

Cloud Computing

Implementation of Machine learning with Google Cloud Platform

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Cloud computing is the third wave of the digital revolution.

- Lowell McAdam, - Former CEO of Verizon

AGENDA:

1. Introduction

2. Fundamental

3. Implementation

4. Evaluation and results

5. Summary and outlook



<https://www.experfy.com/blog/bigdata-cloud>

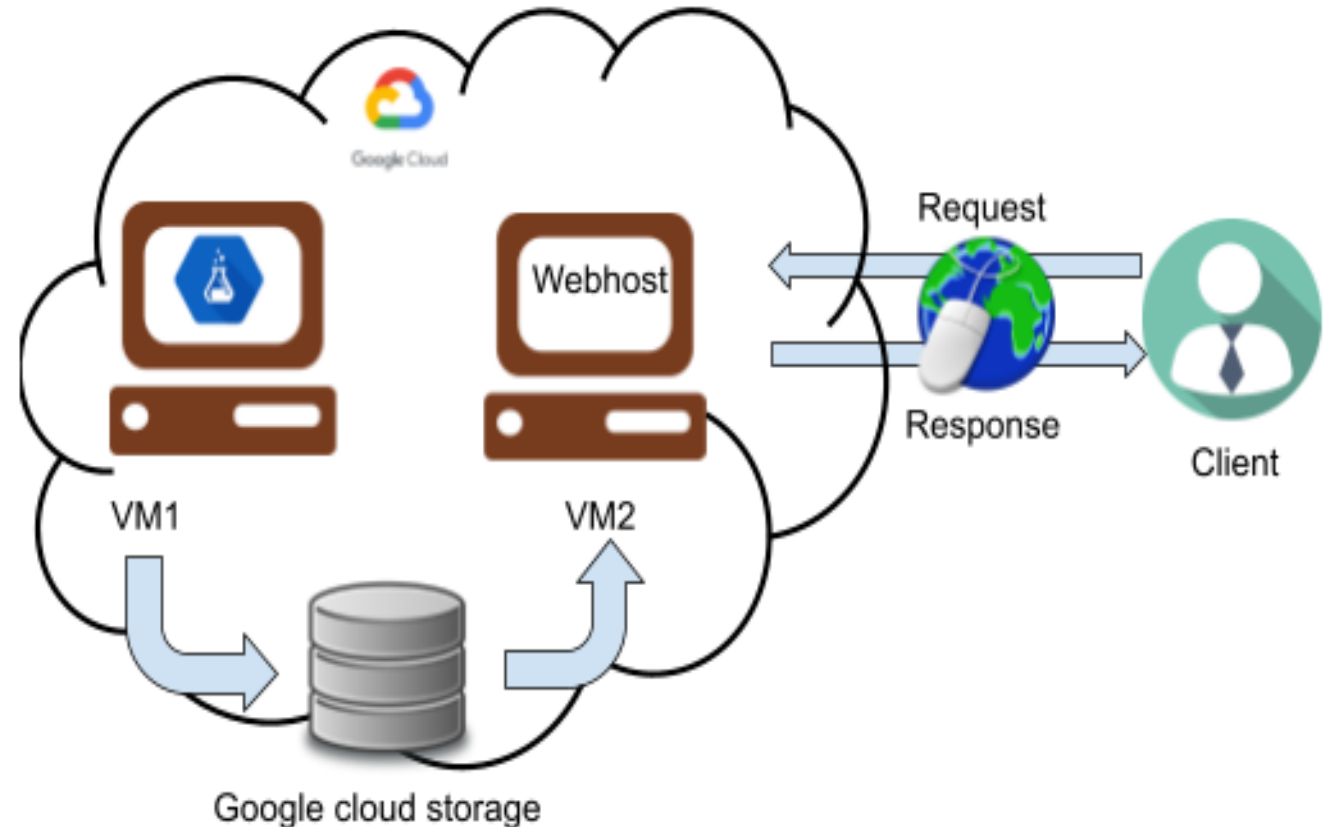


- **Motivation:**

- Cloud computing is the delivery of computing services -servers, storage, databases, networking, software, analytics over the Internet (“the cloud”)
- Use GCP, apply ML, deploy webapp
- Architecture of GCP

- **Purpose:**

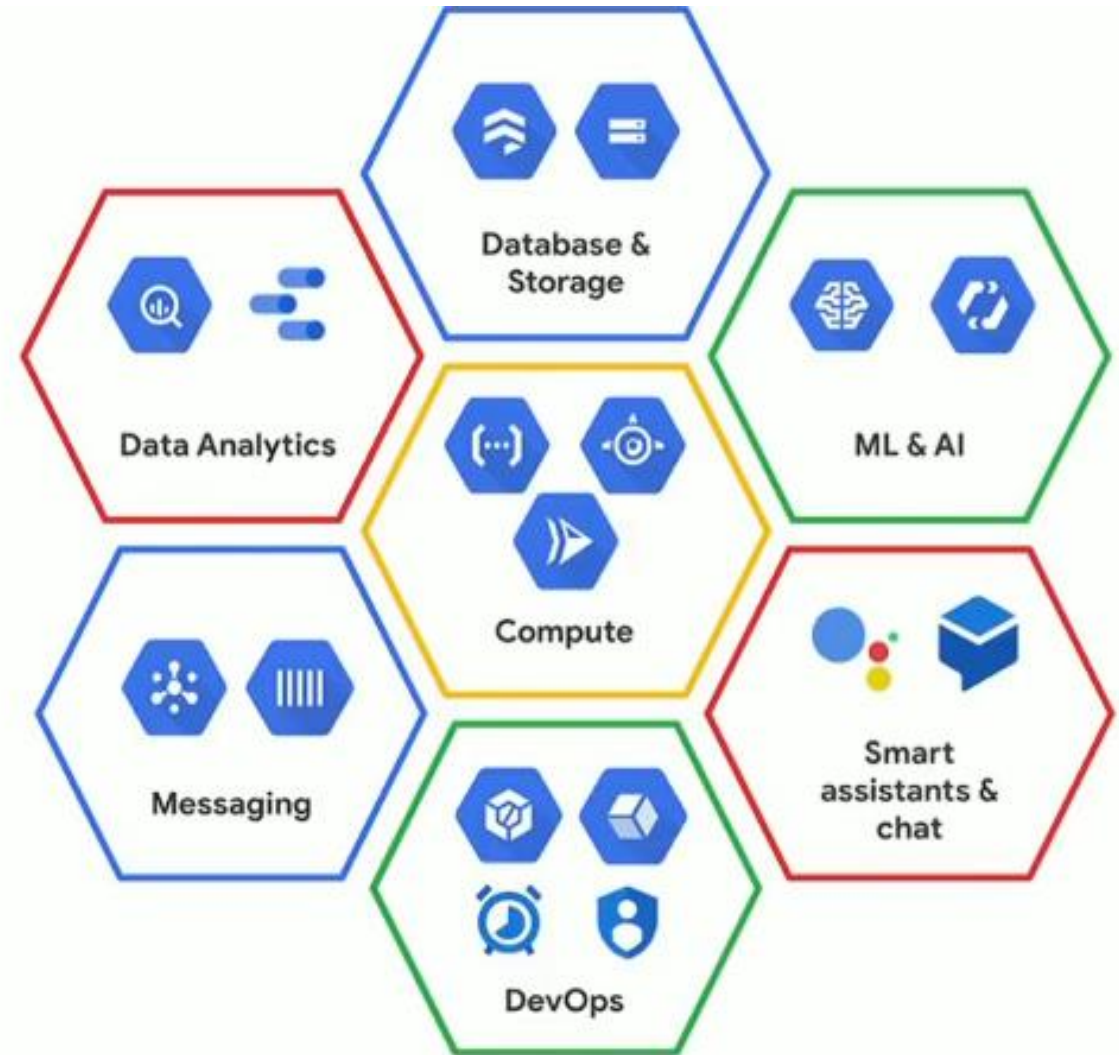
- Increase in the flexibility of storage
- Easy access and Data recovery
- Secure and protected
- Easy to share information





- **Google Cloud Services:**

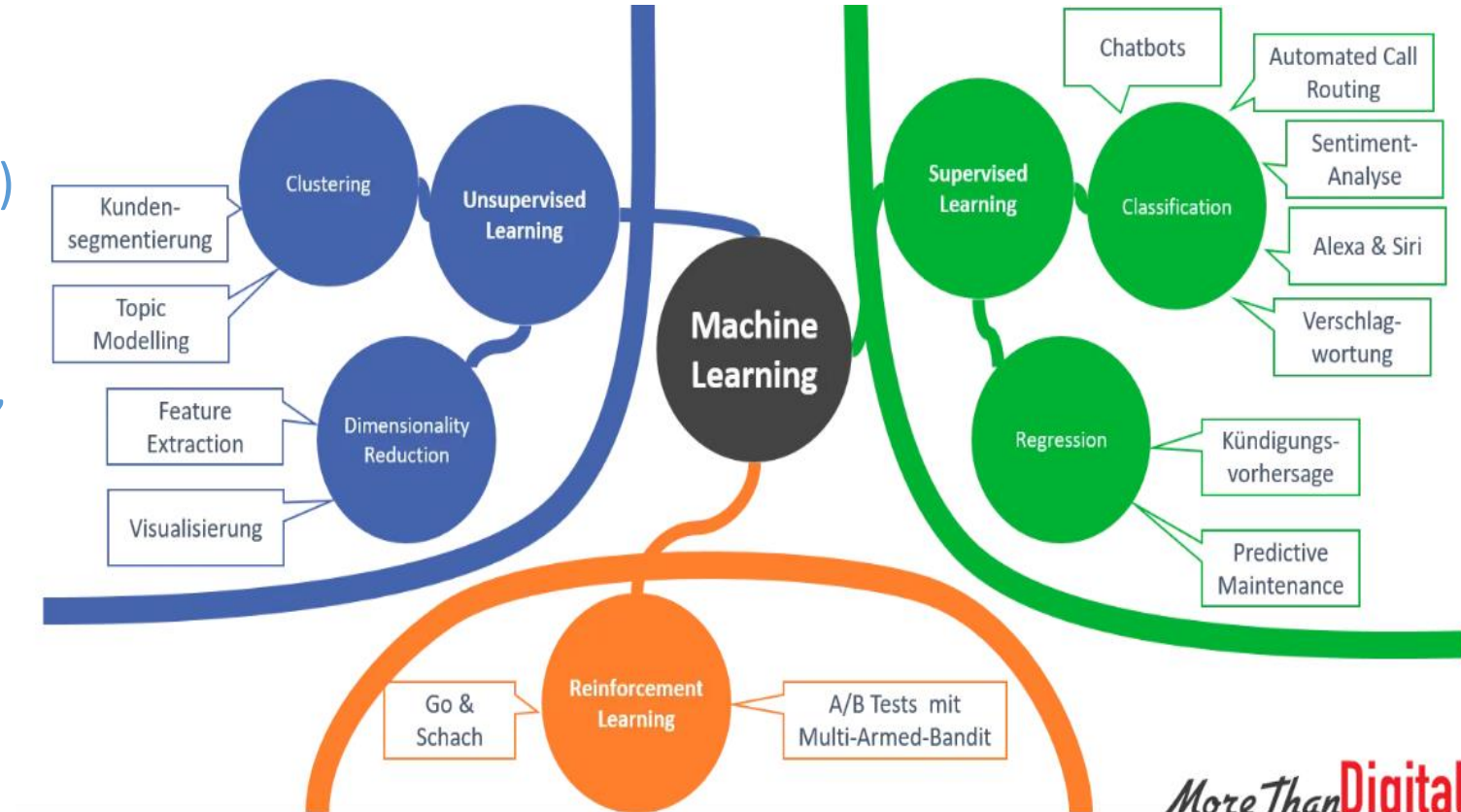
- Google Compute Engine
- Database and Storage
- ML and AI
- Messaging
- DevOps





Machine Learning:

- Supervised Learning(dataset , target)
- Unsupervised Learning(dataset, no target)
- Reinforcement Learning(no dataset , make correct decision)

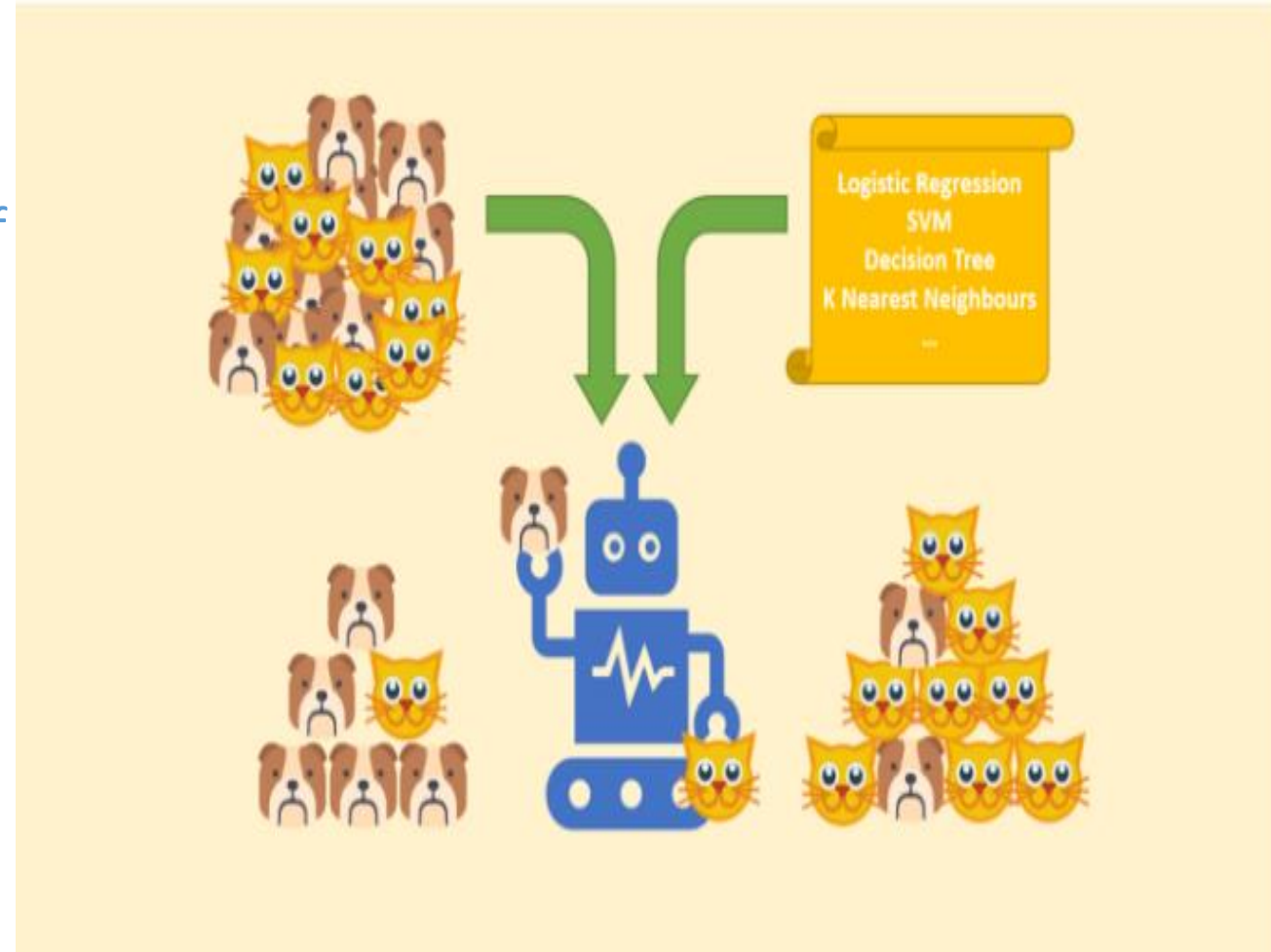


- **Supervised Learning:**

- Regression (predict the number (price of house))
- Classification (image processing)

- **Image processing:**

- Classic classification (linear equation)
- CNN (Convolution Neural Network)



- **Create and login in GCP:**

- Registration
- Bank Details or Credit card
- 300\$ credit and 90 days free

- **Google cloud storage:**

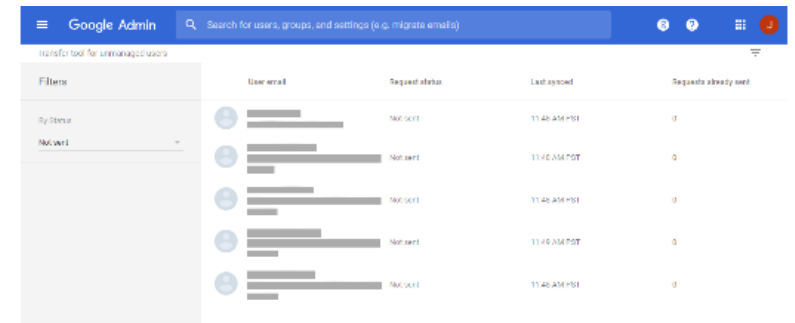
- Save datasets - buckets



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[CREATE FOLDER](#)
[MANAGE HOLDS](#)
[DOWNLOAD](#)

Filter Filter by object or folder name prefix

	Name	Size	Type	Created time ?	Storage clas
	mnist_test	17.5 MB	application/vnd.ms-excel	Jan 6, 2021, 10...	Standard
	mnist_train	104.6 MB	application/octet-stream	Jan 6, 2021, 10...	Standard



Filters	User email	Request status	Last request	Requests already sent
System		REQUEST	11:40:45M PST	0
Request		Not sent	11:40:45M PST	0
		REQUEST	11:40:45M PST	0
		Not sent	11:40:45M PST	0
		REQUEST	11:40:45M PST	0



- **Datalab for ML:**

- **Install datalab:**

Compute engine and Cloud Source repositories API must be enabled

Datalab create <name>

Choose the zone

- **Create:**

Datalab create <name>

- **Connect:**

Datalab connect <name>

- **Import data from google cloud storage to datalab:**

`%%gcs read <directory of google cloud storage> --variables <name>`



Compute Engine API

Google

Compute Engine API

ENABLE

TRY THIS API [↗](#)



Cloud Source Repositories API

Google

Access source code repositories hosted by Google.

ENABLE

TRY THIS API [↗](#)



TensorFlow



- **Export data to google cloud storage:**

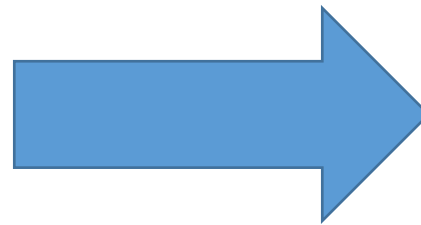
```
!gsutil cp -r "file://model_tensorflow" gs://mnist_2021
```

```
!gsutil cp -r "file://CNN" gs://mnist_2021
```

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Name	Size	Type
CNN/	-	Folder
mnist_test.csv	17.5 MB	application/vnd.ms-excel
mnist_train.csv	104.6 MB	application/octet-stream
model_tensorflow	-	Folder



- **Create Webhost:**

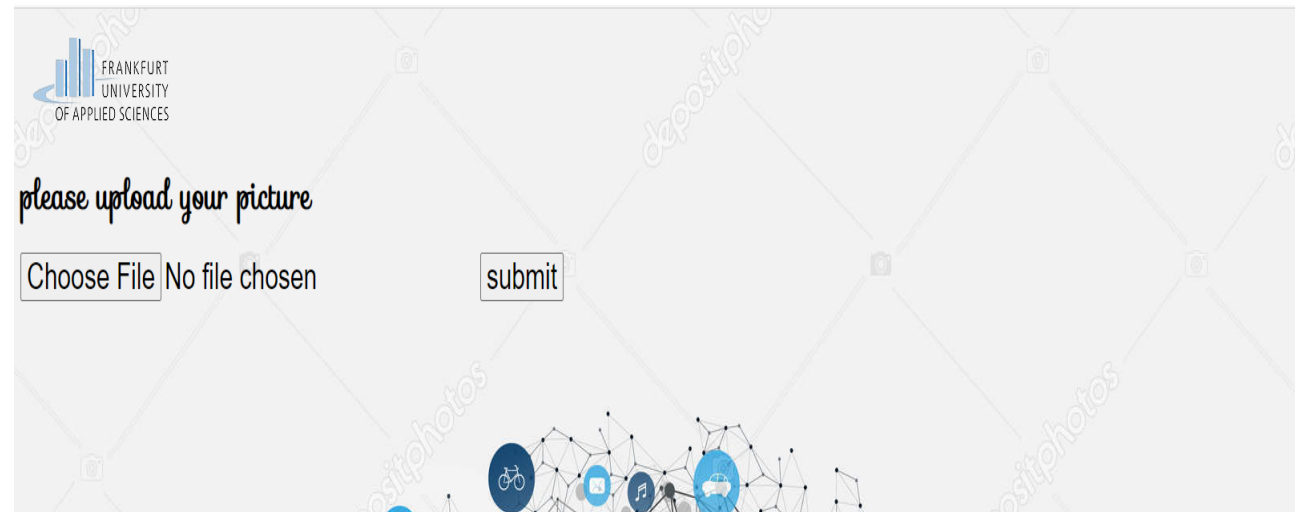
- Choose the solution type(<https://cloud.google.com/solutions/web-hosting>)

- Create VM

- To convert VM to webhosting:

```
sudo apt install apache2
```

```
sudo apt install php libapache2-mod-php php-mysql
```



Live demo

- **Results:**

- Store the image uploaded by user in cloud
- Analyse the picture with ML model

- **Evaluation:**

- Accuracy of model (87 %)
- Few training (10 Iteration)





- **Summary:**

- Analysed the GCP Architecture
- VM, tensorflow
- Implemented Image processing and digit prediction with GCP

- **outlook:**

- We could have used AI-tools – suite for AI developers
- We could have used CNN (Convolution neural Network) instead of linear regression
- <https://www.cs.ryerson.ca/~aharley/vis/conv/>
- <http://www.denseinl2.com/webcnn/digitdemo.html>



Thank you for your
attention 😊