# AWS ML Services



## Amazon Comprehend

- NLP and text analytics
- Extract key phrases, entities, **sentiment**, **language**, syntax, topics, and document classifications
- PII Identification (security)

## Amazon Translate

- Uses deep learning for translation
- Supports custom terminology In CSV or TMX format
- Appropriate for proper names, brand names, etc.

## Amazon Transcribe

- Speech to text
- Speaker identification
- Channel identification : each caller could be transcribed separately
- Automatic language identification
- You can use the Transcribe HTTP/2 streaming client to handle retrying the connection when there are intermittent problems on the network

## Amazon Polly

- Text to Speech
- **Lexicons**
  - Customize pronunciation of specific words & phrases
    •Example: “World Wide Web Consortium” instead of “W3C”
- **SSML**
  - Alternative to plain text
  - Speech Synthesis Markup Language
  - Gives control over emphasis, pronunciation, breathing, whispering, speech rate, pitch, pauses.
- **Speech Marks**
  - used to mark the beginning and end of words and phrases, for example when lip-synching animation.

## Amazon Rekognition

- Object and scene detection
- Image Analysis : can use with Lambda to trigger image analysis upon upload
- Text in image
- Video analysis : video must come from kinesis Video Streams
- Can be customised : train with a small set of labeled images

## Amazon Forecast

- Time series analysis
- “**AutoML**” chooses best model for you :
  - **DeepAR,**
  - **ETS**
    - stands for Exponenetial Smoothing
    - Used for simple datasets (<100 time series)
  - **CNN-QR :**
    - CNN - Quantile Regression
    - Accepts related **historical** time series data + metadata
  - **DeepAR+ :**
    - RNN
    - Accepts related **forward-looking** time series data (Can incorporate **future data** that provide additional predictive power (e.g., special events, promotions).+ metadata
  - **Prophet by Facebook:**
    - Additive model with non-linear trends and seasonality
  - **NPTS**
    - Non-Parametric Time Series
    - Good for sparse data (too missing data
    - Has variants for seasonal/climatological forecasts
  - **Arima**
    - Autoregressive Integrated Moving Average
    - Used for simple datasets (<100 time series)

## Amazon Lex

- Chatbot engine
- A bit is built around intents
- An **utterance** would be a phrase uttered by the user, such as "I want to buy a pizza."
- Lambda functions are invoked to fulfill the intent
- **Slots** specify extra information needed by the intent :Pizza size, toppings, crust type, when to deliver, etc.

## Amazon Personalize

- Recommendation Engine
- API access
- A full retrain (passing trainingMode=full) is recommended at least once a week to make recommendations more relevant
- Updates every 2 hours by default

## Amazon Textract

- OCR with forms, fields, tables support

## AWS DeepRacer

- Reinforcement learning powered 1/18-scale race car

## DeepLens

- Deep learning-enabled video camera
- Integrated with Rekognition, SageMaker, Polly, Tensorflow, MXNet, Caffe

## Amazon Lookout

- Monitors metrics from S3, RDS, Redshift
- Detects abnormalities from sensor data automatically to detect equipment issues

## Amazon Monitron

- End to end system for monitoring industrial equipment & predictive maintenance

## TorchServe

Model serving framework for PyTorch

## AWS Neuron

SDK for ML inference specifically on AWS Inferentia chips

## AWS Panorama

Brings computer vision to your existing IP cameras like face detection

## AWS DeepComposer

Composes a melody into an entire song

## Amazon Fraud Detector

uses ONLINE_FRAUD_INSIGHTS model

## Amazon CodeGuru

Automated code reviews!

## Contact Lens for Amazon Connect

Ingests audio data from recorded calls :

- Theme detection: discovers emerging issues
- Measure talk speed and interruptions
- sentiment Analysis

## Amazon kendra (Alexa’s sister)

Combines data from file systems, SharePoint, intranet, sharing services (JDBC, S3) into one searchable repository

## Amazon Augmented AI (A2I)

Human review of ML predictions

Builds workflows for reviewing low-confidence predictions

Integrated into Amazon Textract and Rekognition

## Applications

- Build your own Alexa!
  Transcribe -> Lex -> Polly
- Make a universal translator!
  Transcribe -> Translate -> Polly
- Build a Jeff Bezos detector!
  DeepLens -> Rekognition
- Are people on the phone happy?
  transcribe -> Comprehend