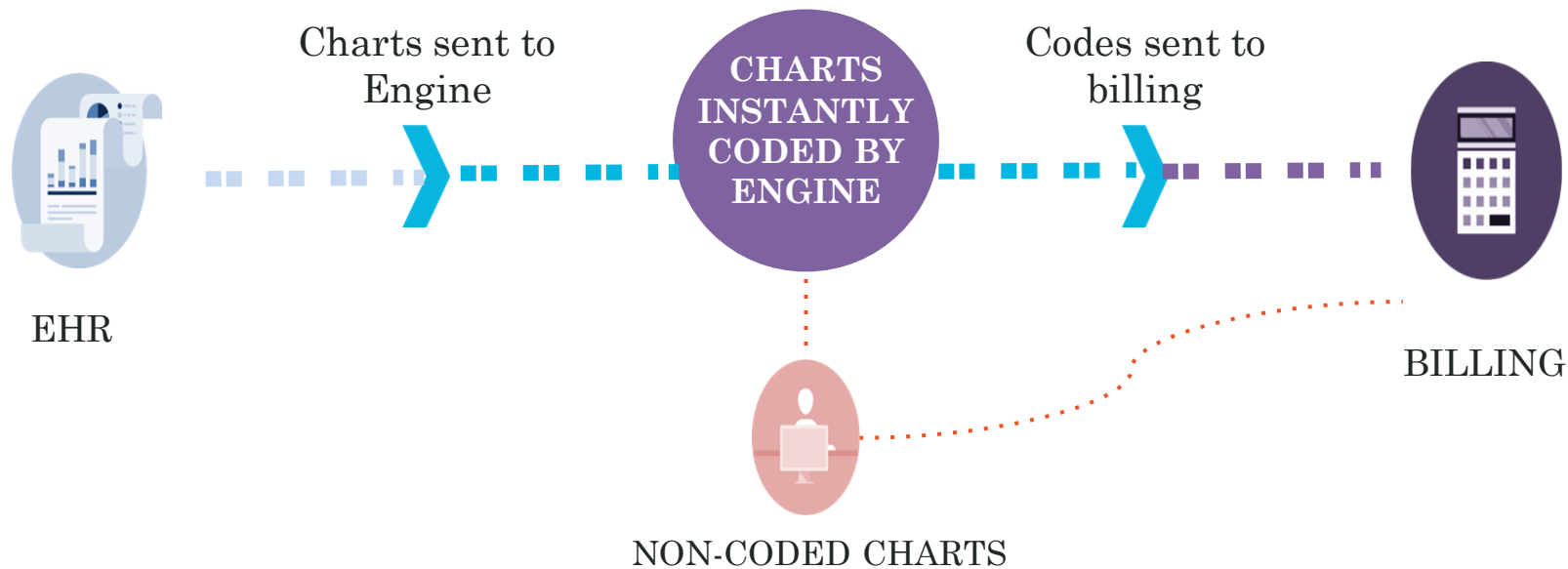


...is a way of enabling computers to understand, interpret, and generate human language in a meaningful way.



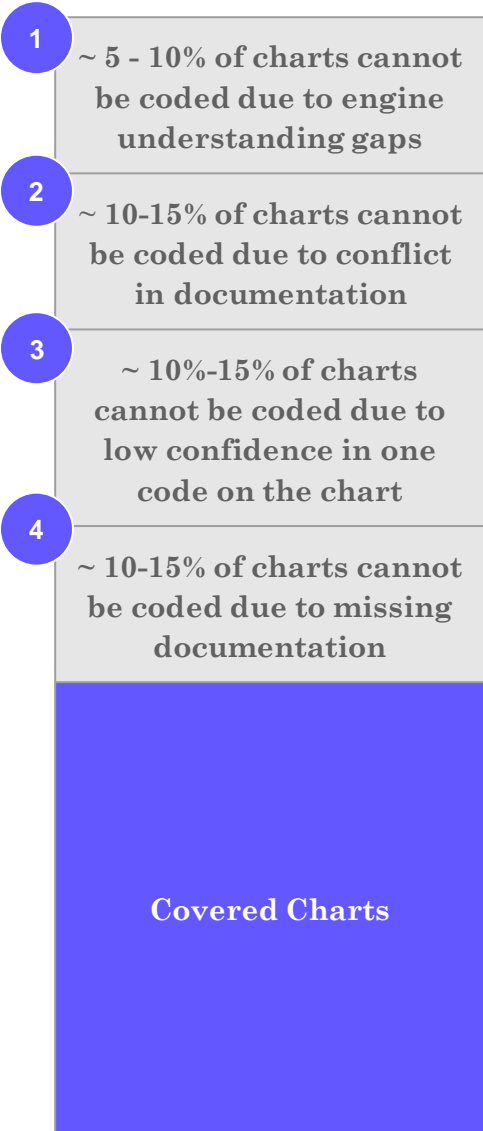
- NLP is like the communication between the players on the team, who use words and signals to pass the ball and work together.
- NLP is like the language of the team, helping the players understand each other and work together better.

# Autonomous Coding Integrated Workflow





# Reasons for Dropped Charts



Reasons for Dropped Charts	
Reason	Example
1 Engine Understanding Gaps	Rare conditions; Edge Cases
2 Conflict in Documentation	Ambiguity around whether a diagnosis was negated or not, ambiguity around whether a condition is from the past vs. current, or laterality conflicts
3 <b>Partial Coding</b> - Low Confidence in 1 Code on Chart	The engine suspects two ICD codes need to be reviewed for an Excludes1 note, but all other ICD codes, CPT, E&M, and Provider attribution are correct  The engine found a trauma code but the engine could not identify an external cause code; but all other ICD, CPT, E&M, and Provider Attribution are accurate.
4 Missing Documentation	Missing ED note or missing provider signature

# Benefits and Limitations

## Autonomous Coding: Limitations

- 1 Currently only covers certain specialities, primarily in outpatient
- 2 Not a 100% solution (only codes a certain percentage of charts)
- 3 Machine Learning based autonomous coding often requires >1 year of data to “learn” and lacks “explainability”

## Autonomous Coding: Benefits

- 1 Lowered risk of staffing challenges (e.g. finding experienced coders, attrition, and retirement)
- 2 Enhanced accuracy, consistency, and compliance due to configuring one machine vs. training multiple coders
- 3 Reduced risk of claims denials and delays in reimbursement
- 4 Improved quality of healthcare data through capturing additional codes
- 5 Increased efficiency through reduced time and effort required to manually code medical records (e.g. 10,000 charts coded in a day)

# Autonomous Medical Coding Onboarding

<b>Training / Configuration</b>	<ul style="list-style-type: none"><li>● Provide training on organization specific coding guidelines and philosophies</li><li>● Train human coding staff on how to validate the engines' results, and provide feedback for continuous improvement</li></ul>
<b>Validation / Auditing</b>	<ul style="list-style-type: none"><li>● Validate the autonomous medical coding results</li><li>● Conduct regular audits and quality assurance checks to ensure that the codes assigned are accurate and compliant</li></ul>
<b>Evaluate / Performance Improvement</b>	<ul style="list-style-type: none"><li>● Evaluate the impact of the autonomous coding system on the organization's operations, such as efficiency, productivity, and cost savings</li><li>● Validate autonomous coding engine is continually improving its knowledge base and learning from audits</li></ul>

# Automated Medical Coding Potential

## Ancillary Outpatient Services

- *Emergency*
- *Pathology*
- *Radiology*
- Physical Therapy
- Occupational Therapy
- Speech Therapy
- Home Health

## Outpatient Service Lines

- Anesthesia
- Family Medicine
- Internal Medicine
- Neurology
- Obstetrics & Gynecology
- Pediatrics
- General Surgery
- Pain Management
- Cardiology
- Orthopedic
- Gastroenterology
- Urology
- Endocrinology
- Ophthalmology
- Oncology
- Behavioral Health

## Inpatient

- Inpatient
- Observation
- Hospice

# Emerging Potential Use Cases



HCC Coding Capture



Quality Audits



Charge Reconciliation

# Steps for Success

## Current Coding Challenges

Evaluate the existing coding processes to identify areas where autonomous coding could bring value, such as reducing coding errors, increasing efficiency, or freeing up staff time for more complex coding tasks.

## Technical Capacity

Determine whether the organization has the technical infrastructure and expertise to implement an autonomous coding partner.

## Coding Philosophy

Document your organization's coding philosophy and guidelines compliant with coding regulations.

# Careers

## Health System

Certified professional coder (CPC)

Coding auditor

Billing auditor

Denial coding analyst

Quality assurance coder

Coding analyst

## Vendors

Product

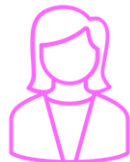
Coding auditor

Quality Assurance Coder

Subject Matter Expert - Product

Product Sales Enablement

Compliance Auditor



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# THANK YOU FOR JOINING!

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