AWS Columbus Learning Days

Build AI and ML powered applications without machine learning expertise

Ankit Battawar
Solution Architect
Amazon Web Services
battawar@amazon.com

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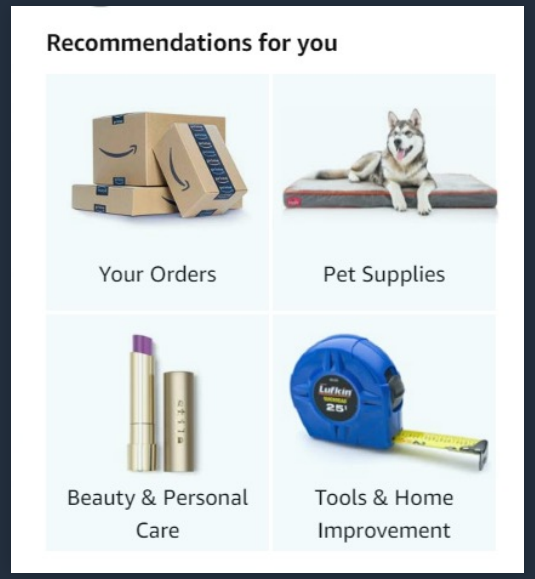
Amazon—Machine learning innovation at scale



4,000 products per minute sold on Amazon.com

1.6M packages every day

Billions of Alexa interactions each week

First Prime Air delivery on **December 7, 2016**

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BUILD AI AND ML POWERED APPLICATIONS WITHOUT MACHINE LEARNING EXPERTISE

Enhance customer experience

Better and faster decision-making

Improve business operations

New products and services

The universe of AI/ML is ever expanding

AI/ML use cases

Forecasting	Anomaly detection	Contact center intelligence	Conversational AI
Intelligent document processing	Intelligent search	Media intelligence	ML modernization
AI for DevOps	Personalization	Identity verification	Automated content creation
Autonomous systems	Fraud Detection	Content moderation	Credit decisioning and underwriting
Cybersecurity	Digital twin/advanced digital simulation	AI for health	HR automation
AI for IT operations	Predictive maintenance	Quality control	Process automation
Supply chain optimization	Visual inspection	Workplace safety	+ Other use cases

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Today, we will do a deep dive on these use cases

AI/ML use cases

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Contact Center Intelligence & Conversational AI

Using AI to improve agent efficiency

"During peak hours, previously you're 45-50 minutes on hold, and now that's has been reduced to about three and a half minutes. One of the other benefits we've gotten from Amazon Connect is sentiment analysis. On a call, we get real-time feedback on whether or not the customer was happy, frustrated, or angry…"

Benny Chacko

Deputy General

LA County Internal Services Department

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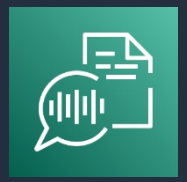
AWS AI services powering AWS CCI & Conversational AI solutions

Amazon Lex	Amazon Polly	Amazon Transcribe	Amazon Comprehend	Amazon Kendra	Amazon Translate
					
Conversational AI	Text to speech	Speech to text	Natural language processing	Intelligent search	Machine translation

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Conversational AI

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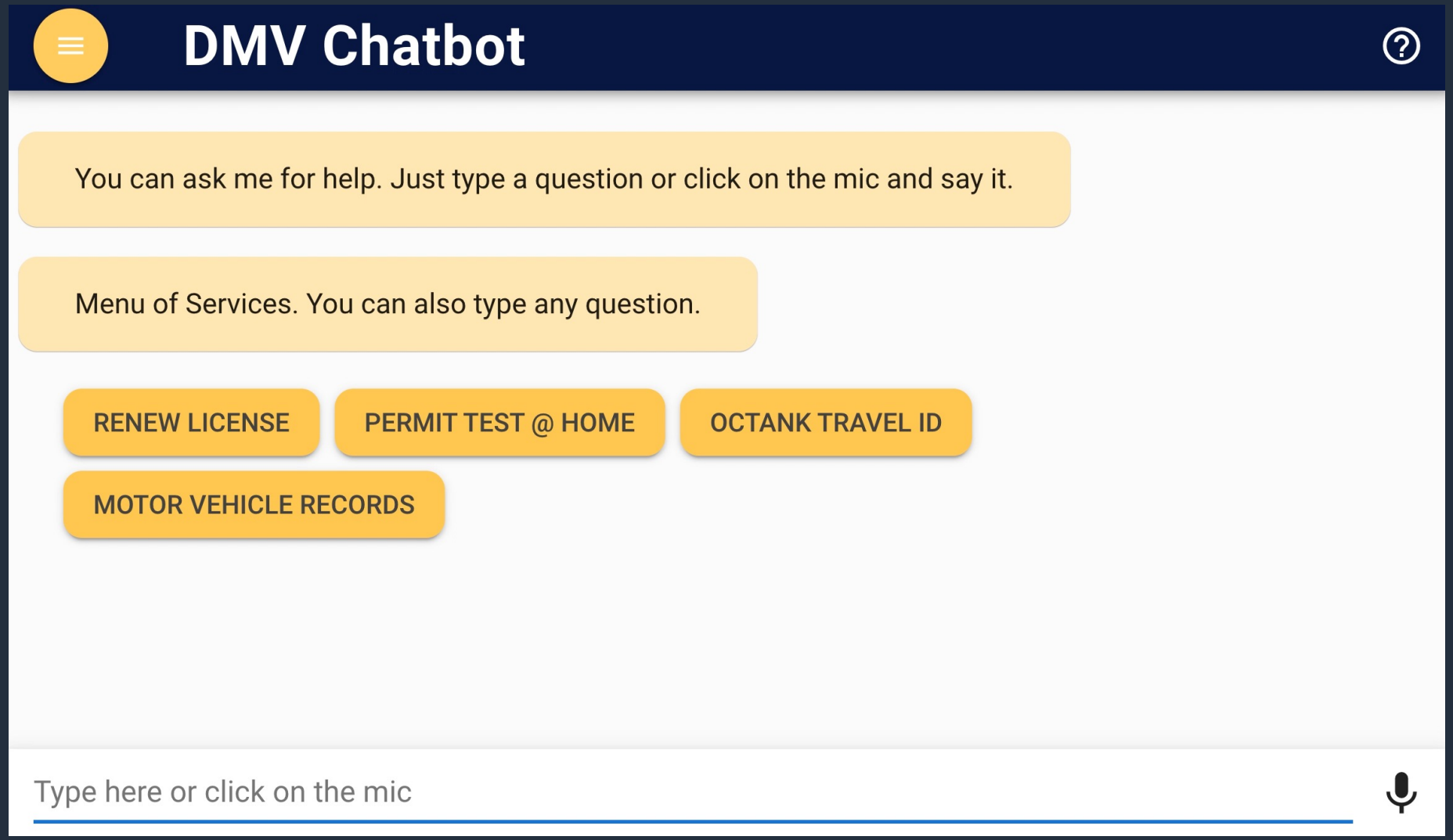
FAQ
(Chatbot)



Get answers to frequently asked questions

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FAQ

(Voice)

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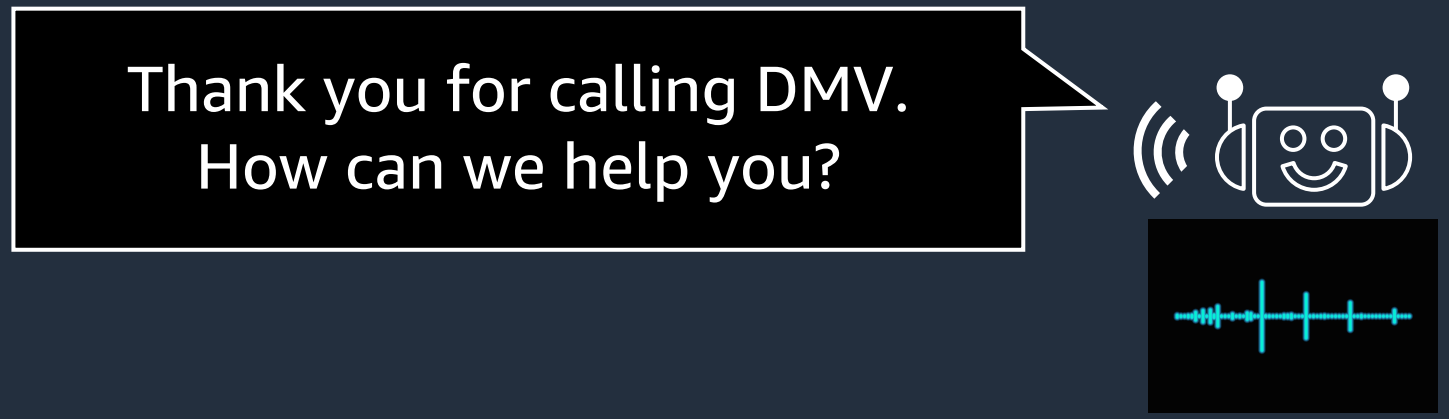

FAQ

(Voice)

aws
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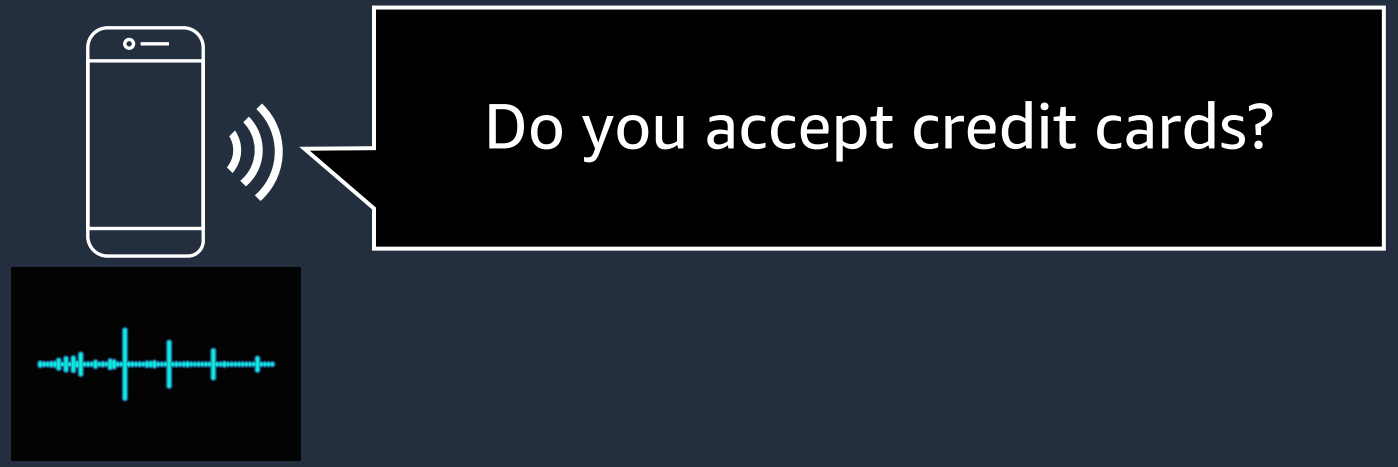
FAQ
(Voice)



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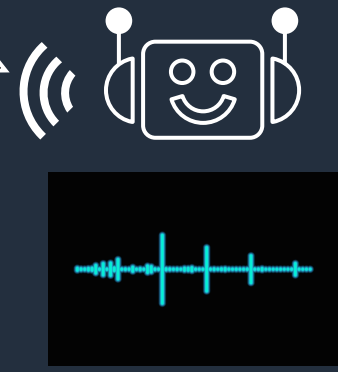
FAQ
(Voice)

We accept Visa, MasterCard, Discover and American Express. Is there anything else we can help you with?



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Tasks

Capture, verify information, and fulfill an intent, all without a live agent.

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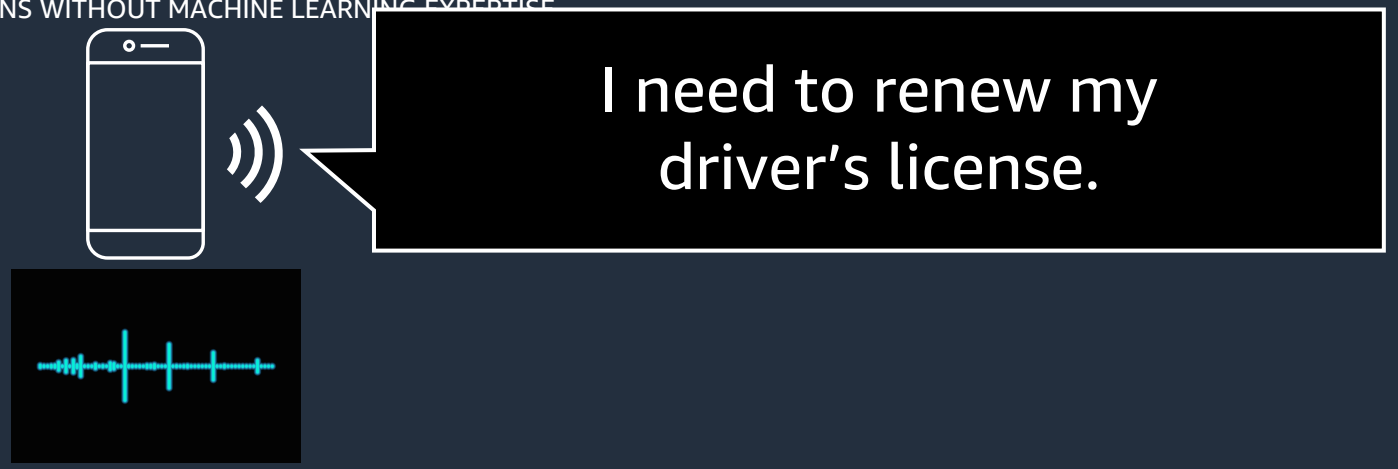

Tasks

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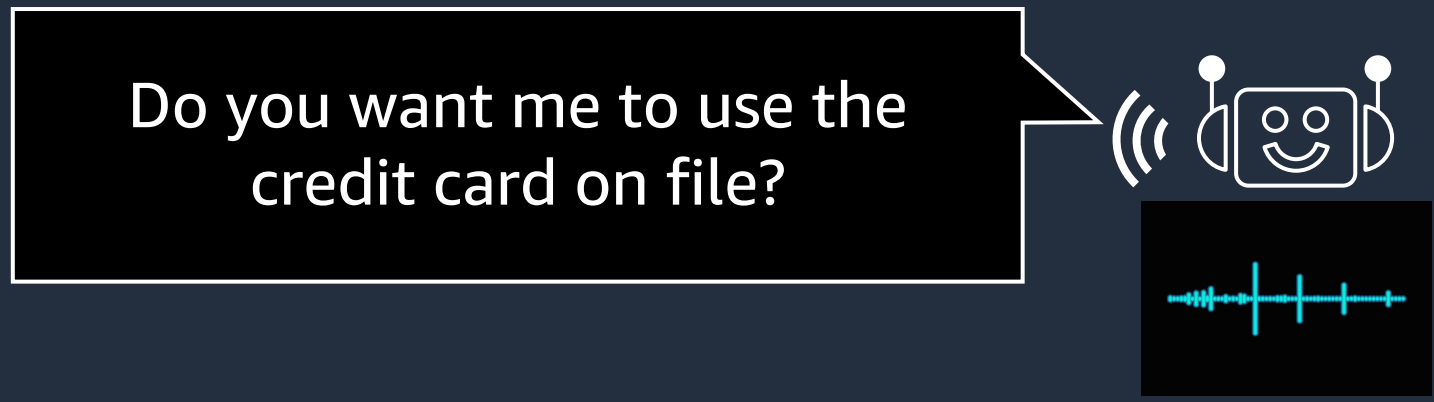
Tasks



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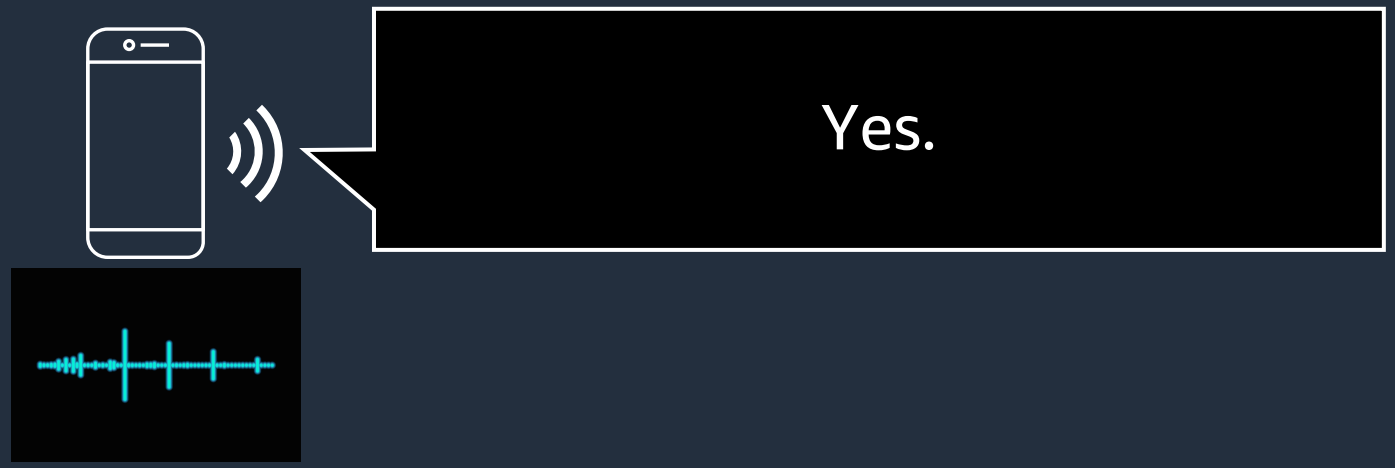
Tasks



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Tasks

Can you verify the last 4 digits of the card number?

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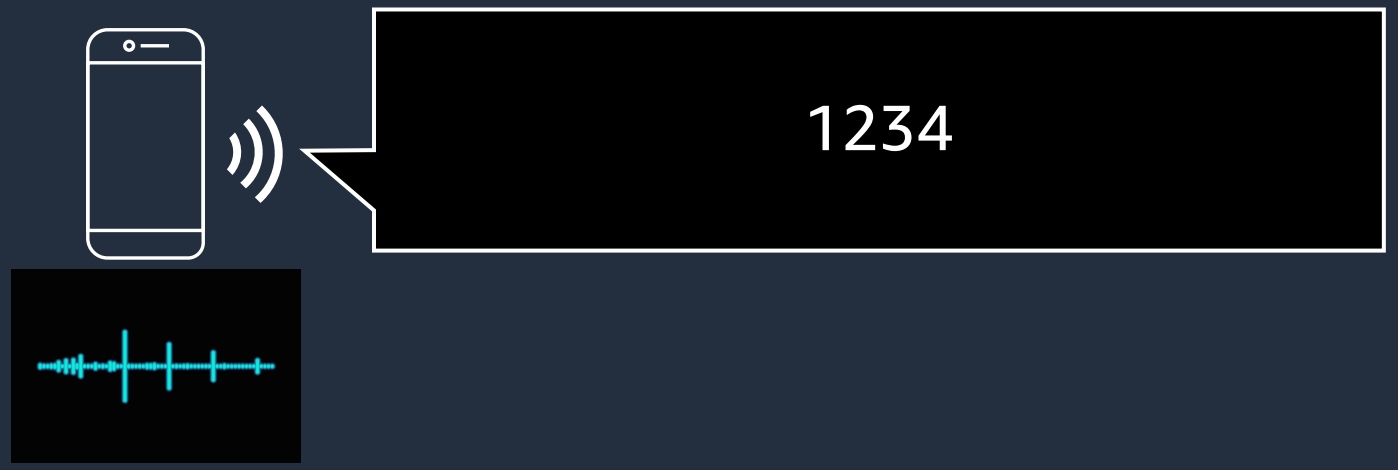
Tasks



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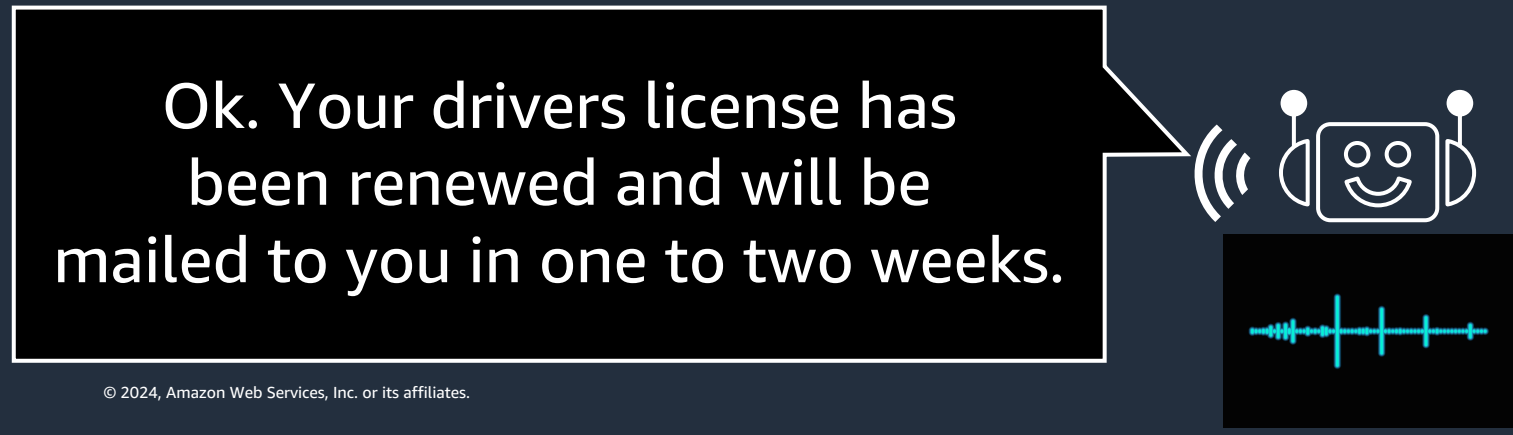
Tasks



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Smart transfer

Verify information and get the customer to the right agent with the best fit.

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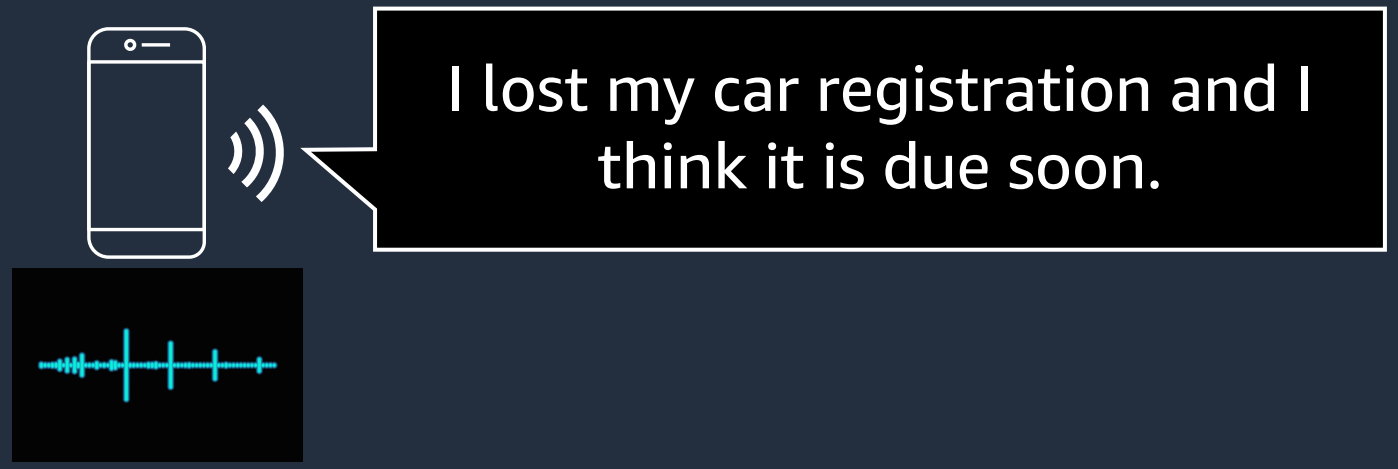

Smart transfer

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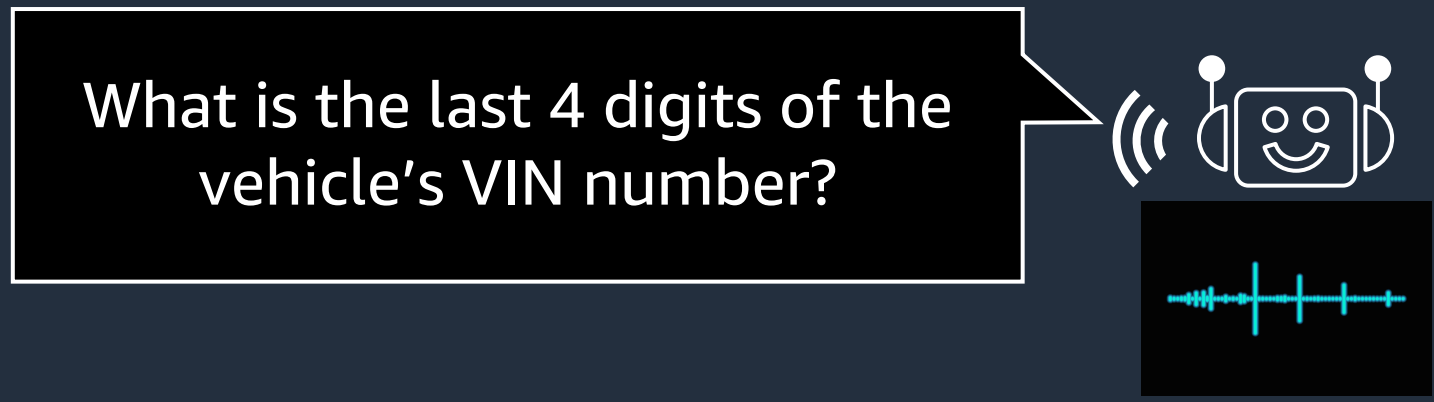
Smart transfer



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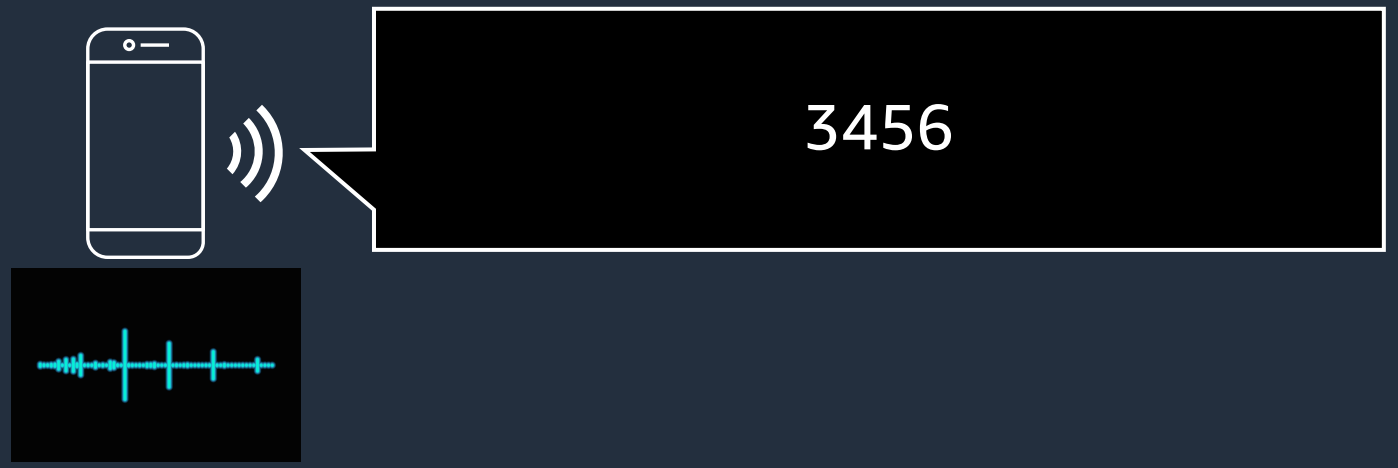
Smart transfer



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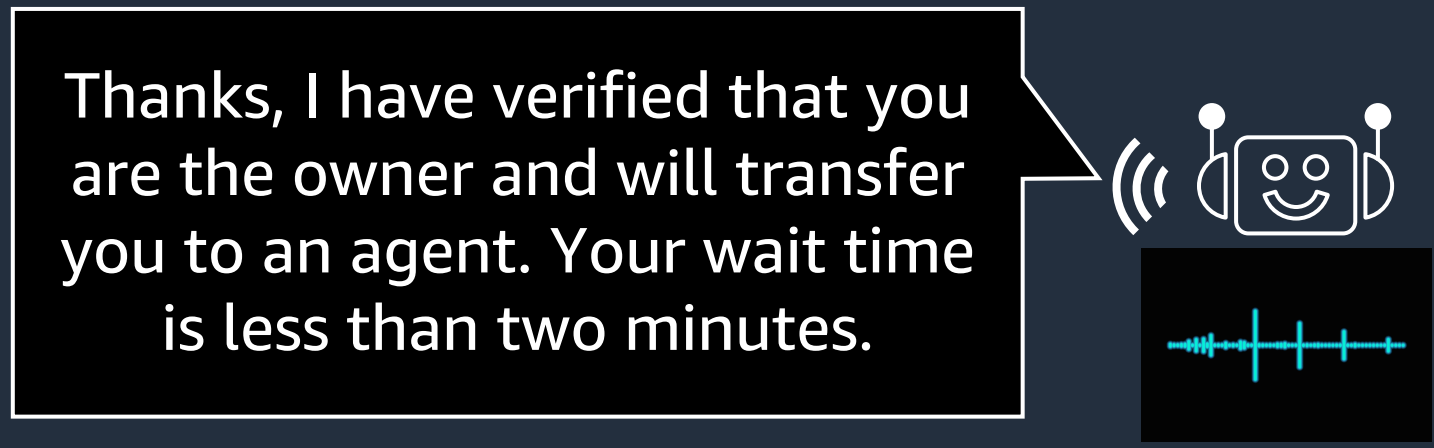
Smart transfer



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Contact Center Intelligence

Post call analytics

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Amazon Transcribe
call analytics

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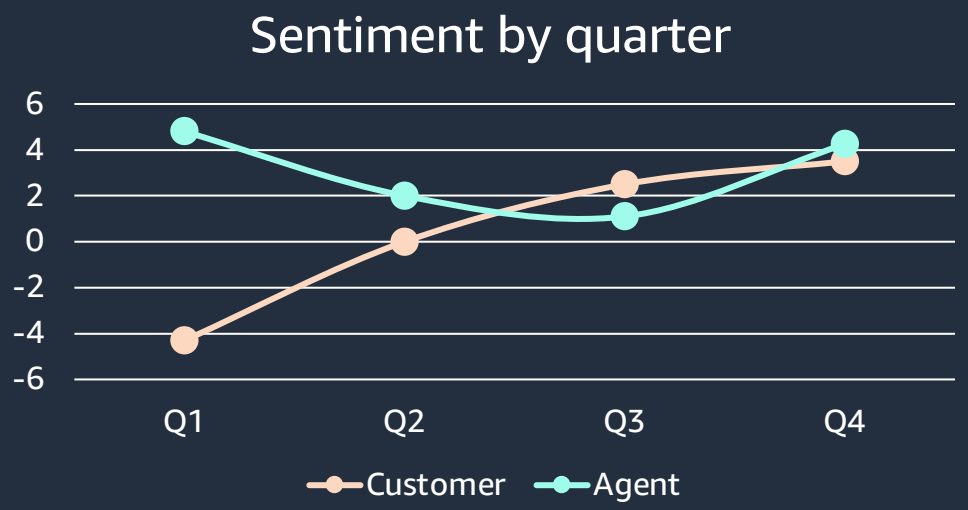

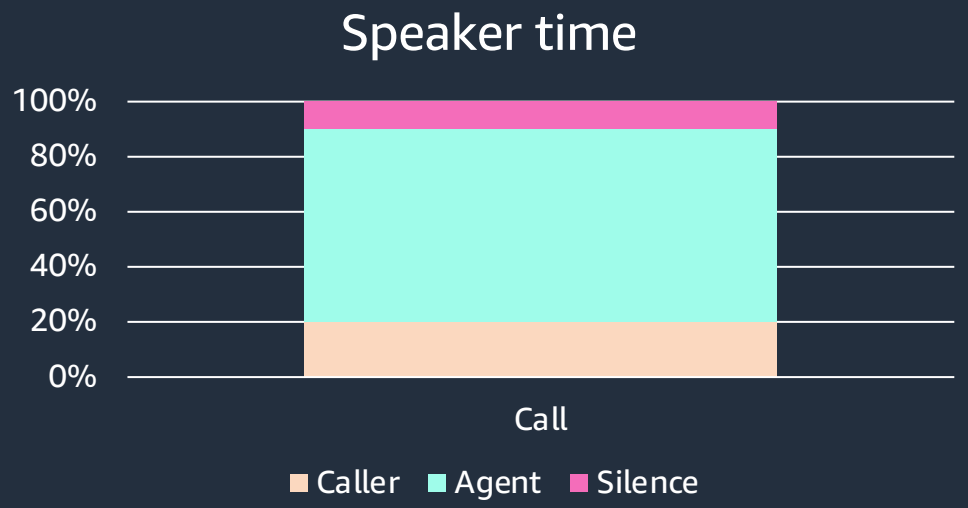

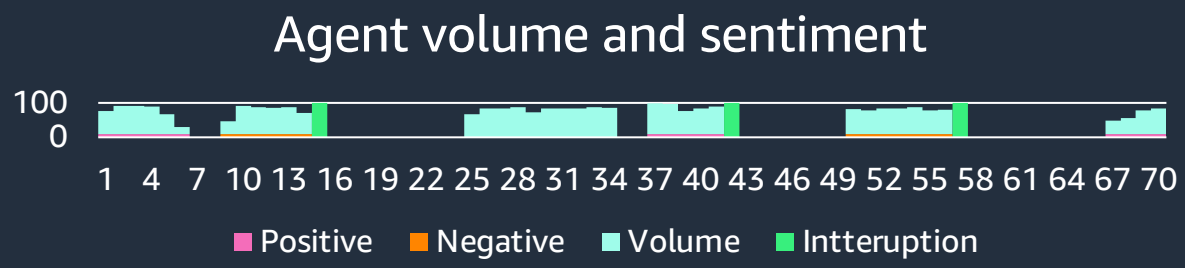

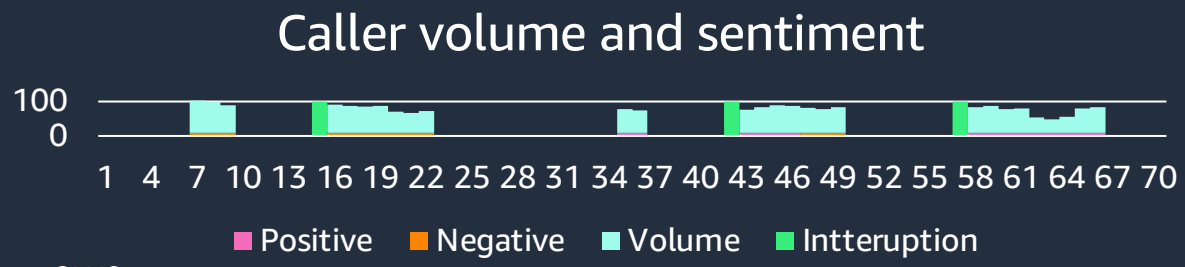

Issue:
[Caller] I dropped my credit card into the water.

Action Items:
[Agent] Ok, I'll have a new one sent to you.

Outcomes:
[Agent] Your card will arrive in 1-2 days.

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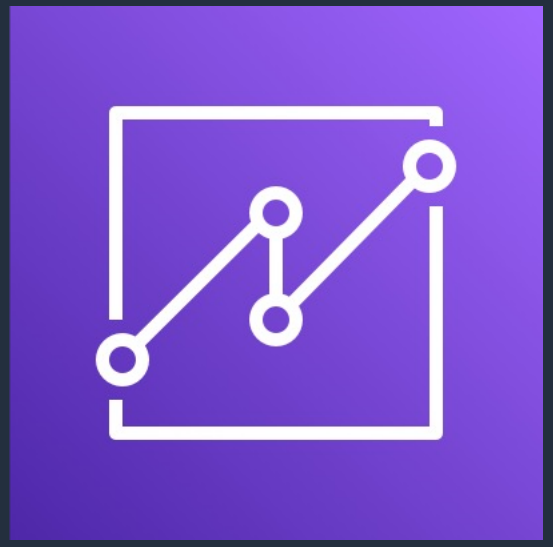
Integrates with Business Intelligence tools

Amazon Athena



Amazon QuickSight

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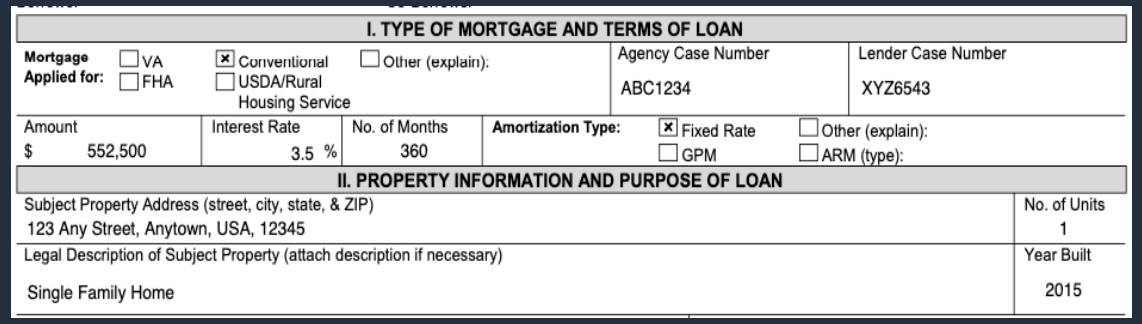
Intelligent Document Processing

Go beyond OCR with accurate and versatile information extraction

Accuracy of forms and tables allows customers to reach 80–90% automation levels on documents that previously needed manual processing.

INPUT → **OUTPUT**



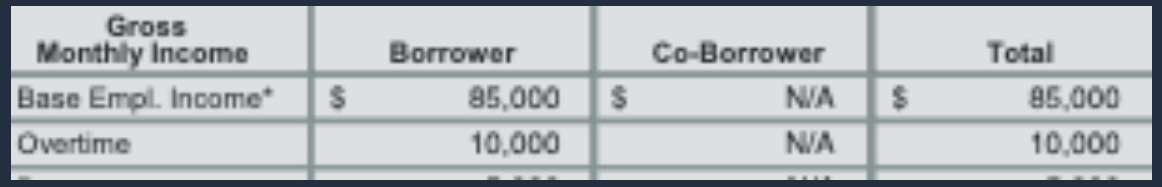
I. TYPE OF MORTGAGE AND TERMS OF LOAN

Mortgage Applied for:	Agency Case Number	Lender Case Number
☐ VA ☐ FHA ☒ Conventional ☐ USDA/Rural Housing Service ☐ Other (explain):	ABC1234	XYZ6543

Amount	Interest Rate	No. of Months	Amortization Type:	
$ 552,500	3.5 %	360	☒ Fixed Rate ☐ GPM	☐ Other (explain): ☐ ARM (type):

II. PROPERTY INFORMATION AND PURPOSE OF LOAN

Subject Property Address (street, city, state, & ZIP)	No. of Units
123 Any Street, Anytown, USA, 12345	1
Legal Description of Subject Property (attach description if necessary)	Year Built
Single Family Home	2015



Gross Monthly Income	Borrower	Co-Borrower	Total
Base Empl. Income*	$ 85,000	$ N/A	$ 85,000
Overtime	10,000	N/A	10,000

Raw text

Borrower | Co-Borrower | I. TYPE OF MORTGAGE AND TERMS OF LOAN | Mortgage | VA | Conventional | Other (explain): | Agency Case Number | Lender Case Number | Applied for: | FHA | USDA/Rural | ABC1234 | XYZ6543 | Housing Service | Amount | Interest Rate | No. of Months | Amortization Type: | Fixed Rate | Other (explain): | $ | 552,500 | 3.5 % | 360 | GPM | ARM (type):

Forms

Lender Case Number	VA
XYZ6543	NOT_SELECTED
Conventional	Other (explain):
SELECTED	

Table recognition

Column 1	Column 2	Column 3	Column 4
Gross Monthly Income	Borrower	Co-Borrower	Total
Base Empl. Income*	$ 85,000	$ N/A	$ 85,000
Overtime	10,000	N/A	10,000

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Analyze documents and send key insights to downstream systems and workflows

Redaction of sensitive data

Hi, my name is John Doe. For verification, the last 4 digits of my social are 6789 and my DOB is 01/01.

Hi, my name is [NAME]. For verification, the last 4 digits of my social are [SSN] and my DOB is [DATE_TIME].

Classify type of document

- Appeal
- Medical record
- Disputed invoice
- Provider contract v1
- Provider contract v2

Recognize medical entities or those specific to your business

Document text:
Mr. Smith is a 63-year-old gentleman with coronary artery disease and hypertension. CURRENT MEDICATIONS: taking a dose of LIPITOR 20 mg once daily.

Output:

Category of entity:	MedCondition
Type:	Dx name
Entity:	Hypertension
Confidence:	0.99

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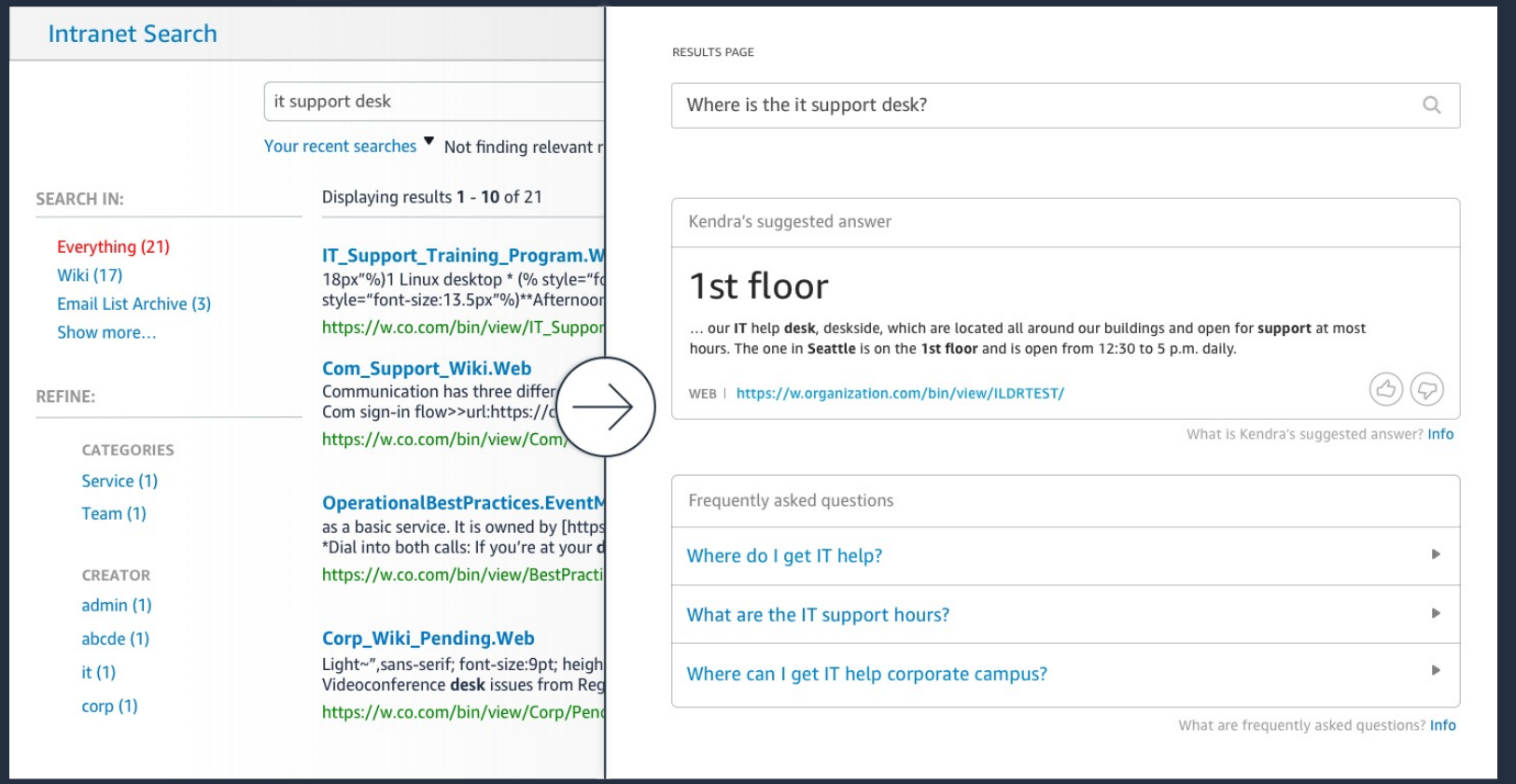
Intelligent Search

Intelligent Search

FIND ACCURATE INFORMATION QUICKLY AND EASILY

Traditional search



Intelligent search

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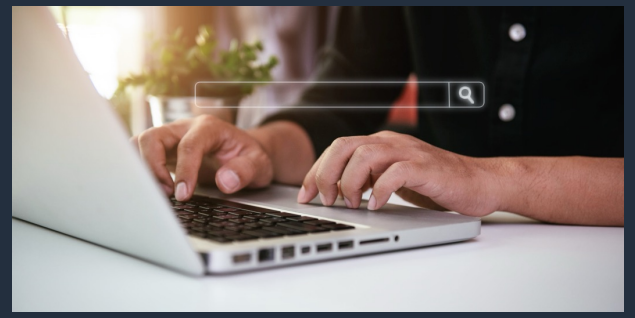
Top intelligent search use cases

Customer experiences

- Agent Assist with accurate search
- Self-service chatbots
- Website search

Enterprise search

- Intranet search
- Domain-focused search (R&D, Compliance, HR, Legal, etc.)



Embedded search

- Add intelligent search to SaaS applications like CRMs, knowledge management systems, productivity apps, etc.

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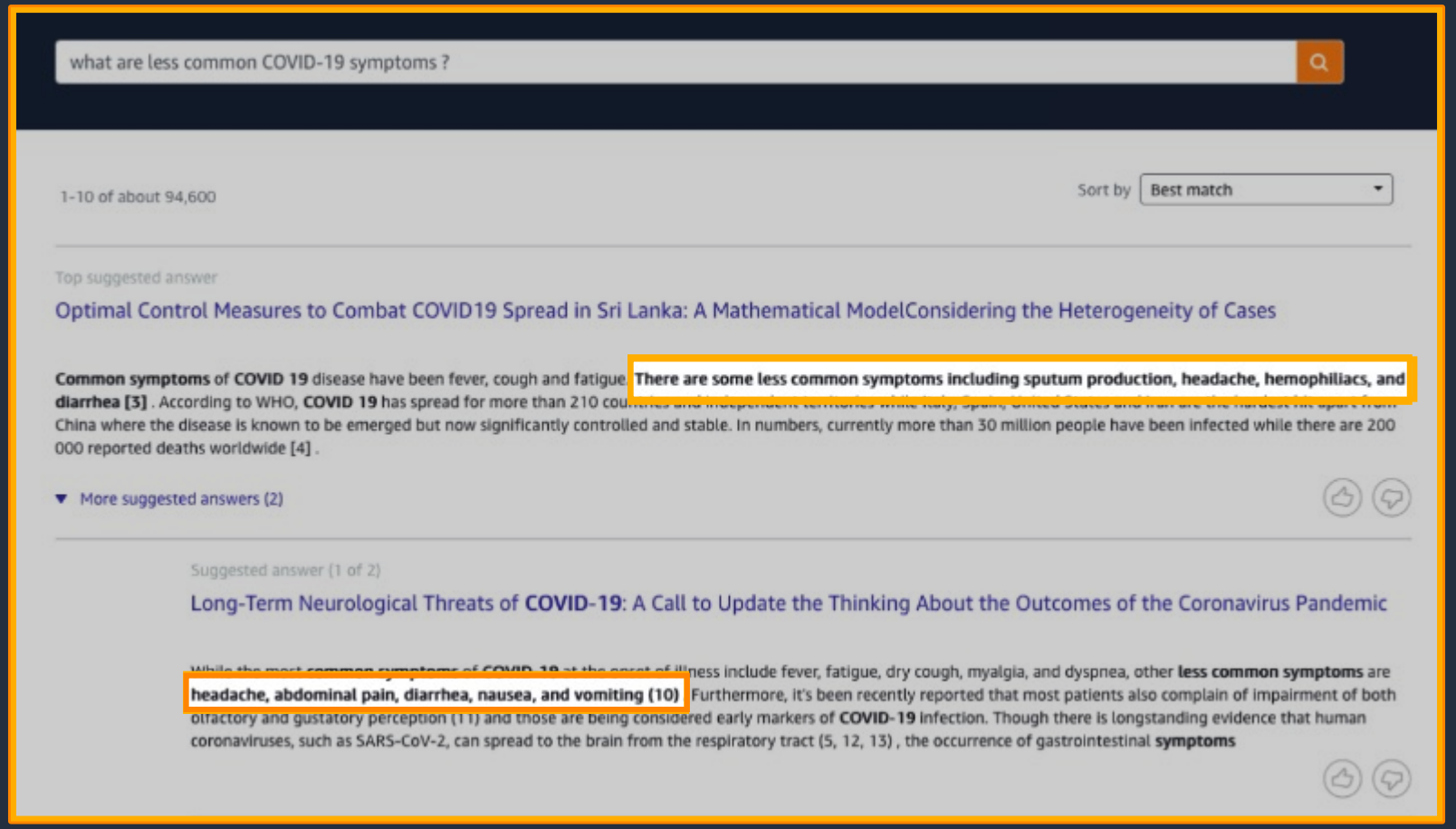
Amazon Kendra

Natural language queries



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NLU and ML core

Natural language queries

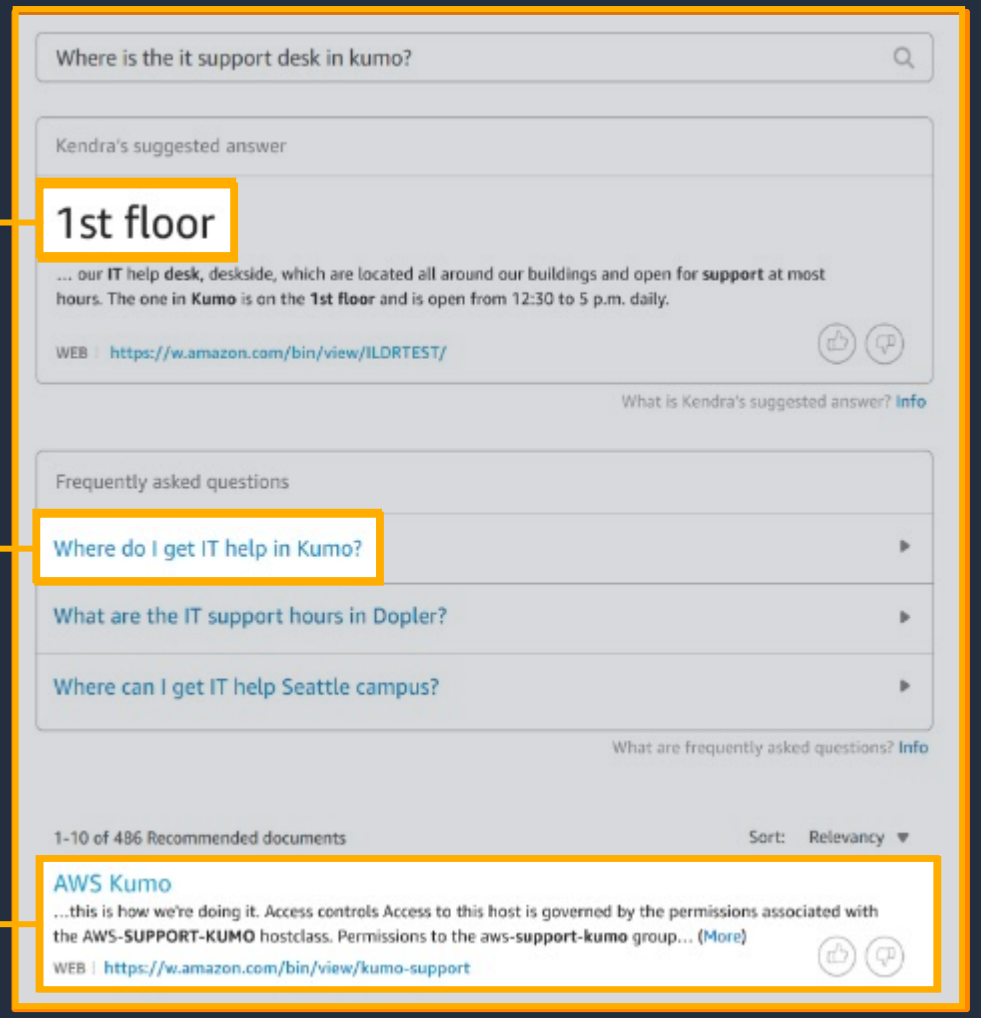
NLU and ML core

Better answers

Reading comprehension

FAQ matching

Document ranking



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Domain expertise

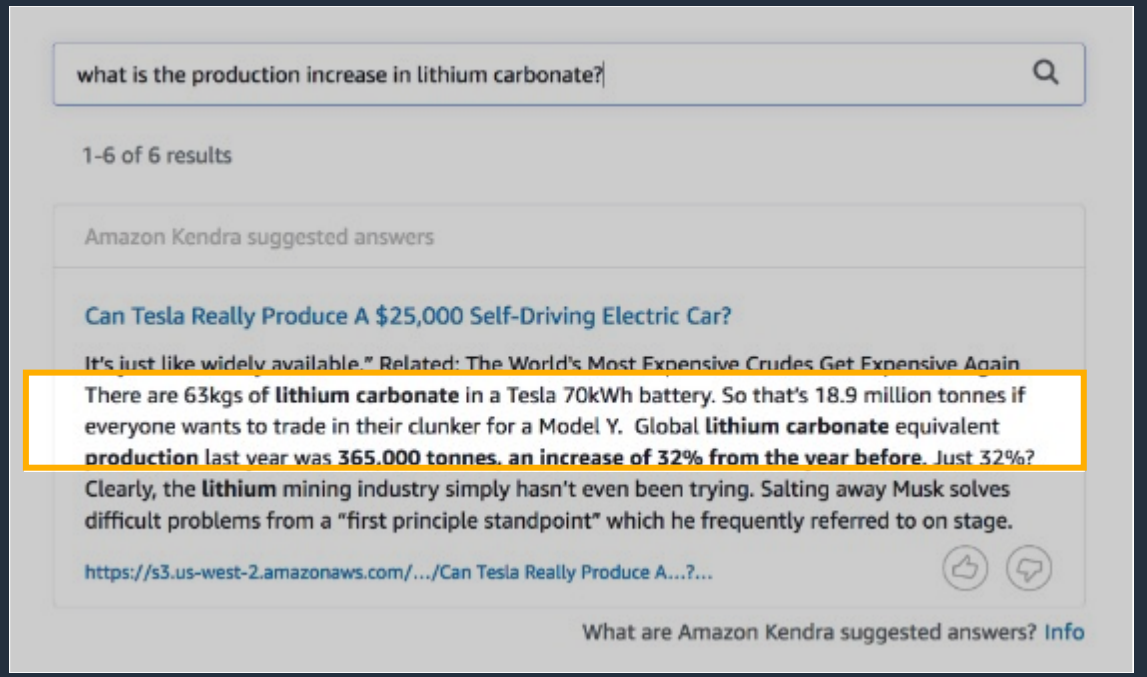
Natural language queries

NLU and ML core

Domain expertise

Optimized for 14 major domains

IT, Financial Services, Insurance, Pharma, Industrial, Energy, Legal, Media and Entertainment, Travel and Hospitality, Health, HR, News, Telecommunications, and Automotive



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Incremental learning

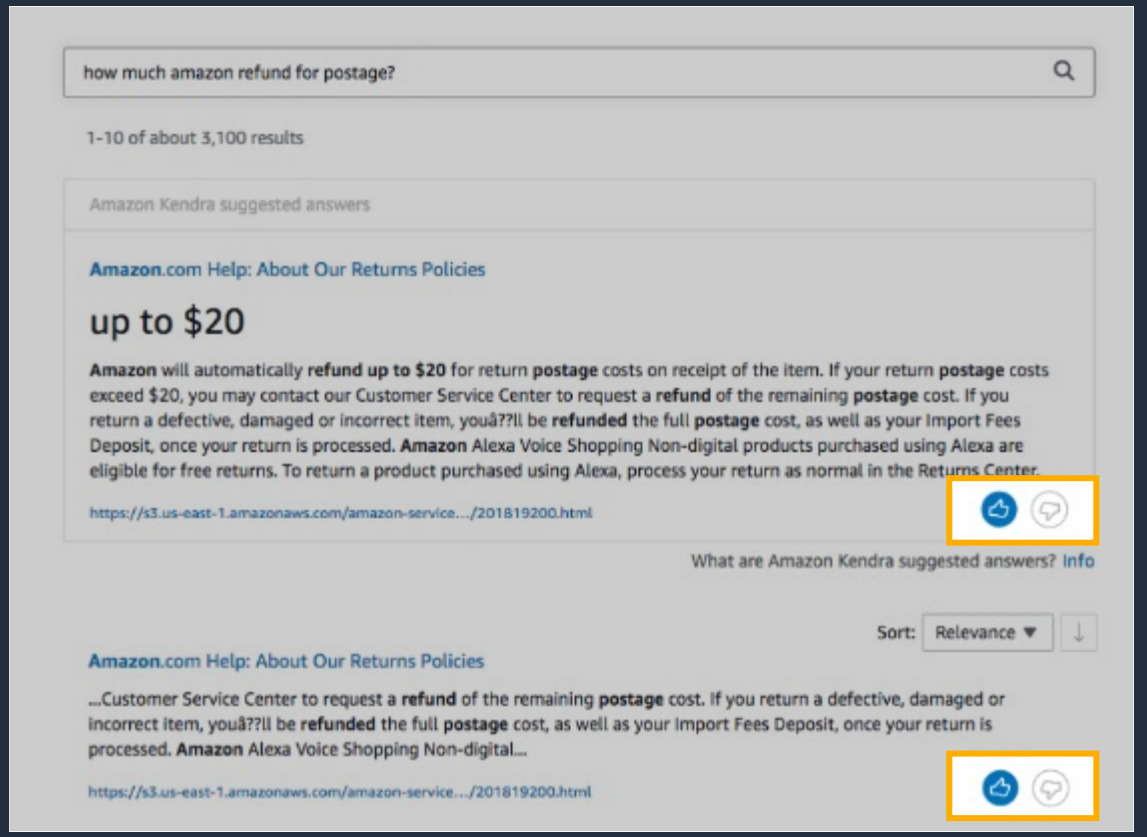
Natural language queries

NLU and ML core

Domain expertise

Continuous improvement

- Amazon Kendra improves automatically over time
- Captures click-through and user feedback
- Retrains models periodically



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BUILD AI AND ML POWERED APPLICATIONS WITHOUT MACHINE LEARNING EXPERTISE

The AWS AI/ML stack

BROADEST AND MOST COMPLETE SET OF MACHINE LEARNING CAPABILITIES

AI SERVICES

SPECIALIZED

BUSINESS PROCESSES
- Amazon Personalize
- Amazon Forecast
- Amazon Fraud Detector

SEARCH
- Amazon Kendra

CONVERSATION
- Amazon Lex
- Amazon Transcribe Call Analytics
- Contact Lens
- Voice ID

CODE + DEVOPS
- Amazon CodeGuru
- Amazon CodeWhisperer
- Amazon DevOps Guru

INDUSTRIAL
- Amazon Monitron
- Amazon Lookout for Equipment
- Amazon Lookout for Vision

HEALTH
- Amazon HealthLake
- Amazon Comprehend Medical
- Amazon Transcribe Medical

CORE

TEXT
- Amazon Translate
- Amazon Comprehend

SPEECH
- Amazon Polly
- Amazon Transcribe

VISION
- Amazon Textract
- Amazon Rekognition
- AWS Panorama

ML SERVICES

SAGEMAKER CANVAS
No-code ML for business analysts

SAGEMAKER STUDIO LAB
Learn ML

SAGEMAKER GROUND TRUTH
Label data

SAGEMAKER STUDIO | RSTUDIO

Prepare data | Store features | Detect bias | Build with notebooks | Train models | Tune parameters | Deploy in production | Explain predictions | Manage & monitor

CI/CD

SAGEMAKER EDGE MANAGER
Manage edge devices

ML FRAMEWORKS & INFRASTRUCTURE

PyTorch, Apache MXNet, TensorFlow | Amazon EC2 | CPUs | GPUs | AWS Inferentia | AWS Trainium | Habana Gaudi | FPGA

aws

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BUILD AI AND ML POWERED APPLICATIONS WITHOUT MACHINE LEARNING EXPERTISE

AI services

EASILY ADD INTELLIGENCE TO YOUR BUSINES APPLICATIONS

SPECIALIZED

BUSINESS PROCESSES
Amazon Personalize
Amazon Forecast
Amazon Fraud Detector

INDUSTRIAL
Amazon Monitron
Amazon Lookout for Equipment
Amazon Lookout for Vision

HEALTH
Amazon HealthLake
Amazon Comprehend Medical
Amazon Transcribe Medical

SEARCH
Amazon Kendra

CONVERSATION
Amazon Lex
Amazon Transcribe Call Analytics
Contact Lens
Voice ID

CODE + DEVOPS
Amazon CodeGuru
Amazon CodeWhisperer
Amazon DevOps Guru

CORE

TEXT
Amazon Translate
Amazon Comprehend

SPEECH
Amazon Polly
Amazon Transcribe

VISION
Amazon Textract
Amazon Rekognition
AWS Panorama

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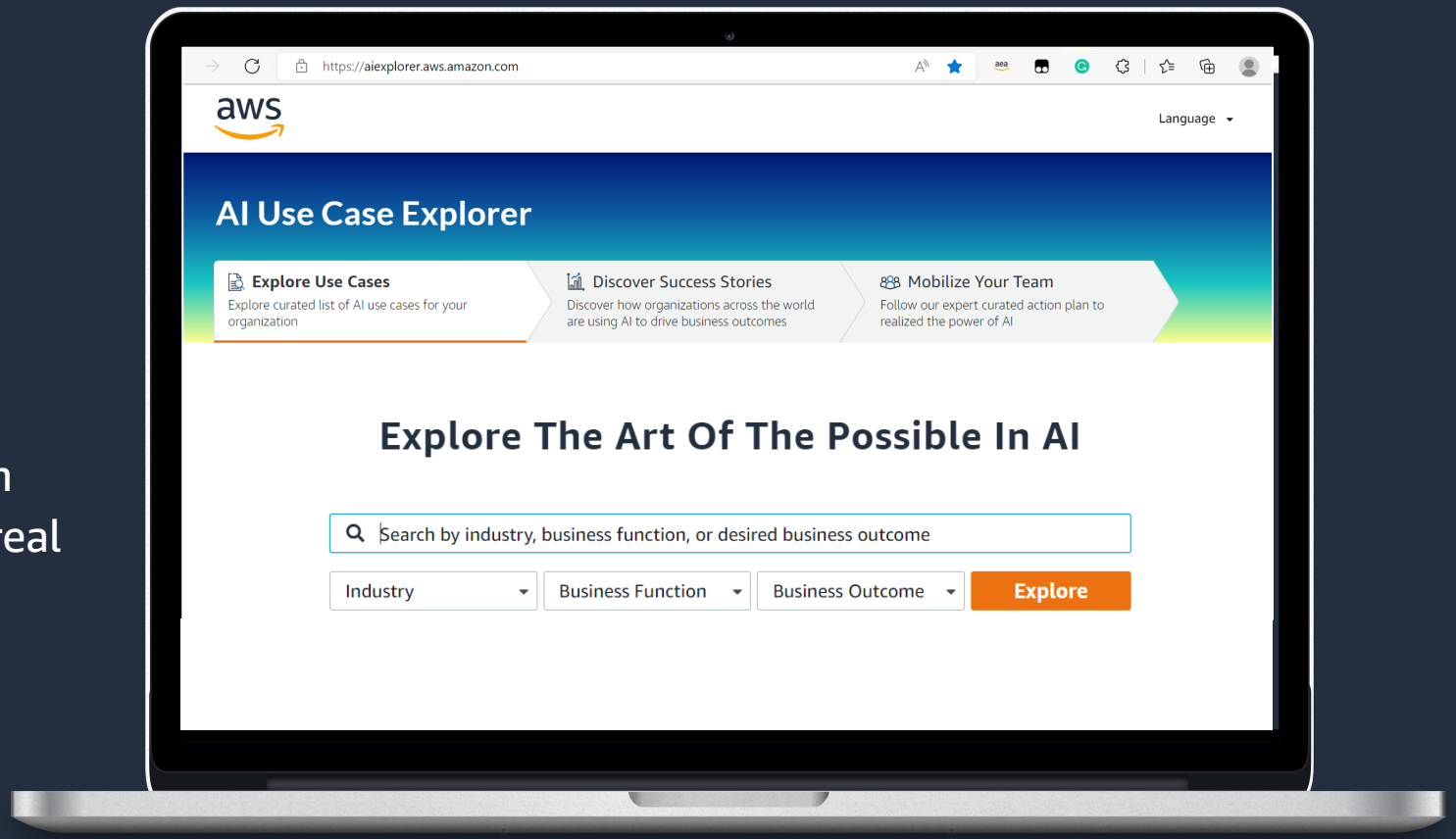
AI Use Case Explorer

Easily find the most relevant AI use cases with related content and guidance to make them real



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Explore main features

Explore use cases

Explore curated list of AI use cases for your organization

100+ use cases and sub use cases

Discover success stories

Discover how organizations across the world are using AI to drive business outcomes

400+ customer success stories

Mobilize your team

Follow our expert-curated action plan to realize the power of AI

50+ resources (ebooks, videos, demos)

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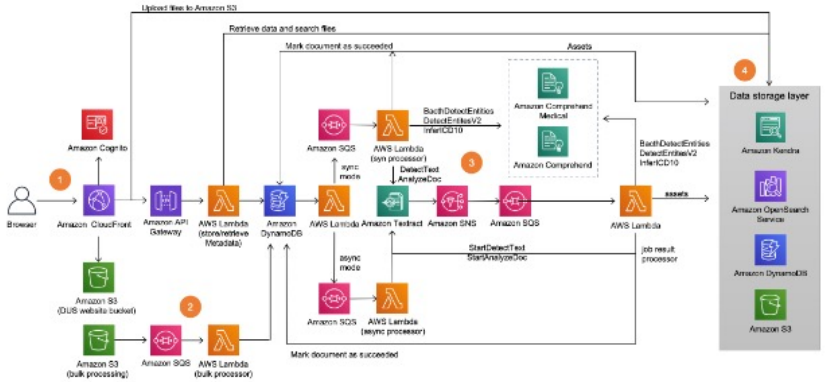
AWS AI/ML Solutions Library - Solutions

Document Understanding Solution Overview Resources & FAQ

AWS Solution overview

The diagram below presents the architecture you can automatically deploy using the solution's implementation guide and accompanying AWS CloudFormation template.



Document Understanding Solution architecture

The AWS CloudFormation template deploys a static web application hosted in an Amazon S3 bucket and served by an Amazon CloudFront distribution. Users are authenticated using Amazon Cognito. The web application interacts with the backend using an Amazon API Gateway API, supported by an AWS Lambda function. Documents are uploaded using either the web application, or directly to a dedicated Amazon S3 bucket for bulk processing. Document processing is initiated by the API, which initiates a Lambda function to add an entry to an Amazon DynamoDB table. The table initiates a second Lambda function that supervises the processing.

Document Understanding Solution

Version 1.0.4
Release date: 08/2022
Author: AWS

Estimated deployment time: 30-60 min

Estimated cost
Source code
CloudFormation template

View implementation guide

Launch in the AWS Console

Additional resources

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Resources and FAQ »

- QnABot on AWS
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