This document serves as a reference and mapping of AI/ML Platform capabilities on Microsoft Azure, Amazon Web Services and Google Cloud Platform. Assessment/Insights are not official but an individual’s construction post reviewing recent updates and announcements. **PS->**Created and shared as an internal reference purely for learning purposes only.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | Assessment/Insights |
| Custom Machine Learning | ML Services | Cloud Machine Learning |  |
| **Machine Learning Service** | Amazon Sagemaker | AI Platform (beta) | AWS does offer sophisticated native services (i.e. SageMaker) and have the first mover advantage in helping Data Scientists realize ‘Data Science life cycle’ on their cloud.    Microsoft taken a giant leap on the service offerings compared to AWS and have finally brought in clarity on which tools are targeted at what type of users. At this stage, it is a consolidation more than anything else and does establish clarity & credibility in the ecosystem on Microsoft AI Platform offerings.    Google who appeared not to be in this race has just arrived with their beta offerings. |
| Automated Machine Learning |  |  |
| Visual Interface (aka ML Studio) |  |  |
| Notebook VMs | Notebook | ML Development: End to End Cycle (beta) |
| Experiments | Training |
| Pipelines | Inference |
|  | Ground Truth |  |
|  | Sagemaker Neo |  |
| ONNX Support | Via Deep Learning AMIs |  |
|  | DeepRacer |  |
| Azure Kinect DK, Vision AI Dev Kit | DeepLens |  |
|  | |  |  |
| **ML Compute** |  |  |  |
| Hardware Acceleration (FPGA) | EC2 F1 Instances | Google Cloud TPUs | Google TPUs are a popular and preferred option among data science community.    All 3 offer Data Science and Deep Learning VMs, in addition to providing a choice on the hardware accelerated compute variants. |
| GPU Optimized VMs – N Series | EC2 P3 Instances | GPU Compute |
|  | Elastic Inference |  |
|  | AWS Inferentia |  |
| Data Science VM |  |  |
| Deep Learning VM | Amazon Deep Learning AMIs | Deep Learning Virtual Machine Images |
|  | Amazon Deep Learning Containers |  |
|  | |  |  |
| **MLOps** |  |  |  |
| Code Management | Not a unified experience and the story is yet to emerge | ML Development: End to End Cycle (beta) | Microsoft brings in legacy of experience in offering DevOps capabilities and tops the chart in extending Azure DevOps to address MLOps.  AWS does have a deploy + manage capability but not as complete as Microsoft’s offering.  Early stage for Google’s MLOps story as they just announced their life cycle offerings. The building blocks are yet to emerge as one consolidated story. |
| Data Set Management |
| Environment Management |
| Model Debugging and Deployment |
| Model Validation and Profiling |
| Model Interpretability |
| ML Audit Trail |

|  |  |  |  |
| --- | --- | --- | --- |
| Conversation AI |  |  |  |
| Azure Bot Service | Amazon Lex | Dialogflow Enterprise Edition |  |
|  |  |  |  |
| Cognitive Services | AI Services | Service |  |
|  |  | AutoML Tables (beta) | Unique to Google |
| **VISION** |  |  |  |
| Computer Vision | Amazon Rekognition | Vision API | All 3 have key service offering under the stream of Computer Vision.    However, Microsoft and AWS seem to have comparable APIs with few differences. |
| Image Classification | Object detection | Vision API |
| Scene and Activity Recognition | Scene, and activity detection | Vision API |
| Celebrity & Landmark Recognition | Celebrity recognition | Vision API |
| Optical Character Recognition | Text in Images | Vision API |
| Handwriting Recognition |  |  |
|  |  | Data Labeling for Images |
|  |  |  |
| Face |  |  |
| Face Detection | Facial recognition |  |
| Person Identification | Face-based user verification |  |
| Emotion Recognition | Facial analysis |  |
| Similar Face Recognition | Facial recognition |  |
|  |  |  |  |
| Ink Recognizer (P) |  |  | Unique to Microsoft |
| Recognize Digital Ink and Handwriting |  |  |
| Recognize and Pinpoint common shapes |  |  |
|  |  |  |  |
| Video Indexer | Amazon Rekognition |  | All 3 have key service offering under the stream of Video Analytics.    Google might have a slight edge over Microsoft and AWS with AutoML bringing in the required flexibility to optimize for a domain/use case. |
| Face Detection in Video |  |
| Object, Scene and activity Detection |  |
| Metadata, Audio, and keyframe extraction | Video Intelligence API |
|  |  | AutoML Video Intelligence (beta) |
|  |  |  |  |
| Custom Vision |  | AutoML Vision | Unique to Microsoft and Google. Microsoft does give additional capability to build compact models targeting edge devices and compliments ONNX to address model interoperability. |
| Classification |  | Image Classification |
| Object Identification |  | Object Detection (beta) |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| Form Recognizer (P) | Amazon Textract | Document Understanding AI (beta) |  |
| Extract text, Key-value pairs and tables |  |  |  |
|  | | | |
| **SPEECH** |  |  |  |
| Speech Services |  |  | All 3 have key service offering under the stream of Speech to Text and Text to Speech.    Microsoft and AWS has comparable services and appears exhaustive compared to Google’s offering |
| Speech to Text | Amazon Transcribe | Cloud Speech-to-Text |
| Text to Speech | Amazon Polly | Cloud Text-to-Speech |
| Real-time Speech Translation | Amazon Polly |  |
|  |  |  |
| Speaker Recognition (p) | Amazon Polly |  |
| Speaker Identification |  |
| Speaker Verification |  |
|  |  |  |
| Custom Speech(p) |  |  |
| Conversation Transcription |  |  |
| Translator Speech | Amazon Translate |  |
|  |  | Contact Center AI (beta) | Unique to Google |
|  | | | |
| **LANGUAGE** |  |  |  |
|  | Amazon Comprehend Medical |  | Unique to AWS |
| Text Analytics | Amazon Comprehend | Cloud Natural Language | Comparable services across all 3,with google bring in a differentiator with their AutoML offering for Natural Language and Translation |
| Named Entity Recognition |
| Key Phrase Extraction |
| Text Sentiment Analysis |
|  |  | AutoML Natural Language |
|  |  |  |
| Translator Text | Amazon Translate | Translation API |
| Automatic language detection |
| Automated text translation |
| Customizable translation |
|  |  | AutoML Translation |  |
|  |  |  |  |
| Bing Spell Check |  |  |  |
| Multi-lingual spell check |  |  |  |
| Contextual Spell checking |  |  |  |
|  |  |  |  |
| QnA Maker |  |  |  |
| Knowledge base creation from Q&As |  |  |  |
|  |  |  |  |
| Content Moderator | Rekognition (Image Moderation) | Vision API |  |
| Detect offensive & unwanted text, images |  |
|  |  |  |  |
| Language Understanding | Amazon Lex |  |  |
| Contextual Language Understanding |  |  |
|  |  |  |  |
|  |  | AutoML Natural Language | Unique to Google |
| Linguistic Analysis (p) |  |  | Unique to Microsoft |
|  |  |  |  |
| **DECISION** |  |  |  |
|  | Amazon Forecast |  | Unique to AWS |
| Personalizer (p) | Amazon Personalize | Recommendations AI (beta) |  |
| Anomaly Detector (p) |  |  | Unique to Microsoft |
|  |  |  |  |
| **SEARCH** |  |  |  |
| Bing Web Search |  |  | Unique to Microsoft |
| Bing Visual Search |  |  |
| Bing Custom Search |  |  |
| Bing Entity Search (NER) |  |  |
| Bing Video Search |  |  |
| Bing New Search |  |  |
| Bing Image Search |  |  |
| Bing Autosuggest |  |  |
| Bing Local Business Search (p) |  |  |
|  |  |  |  |
| Azure Open Datasets (p) |  | Google Dataset Search (beta) | Google’s Dataset offerings are vast considering they source datasets from Kaggle |
|  |  |  |  |