NLP for Sensitive Data

Sensitive Text Detection with Custom Natural Language Processing (NLP) Models

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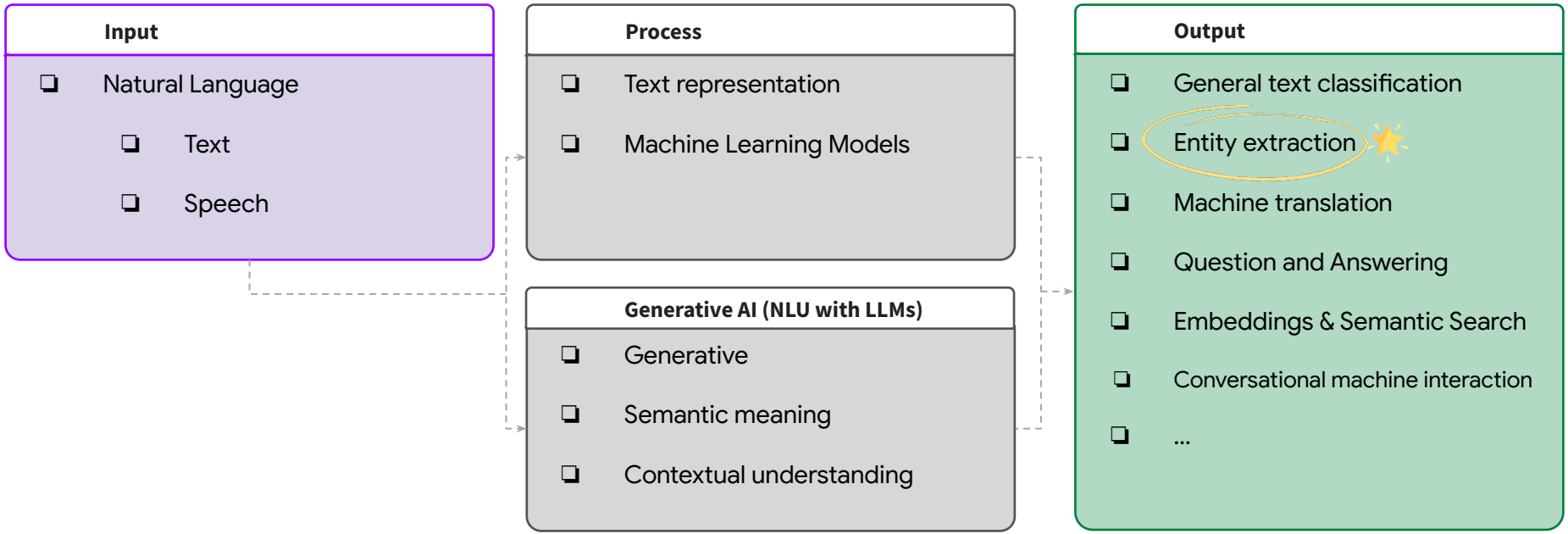
Agenda

1. Demo: Custom Entity Recogniser
2. Process
3. Real world use-cases


Demo
Custom Named Entity Recogniser

What is Natural Language Processing (NLP)?



Process

1. Identifying the right NLP Use Cases
2. Annotate data with the help of Generative AI
3. Train a custom Named Entity Recognition (NER) model & refine
4. Evaluate, test, custom NER model
5. Deploy and integrate

Today's Tools

- Google Colab (shared)
- spaCy NLP library
- Google Cloud Platform

Identifying the right NLP Use Cases

Don’t “A.I.” all the things.

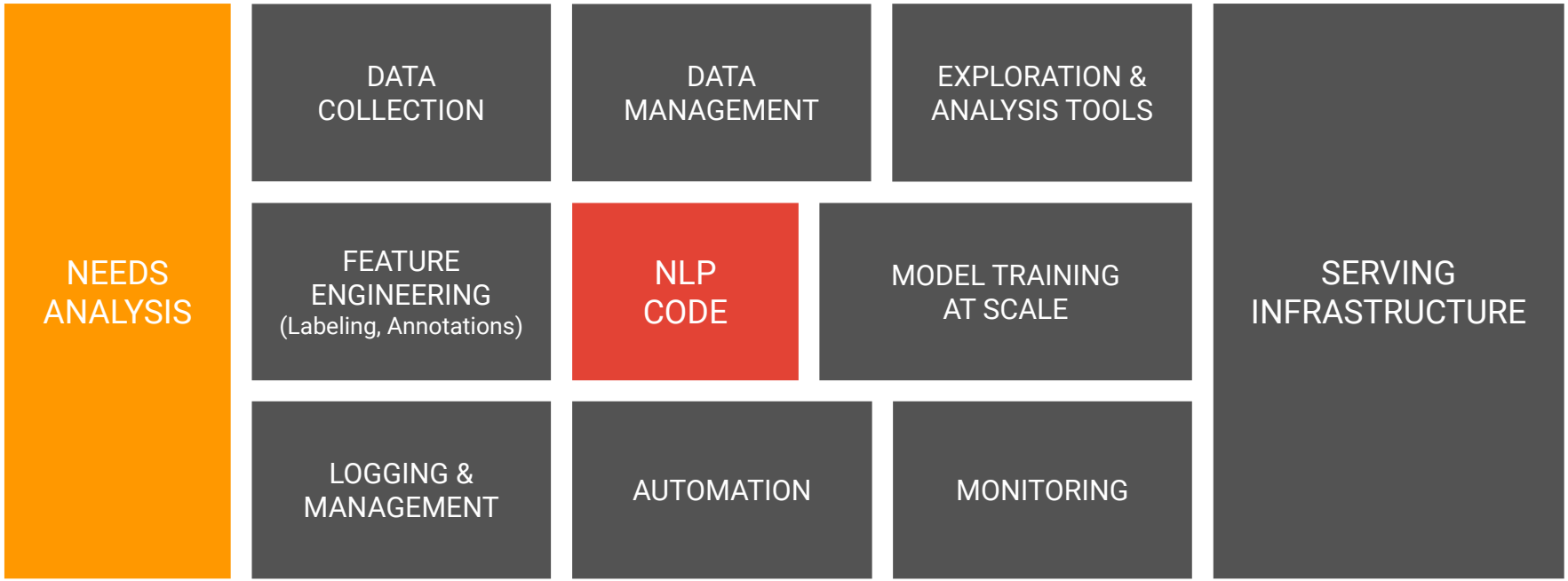
Human-centered needs analysis for A.I.

Identifying the right NLP Use Cases

User patterns

Scope

Production grade ML/NLP



Adapted from: "Hidden Technical Debt in Machine Learning Systems", D. Sculley et. al, Google

Identifying the right NLP Use Cases

If Machine Learning and NLP is needed, which type is best?

Automation	Augmentation
User doesn't know how to do something	User feels responsible for task
User can't do something	**High stakes** situation
Task is boring, **repetitive**, or dangerous	Complicated personal preferences

Setting expectations

Process

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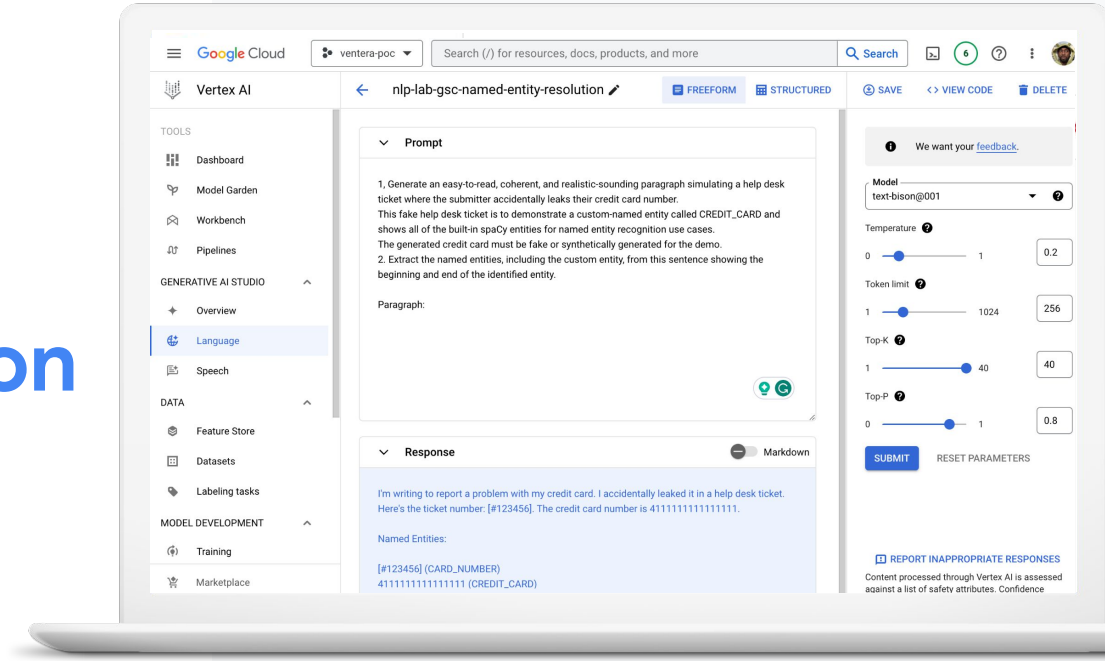
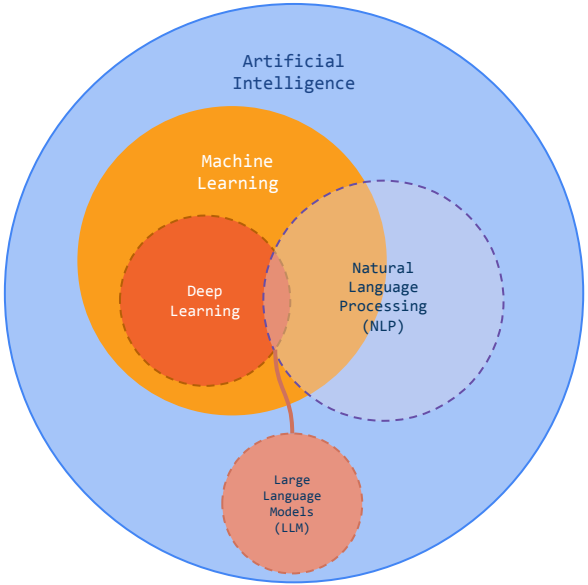
Labeling

Annotating your text for Entity Recognition



A brief bit about how NLU, LLM, GenAI play into NER workflow



Teacher: Class, pay attention

Transformer Models:

Process

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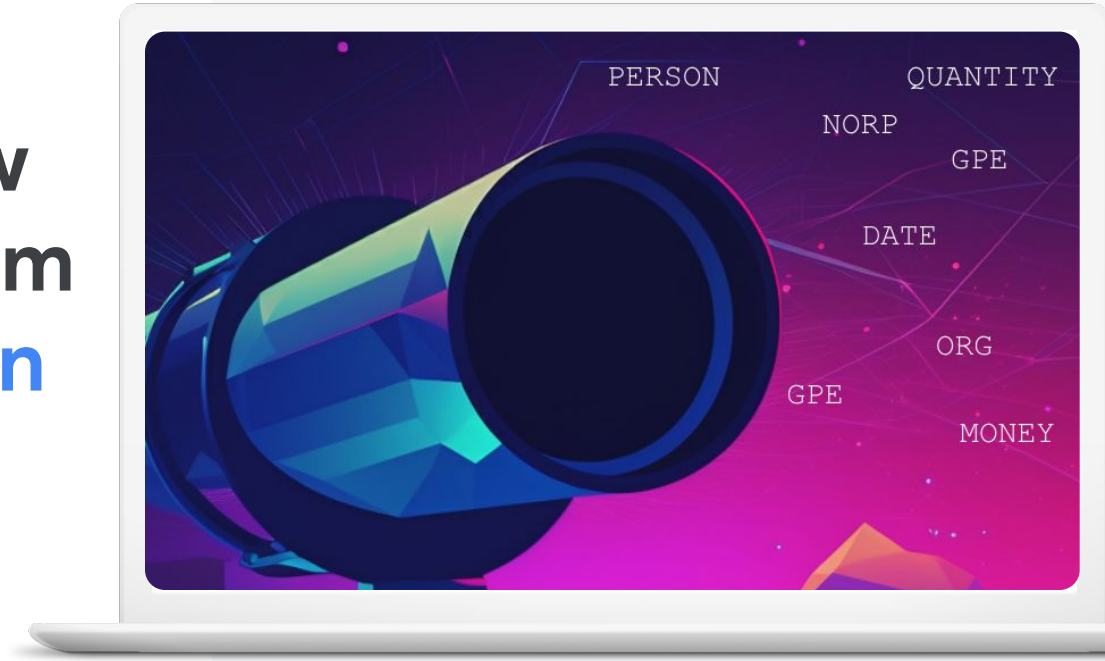
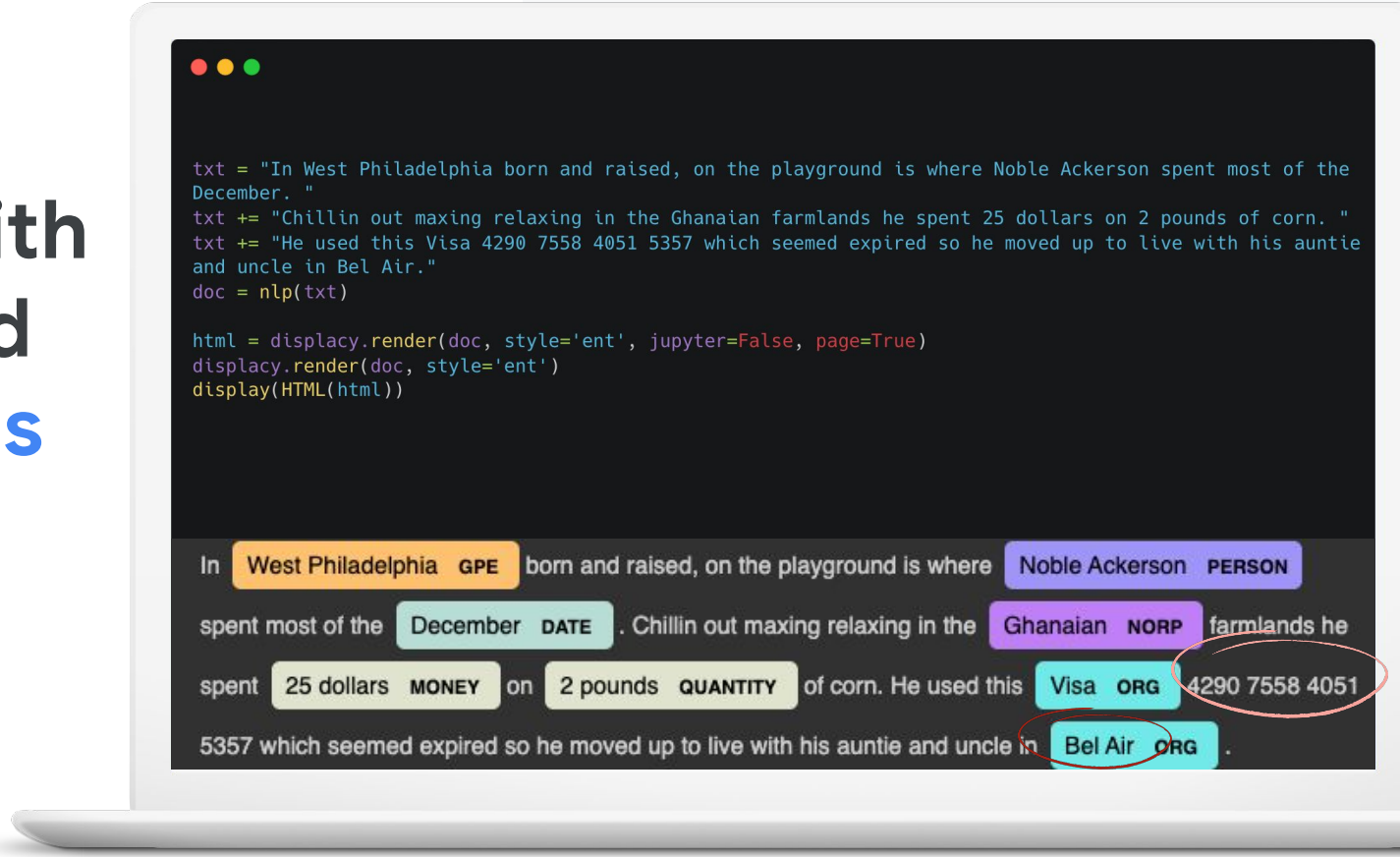
...with Large Language Models

The NLP workflow for training custom Entity Recognition



Starting with Pre-trained NER Models



Process

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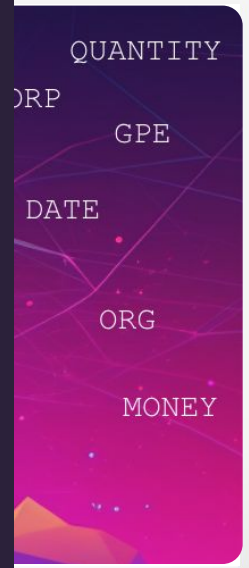
5. Deploy and integrate

```python
from fastapi import FastAPI
from pydantic import BaseModel
import spacy

app = FastAPI()

# Load the trained model from disk
nlp = spacy.load("./custom_ner_model")

class Item(BaseModel):
    text: str

@app.post("/predict/")
def predict(item: Item):
    # Process the text with the trained NER model
    doc = nlp(item.text)

    # For each entity in the document...
    entities = []
    for ent in doc.ents:
        # Add the entity to the list of entities
        entities.append({"text": ent.text, "start_char": ent.start_char, "end_char": ent.end_char,
"label": ent.label_})

    # Return the entities
    return {"entities": entities}
```



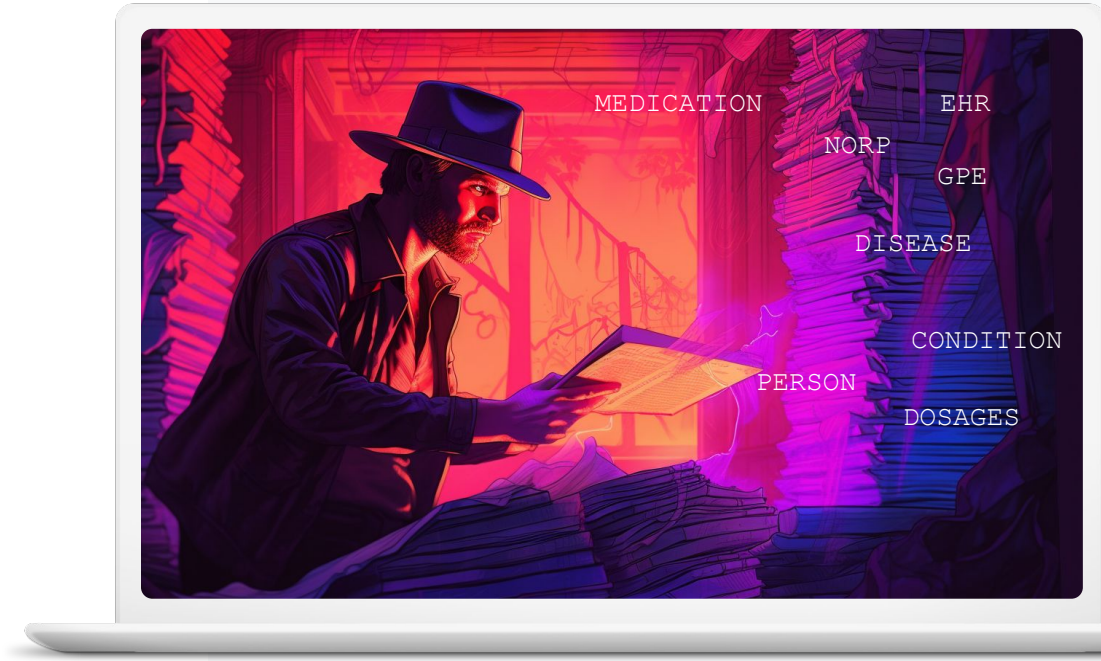
```
...

exports.dialogflowFirebaseFulfillment = functions.https.onRequest((request, response) =>
{ const agent = new WebhookClient({ request, response });

  function callModel(agent) {
    const text = agent.parameters.any;  // Get the text parameter from Dialogflow
    return axios.post('http://54.183.22.123:8000/predict/', {"text": text})
      .then((result) => {
        // Send the entities from the model back to the Dialogflow agent
        agent.add(`Entities: ${JSON.stringify(result.data.entities)}`);
      });
  }

  let intentMap = new Map();
  intentMap.set('Creditcard-leak', callModel);
});
```

Wrap up

1. ~~Demo: Custom Entity Recogniser~~
2. ~~Process~~
3. Real world use-cases

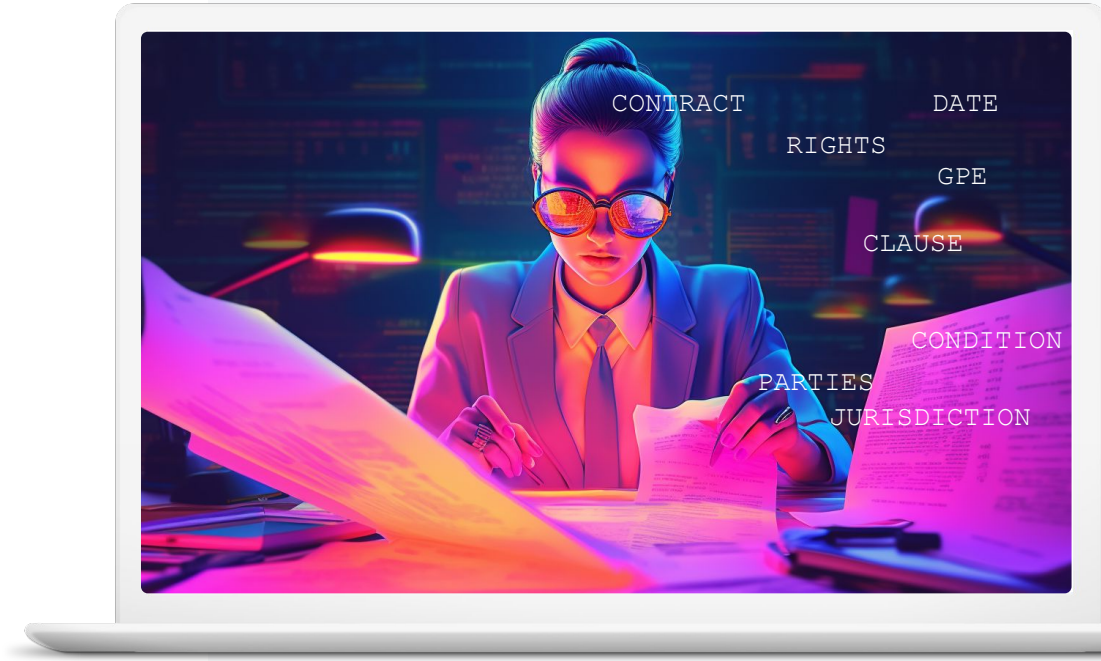
Custom Entities for Clinical Documentation

Healthcare Clinical Documentation



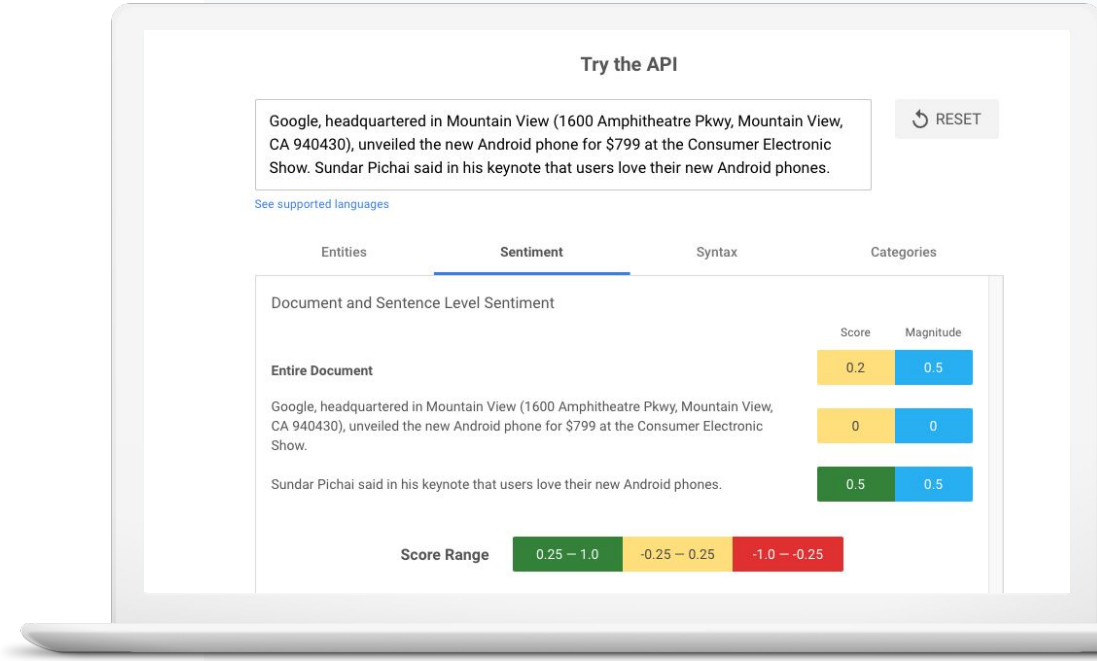
Custom Entities for Legal Documents

Legal Contract Analysis



Sentiment Analysis Use Case

cloud.google.com/natural-language



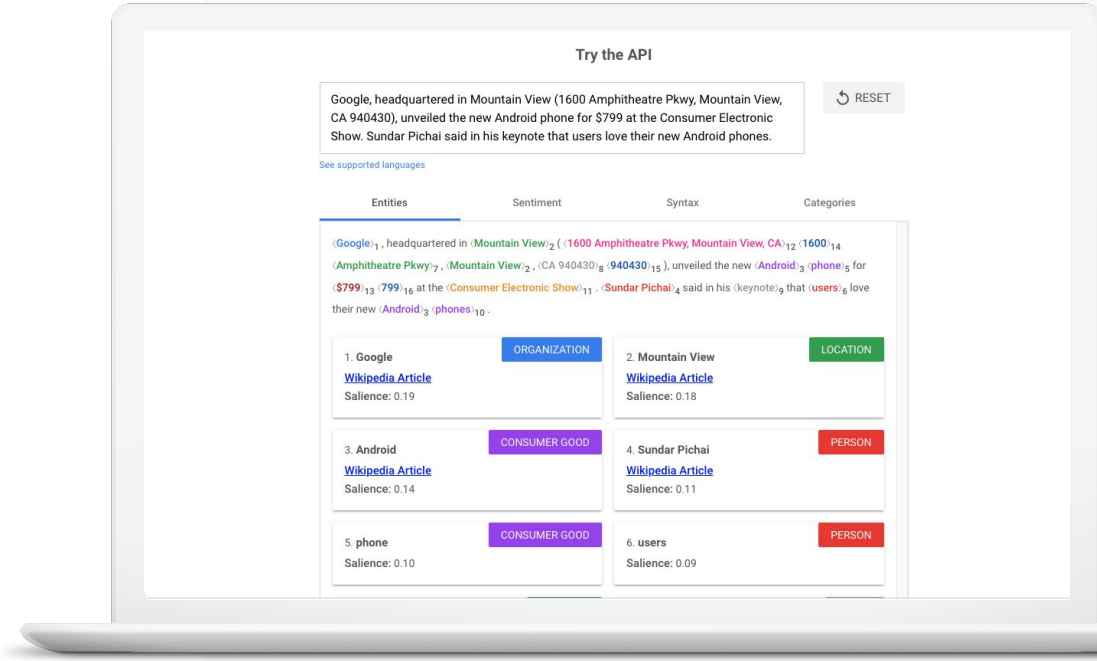
Translation
Use Case

https://cloud.google.com/translate

All-industries

Try Natural Language AI on Google Cloud

cloud.google.com/natural-language



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medium.com/@nobleackerson

youtube.com/c/nobleackerson

Resources

[What is Natural Language Processing]? [Google Cloud]

[Natural Language Processing on Google Cloud] [Cloud Skills Boost]

[TensorFlow Models NLP Library] [tensorflow.org]

Identifying Use Cases for LLMs

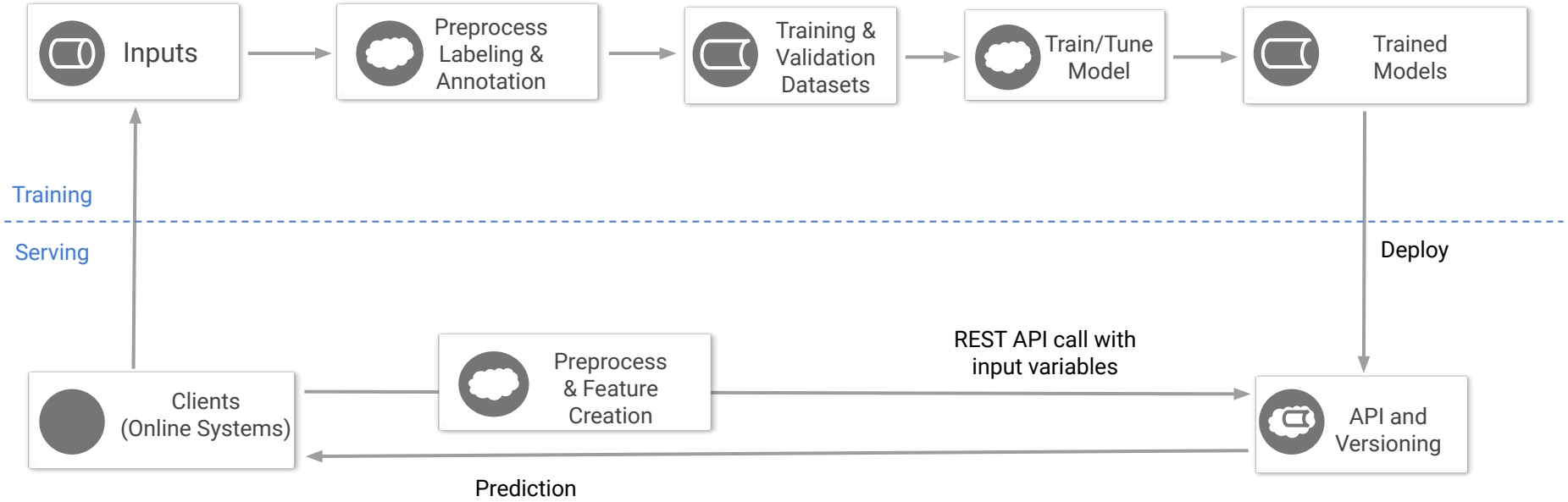
Risk Tolerance

Human Review

Text (or Code) Intensive

Business Value

oken Classification with Custom NER models



In case of demo fail