AWS Solutions Architecture Notes

Your Name

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Course Introduction Identity & Federation Security Compute & Load Balancing Storage Caching Databases Service Communication Data Engineering Monitoring Deployment and Instance Management Cost Control Migration VPC Machine Learning

1   Rekognition Overview

- Find objects, people, text, scenes in images and videos using ML - Facial analysis and facial search to do user verification, people counting. - Create a database of "familiar faces" or compare against celebrities - Use cases: - Labeling - Content Moderation - Text Detection - Face Detection and Analysis (gender, age range, emotions....) - Face Search and Verification - Celebrity Recognition - Pathing (ex: for sports game analysis)

1.1   Amazon Rekognition - Content Moderation

- Detect content that is inappropriate, unwanted or offensive (image and videos) - Used in social media, broadcast media, advertising and e-commerce situation to create a safer user experience - Set a Minimum Confidence Threshold for items that will be flagged - Flag sensitive content for manual review in Amazon Augmented AI (A2I) - Help comply with regulations

2   Transcribe Overview

- Automatically convert speech to text. - Uses a deep learning process called automatic speech recognition (ASR) to convert speech to text quickly and accurately. - Automatically remove Personally Identifiable Information (PII) using Redaction. - Supports Automatic Language Identification for multilingual audio - Use cases: - transcribe customer service calls - automate closed captioning and subtitling - generate metadata for media assets to create a fully searchable archive

3   Polly Overview

- Turn text into lifelike speech using deep learning - Allowing you to create applications that talk

3.1   Amazon Polly - Lexicon & SSML

- Customise the pronunciation of words with Pronunciation lexicons - Stylized words: St3ph4ne =¿ "Stephane" - Acronyms: AWS =¿ "Amazon Web Services" - Upload the lexicons and use them in the SynthesizeSpeech operation. - Generate speech from plain text or from documents marked up with Speech Synthesis Markup Language (SSML) - enables more customisation - Emphasising specific words or phrases. - Using phonetic pronunciation. - Including breathing sounds, whispering. - Using the Newscaster speaking style

4   Translate Overview

- Natural and accurate language translation - Allows you to localise content - such as websites and applications - for international users and to easily translate large volumes of text efficiently.

5   Lex + Connect Overview

- Amazon Lex: (same technology that powers Alexa) - Automatic Speech Recognition (ASR) to convert speech to text - Natural Language Understanding to recognise the intent of text, callers - Helps build chatbots and call centre bots - Amazon Connect: - Receive calls, create contact flows, cloud-based virtual contact centre - Can integrate with other CRM systems of AWS - No upfront payments, 80% cheaper than traditional contact center solutions

6   Comprehend Overview

- For Natural Language Processing - NLP - Fully managed and serverless service - Uses machine learning to find insights and relationships in text - Language of the text - Extracts key phrases, places, people, brands or events - Understands how positive or negative the text is - Analyses text using tokenization and parts of speech - Automatically organises a collection of text files by topic - Sample use cases: - Analyse customer interactions (emails) to find what leads to a positive or negative experience - Create and groups articles by topics that Comprehend will uncover

7   Comprehend Medical Overview

- Amazon Comprehend Medical detects and returns useful information in unstructured clinical text: - Physician's notes - Discharge summaries - Test results - Case notes - Uses NLP to detect Protected Health Information (PHI) - DetectPHI API - Store your documents in Amazon S3, analyse real-time data with Kinesis Data Firehose or use Amazon Transcribe to transcribe patient narratives into text that can be analysed by Amazon Comprehend Medical.

8   SageMaker Overview

- Fully managed service for developers / data scientists to build ML models - Typically difficult to do all processes in one place + provision servers

9   Kendra Overview

- Fully managed document search service powered by Machine Learning - Extract answers from within a document (text, pdf, HTML, PowerPoint, MS Word, FAQs) - Natural language search capabilities - Learn from user interactions / feedback to promote preferred results (Incremental Learning) - Ability to manually fine-tune search results (importance of data, freshness, customer)

10   Personalise Overview

- Fully managed ML-service to build apps with real-time personalised recommendations - Example: personalised product recommendations/re-ranking, customised direct marketing Example: User bought gardening tools, provide recommendations on the next one to buy. - Same technology used by Amazon.com - Integrates into existing websites, applications, SMS, email marketing

systems......... - Implement in days, not months (don't need to build, train and deploy ML solutions) - Use cases; retail stores, media and entertainment

11   Textract Overview

- Automatically extracts text, handwriting and data from any scanned documents using AI and ML - Extract data from forms and tables - Read and process any type of document (PDFs, images) - Use cases: - Financial Services (e.g, invoices, financial reports) - Healthcare (e.g medical records, insurance claims) - Public Sector (e.g tax forms, ID documents, passports)

12   Machine Learning Summary

- Amazon Rekognition:

  - Image and video analysis for object, face, and scene recognition
  - Content moderation and facial analysis
  - Text detection and celebrity recognition

- Amazon Transcribe:

  - Converts speech to text using automatic speech recognition (ASR)
  - Supports multilingual audio and PII redaction
  - Automates closed captioning and metadata creation for media

- Amazon Polly:

  - Converts text to lifelike speech using deep learning
  - Supports customization with Pronunciation Lexicons and SSML
  - Features speaking styles like Newscaster

- Amazon Translate:

  - Provides natural, accurate language translation
  - Supports content localization for global audiences

- Amazon Lex:

  - Powers intelligent chatbots with ASR and NLU
  - Recognizes user intent for conversation-based applications

- Amazon Comprehend:

  - Natural Language Processing to analyze text sentiment, key phrases, and entities
  - Automatically categorizes documents by topic

- Amazon SageMaker:

  - Fully managed service to build, train, and deploy machine learning models

- **–** Simplifies the ML workflow for developers and data scientists

- Amazon Textract:

  - **–** Extracts text and data from scanned documents using AI
  - **–** Handles forms, tables, and a variety of document types

Other Services Example Preparation (´')