Google Cloud

Document and Form Processing Automation with Document AI

Using Machine Learning to Automate Document and Form Processing

Unleash the value of your unstructured document data or speed up manual document processing tasks with the help of Google AI. We will help you build an end-to-end, production-capable document processing solution with Google's industry-leading Document AI tools, customized to your case.

Business Challenge

Most business transactions begin, involve, or end with a document. However, approximately 80% of enterprise data is unstructured which historically has made it expensive and difficult to harness that data. The inability to understand unstructured data can decrease operational efficiency, impact decision making, and even increase compliance costs. Decision makers today need the ability to quickly and cost effectively process and make use of their rapidly growing unstructured datasets.

Document Workflows	Unstructured Data	Free Form Text
RPA vendors estimate that ~50% of their workflows begin with a document	Approximately 80% of enterprise data is unstructured including machine and human generated	70% is free-form text such as written documents and emails

Solution Overview

Google's mission is "to organize the world's information and make it universally accessible and useful". This has led Google to create a comprehensive set of technologies to read (Optical Character Recognition), understand (Natural Language Processing) and make useful (data warehousing, analytics, and visualization) documents, forms, and handwritten text.

Google's Document AI technologies provide OCR (optical character recognition) capabilities that deliver unprecedented accuracy by leveraging advanced deep-learning neural network algorithms. Document AI has support for 200 languages and handwriting recognition of 50 languages. In addition, Google Cloud provides the ability to build automated data pipelines to upload, process, and store the structured data from documents and forms as a holistic solution that can integrate with existing workflows. Document AI solutions can be deployed in weeks versus months or years.

Document AI enables customers to increase operational efficiency, reduce document processing costs, improve customer experience, and enable decision makers to better understand their unstructured datasets.

Document AI Solution

There are three key components in a Google Cloud Document AI solution:

Document Repository

Store scanned or digital documents in one or more Google Cloud Storage (GCS) buckets.

Entity Extraction and OCR

Perform OCR and entity extraction on the documents and forms. Google Cloud provides both pre-trained and custom-trained ML/AI models to be able to do entity extraction, document classification, and sentiment analysis. *(Figure 2)*

Data Warehouse

Store the newly structured data in a data warehouse . BigQuery supports built-in ML/AI data models as well as provides built-in data visualization which allows new insights to be derived directly from the data.

Figure 1 depicts a sample architecture of using Document AI to do document processing.

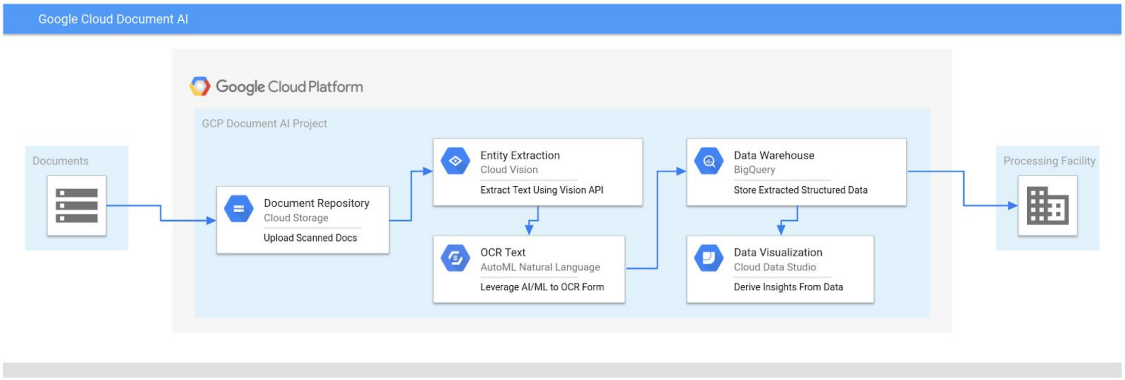

Figure 1. Sample Document AI Architecture

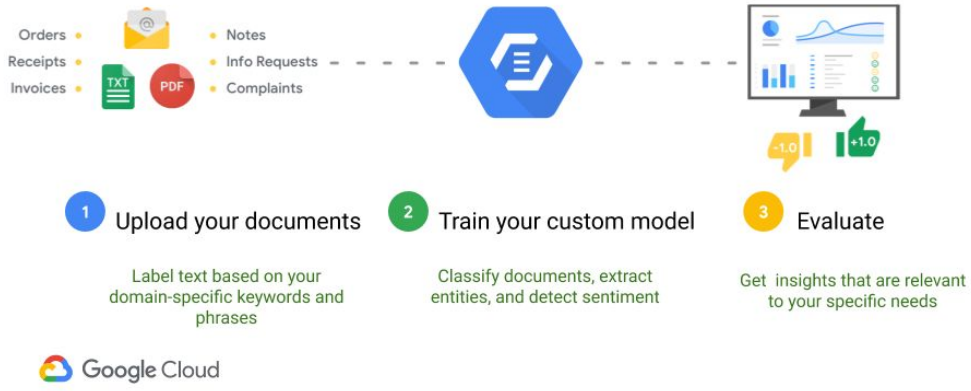

Figure 2. High-level process for performing Machine Learning on a document leveraging Google Cloud AutoML for custom-trained models

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Sample Implementation of Document AI

Document AI can be used to solve numerous unstructured document processing requirements. One clear example of how Document AI can be used is to ingest, OCR, extract, understand, and store patent filings that otherwise lived in unstructured documents. *Figure 3* shows the life cycle of a patent filing and how Google Cloud Document AI is able to process and analyze the document leveraging ML/AI technology.

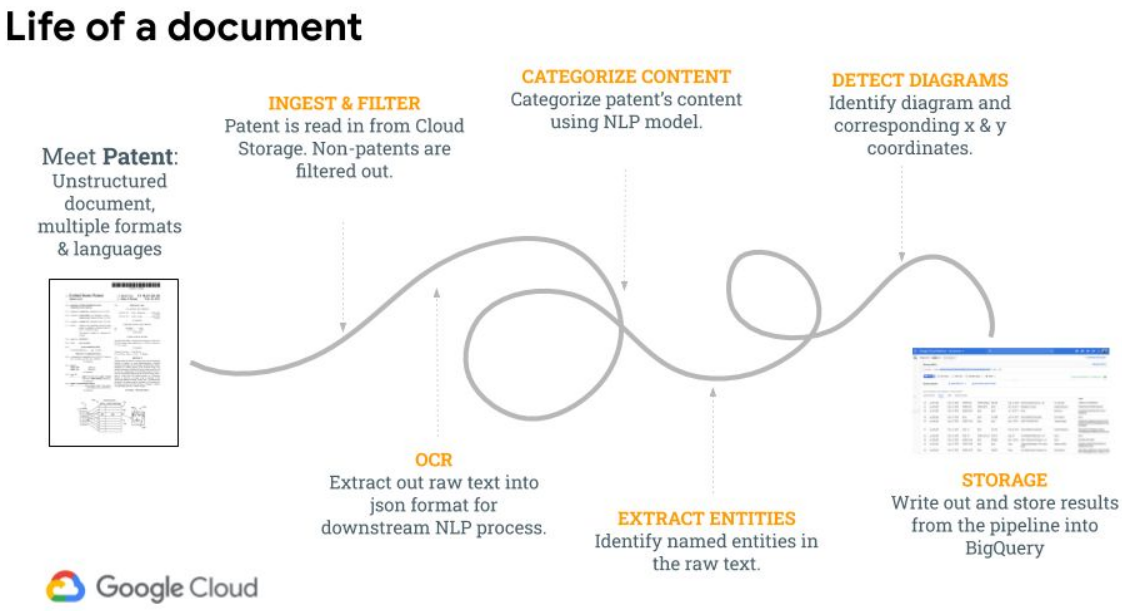

Figure 3. Sample Document AI Workflow

Document AI solution begins with ingesting the documents and performing OCR on them. After ingesting the documents, Document AI is able to use Natural Language Processing (NLP) to categorize the content using the trained NLP model. Document AI will then extract the desired text entities and diagrams.

After Document AI processes the document, it stores the structured data inside a data warehouse such as Google BigQuery. Now that the datasets are structured, it is much easier to draw insights from this data. For instance, it would be easy to see filing trends across years, inventors, or even specific technologies. BigQuery has built-in support for data visualization as well as built-in ML/AI models that can be used to help discover and analyze these types of insights from the data.

This is just one example of the way Google Cloud Document AI can be used to cost-efficiently bring structure to unstructured data and leverage the data to draw new insights to inform decision makers. One of the biggest benefits of Document AI is the fact that both pre-trained and custom-trained AI/ML models are available depending on the type of document and form processing that is required.

Google Cloud

Google Cloud Professional Services Offerings

Google Cloud's Professional Services Organization (PSO) is able to work directly with customers to help design, build, and deploy a customized Document AI solution to allow customers to unlock the value of the unstructured data and cost-effectively process documents and forms.

Key activities

- **Assess the performance of DAI on your use case**
  - Work with your subject matter experts to understand use cases and frame business challenges as an ML project.
  - Define performance metrics to check the value of a production-capable DAI solution, and
  - Evaluate capabilities to fulfill organization's needs
- **Design and build a production-capable DAI solution**
  - Develop an end-to-end, production-capable DAI pipeline for your document processing needs
- **Test and improve the DAI solution**
  - Measure performance of the DAI pipeline to ensure that it fulfills requirements, and iterate on the pipeline until requirements are met
- **Project management activities**
  - Requirements gathering and tracking, work planning, progress measurement against timelines, risk analysis and mitigation, regular updates, and stakeholder alignment
- **Planning review and technical guidance**
  - Provide guidelines on methodology and technical best practices for integrating the DAI solution into your team's environment

Deliverables

- **Program charter** - Goals agreed on with key stakeholders, solution requirements documented, and a high-level project plan developed
- **Technical Design Document -** Detailed technical architecture and requirements for an end-to-end Document AI solution on Google Cloud that includes input/output schema, data preprocessing, evaluation methodology, and test plans
- **Machine learning model -** A trained machine learning model on GCP based on your data
- **Prod-capable ML pipeline** - Custom code for an end-to-end production-capable DAI solution
- **Deployment Documentation -** A full technical writ eup of the DAI solution, including instructions to deploy the solution
- **Program closure summary -** Documentation, a summary of the project and solution build, and a final presentation for your stakeholders

Engagement Details

- Prerequisites: A clear business use case for a Document AI Google Cloud project with appropriate training data in Google Cloud for ML models
- Up to 48 days engagement (96 FTE days) within a 15-week period for your project:
  - Phase 1: Up to 16 days engagement (32 FTE days) within a 5-week period
  - Phase 2: Up to 32 days engagement (64 FTE days) within a 10-week period
- Phase 1 prototypes your use case with DAI to obtain performance metrics; phase 2 builds the production capable pipeline
- The typical team consists of cloud consultants, machine learning or AI engineers, application development engineers, and subject matter experts
- Project scope, resourcing, assumptions, and dependencies will be in the project charter
- Depending on the PSO and GCP resources needed, a DAI solution costs $250k-$750k

Let's connect to discuss how Google Cloud Document AI can help your organization!

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