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MACHINE LEARNING WITH CLOUD PLATFORMS

This paper presents a general overview of how machine learning solutions may be implemented using modern cloud platforms.

Keywords: *machine learning; cloud platform; artificial intelligence; data science; deep learning; artificial neural network.*

Nowadays, machine learning solutions based on cloud platforms [1], [2] are used in a large number of industry applications. Among them are e-commerce, retail, health-care and life sciences, gaming, government, cybersecurity and information protection [3], entertainment, education, digital signal processing [4], manufacturing, telecommunications [5], [6], logistics, technical diagnosis [7], financial services, and many other areas.

The main artificial intelligence (AI) services offered by Google Cloud are AI Sight, AI Language, AI Conversation, AI Structured Data, and others. Within the services a lot of AI and machine learning products are available. Google Cloud offers two computer vision products that use ML to understand images with industry-leading prediction accuracy [1]. AutoML Vision automates the training of custom machine learning models. Vision API offers powerful pre-trained machine learning models through REST and RPC APIs. Two ways to make media more discoverable and valuable are available within the Video AI. AutoML Video Intelligence has a graphical interface that makes it easy to train custom models to classify and track objects within videos. Video Intelligence API has pre-trained ML models that automatically recognize a vast number of objects, places, and actions in stored and streaming video [1]. Speech-to-Text accurately converts speech into text using an API powered by Google's AI technologies. Speech recognition and transcription is available for more than 125 languages. Text-to-Speech converts text into natural-sounding speech. There are 220 voices for more than 40 languages. It is possible to deliver a better voice experience for customer service with voice bots on Dialogflow that dynamically generate speech, instead of playing static, prerecorded audio. Dialogflow is a lifelike conversational AI with state-of-the-art virtual agents. Available in two editions: Dialogflow CX (advanced) and Dialogflow ES (standard). It supports rich, intuitive customer conversations, powered by AI [1]. Cloud Natural Language derives insights from unstructured text. Natural Language uses ML to reveal the structure and meaning of text. It is possible to extract information about people, places, and events, and better understand social media sentiment and customer conversations [1]. Natural Language enables text analysis. AutoML Natural Language trains high-quality custom ML models to classify, extract, and detect sentiment. Natural Language API are the powerful pretrained models those enables ease application of natural language processing (NLP) and natural language understanding (NLU) with sentiment

analysis, entity analysis, entity sentiment analysis, content classification, and syntax analysis [1]. Healthcare Natural Language AI performs real-time analysis of insights stored in unstructured medical text. It allows to distill machine-readable medical insights from medical documents.

The following top level solutions are available using descripted products as building blocks: Contact Center AI that improves customer service with AI that understands, interacts, and talks; AI Platform (unified), fully managed, end-to-end platform for data science and machine learning; Document AI that reduces document processing costs via automate data capturing at scale [2].

The Cloud provides also many advanced data analytics tools: BigQuery, serverless, highly scalable, and cost-effective multi-cloud data warehouse designed for business agility; Pub/Sub, messaging and ingestion for event-driven systems and streaming analytics, Dataflow, unified stream and batch data processing that's serverless, fast, and cost-effective; Cloud Data Fusion, fully managed, cloud-native data integration at any scale; Data Catalog, a fully managed and highly scalable data discovery and metadata management service [1], [2].

Google Cloud provides also AI Infrastructure that allows business to train deep learning (DL) and ML models cost-effectively. The infrastructure has accelerators for every use case, from low-cost inference to high-performance training. It enables fast iteration with high-performance Cloud GPUs and Cloud TPUs. At the same time, it is simple to get started with a range of services for development and deployment [1].

Another popular cloud AI platform is AWS SageMaker [8]. Amazon SageMaker helps data scientists and developers to prepare, build, train, and deploy high-quality machine learning models quickly by bringing together a broad set of capabilities purpose-built for machine learning [8]. To make it easier to get started, Amazon SageMaker JumpStart provides a set of solutions for the most common use cases that can be deployed readily with just a few

clicks [8]. Also, it helps the user quickly and easily get started with machine learning. The solutions are fully customizable and supports one-click deployment and fine-tuning of more than 150 popular open source models such as natural language processing, object detection, and image classification models [8]. The popular solutions are: extract and analyze the data, froud detection, churn prediction, personalized recommendations and many others.

Amazon SageMaker is available for free, for 2 months, as part of the AWS Free Tier program. Users can get access to 250 hours per month of ml.t3.medium notebooks usage with the Free Tier [8].

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USE OF APPLIED INFORMATION SYSTEMS FOR CONTROL AND MANAGEMENT OF SMALL AND MEDIUM-SIZED BUSINESSES AT ONCE BY SEVERAL PARTNERS OR AN OWNER IN A PANDEMIC CONDITIONS. PLANNING OF OWN IFORMATION SYSTEM FOR THIS PURPOSE

Every business needs to measure the effectiveness of development at each stage, calculate the cost and profit, and for this purpose and use business metrics.