Amazon Comprehend Medical

Ethan Hung | Josh Everly | Lepakshi Ganta | Shweta Chabukswar | Yash Bhirud | Yeswanth Chinta

The deluge of unstructured information

“A Gartner research claims that organizations worldwide record a 25% growth in usage of paper each year. Paper continues to be a hindrance for many organizations owing to difficulties in processing and extracting information from such documents. More often than not, this process is carried out manually in organizations making it an arduous task that is prone to errors.”

Challenges in understanding documents

Extracting text manually is time-consuming, error prone, and expensive

Current rules-based systems are not intelligent and break with format changes

Extracting insights from documents requires large volumes of labeled data and ML skills

Some use cases may require human oversight; building human review workflows is complex and may increase time to market

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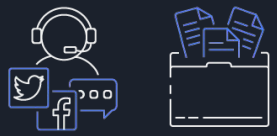
Discover Relationships and Insights in Text data



Documents

Medical Documents

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Real-time Endpoint

Predefined Category 1

Predefined Category 2

Predefined Category 3

Predefined Category 4

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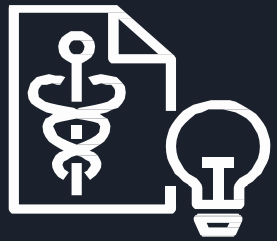
A natural language processing (NLP) service that uses machine learning to find insights and relationships in text



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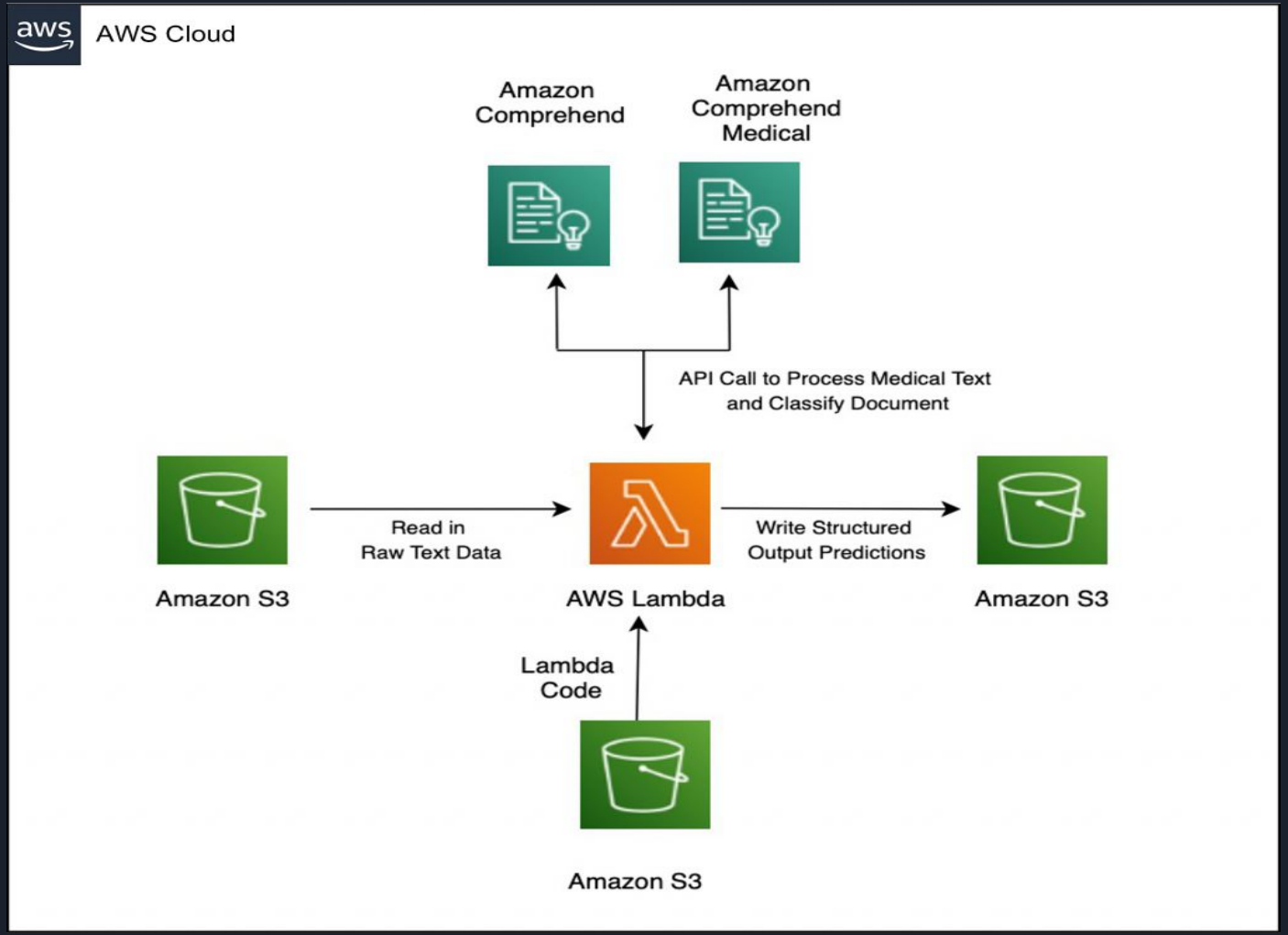
Includes the same NLP tools from Amazon Comprehend but is tailored for extracting complex medical information and is HIPAA-eligible

Is my treatment tailored to the patient?

Can I get a better patient view?

Is my treatment safe?

How do I protect sensitive data?


AWS Cloud
Amazon Comprehend
Amazon Comprehend Medical
API Call to Process Medical Text and Classify Document
Read in Raw Text Data
Write Structured Output Predictions
Amazon S3
AWS Lambda
Amazon S3
Lambda Code
Amazon S3

Classes of Medical Information

- **ENTITY**: people, treatments, medications, and conditions. e.g. “Ibuprofen”
- **CATEGORY**: group to which an entity belongs. e.g. “MEDICATION”
- **TYPE**: the type of entity within its category. e.g. “GENERIC_NAME”
- **ATTRIBUTE**: information related to an entity, such as dosage. e.g. “200 mg”
- **TRAIT**: something ACM understands about an entity. e.g. “NEGATION”

Example Output

- “chronic” is in category MEDICAL_CONDITION and of type ACUITY
- “aching pain” is in category MEDICAL_CONDITION and of type DX_NAME


```
"Entities": [
    {
      "Id": 0,
      "BeginOffset": 26,
      "EndOffset": 33,
      "Score": 0.9961825013160706,
      "Text": "chronic",
      "Category": "MEDICAL_CONDITION",
      "Type": "ACUITY",
      "Traits": []
    },
    {
      "Id": 1,
      "BeginOffset": 34,
      "EndOffset": 45,
      "Score": 0.8380221724510193,
      "Text": "aching pain",
      "Category": "MEDICAL_CONDITION",
      "Type": "DX_NAME",
      "Traits": [
        {
          "Name": "SYMPTOM",
          "Score": 0.6004688739776611
        }
      ]
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Some Use Cases

Patient & population health analytics

Unstructured data is difficult to mine

ACM creates ”single lens” on a single patient or a cohort of patients

Revenue cycle management: Medical coding

Process of coding or classifying patient records

Impact coding efficiency and

reduce burden on clinical staff

Cohort Analysis

Identify the right patients for clinical trials quickly

Allow for quick and accurate indexing across large patient populations

DEMO

Thank you!

Patient & population health analytics

Challenges

Unstructured data is difficult to mine
Example: How do I find trends in my population with the granularity provided through ICD-10?

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Outcomes

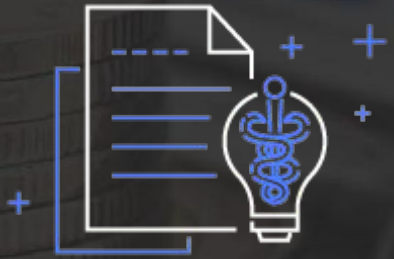
Create ”single lens” on a single

patient or a cohort of patients

Revenue cycle management: Medical coding

Challenges

Process of coding or classifying patient records according to the International Classification of Diseases (ICD) is one of the most complex transactions



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Outcomes

Impact coding efficiency and reduce burden on clinical staff

Cohort analysis

Challenges

Identify the right patients for clinical trials quickly

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Outcomes

Allow for quick and accurate indexing across large patient populations

Medication reconciliation

Challenges

Process of creating the most accurate list possible of all medications a patient is taking to prevent adverse drug events

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Outcomes

Ability to process unstructured data in physician's admission, transfer, and/or discharge notes, and link to a unique RxNorm concept ID