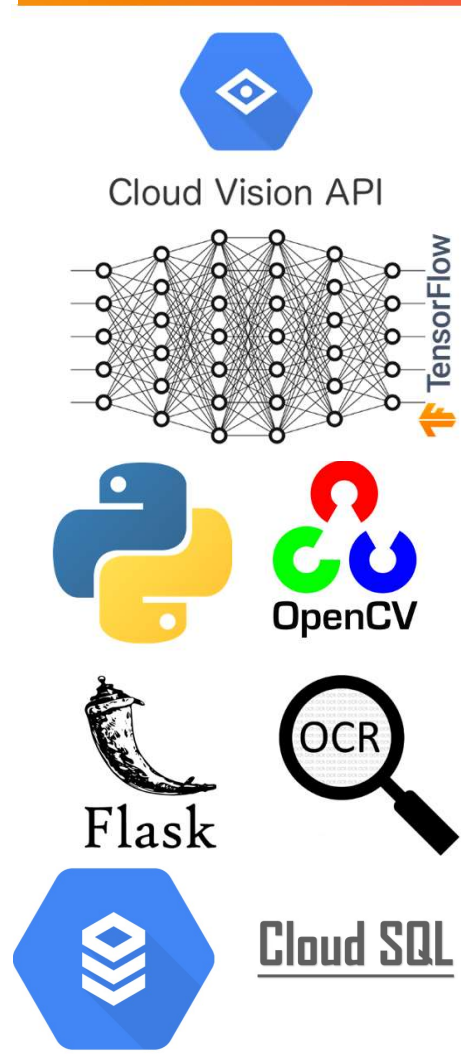




Google Cloud Platform

Web application for recognizing vehicle number plates over GCP

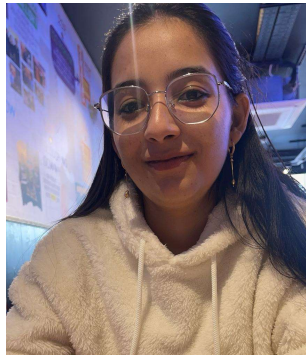
- Sonal Choudhary
- Jashandeep Kaur
- Daniilas Medvedevas
- Nihal Bhatnagar
- Dnyanesh Walwadkar



Team – (Group 10)



**Sonal
Choudhary**
210895629



**Jashandeep
Kaur**
210829277



**Dnyanesh
Walwadkar**
210405048



**Daniilas
Medvedevas**
210673452

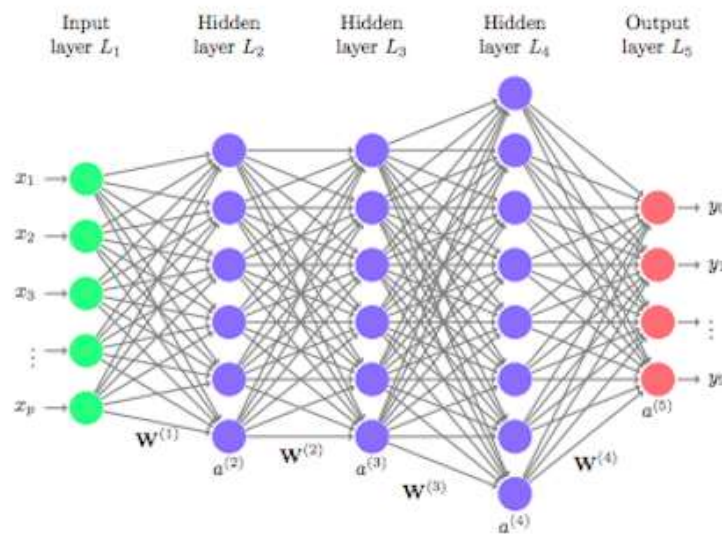


**Nihal
Bhatnagar**
200743080

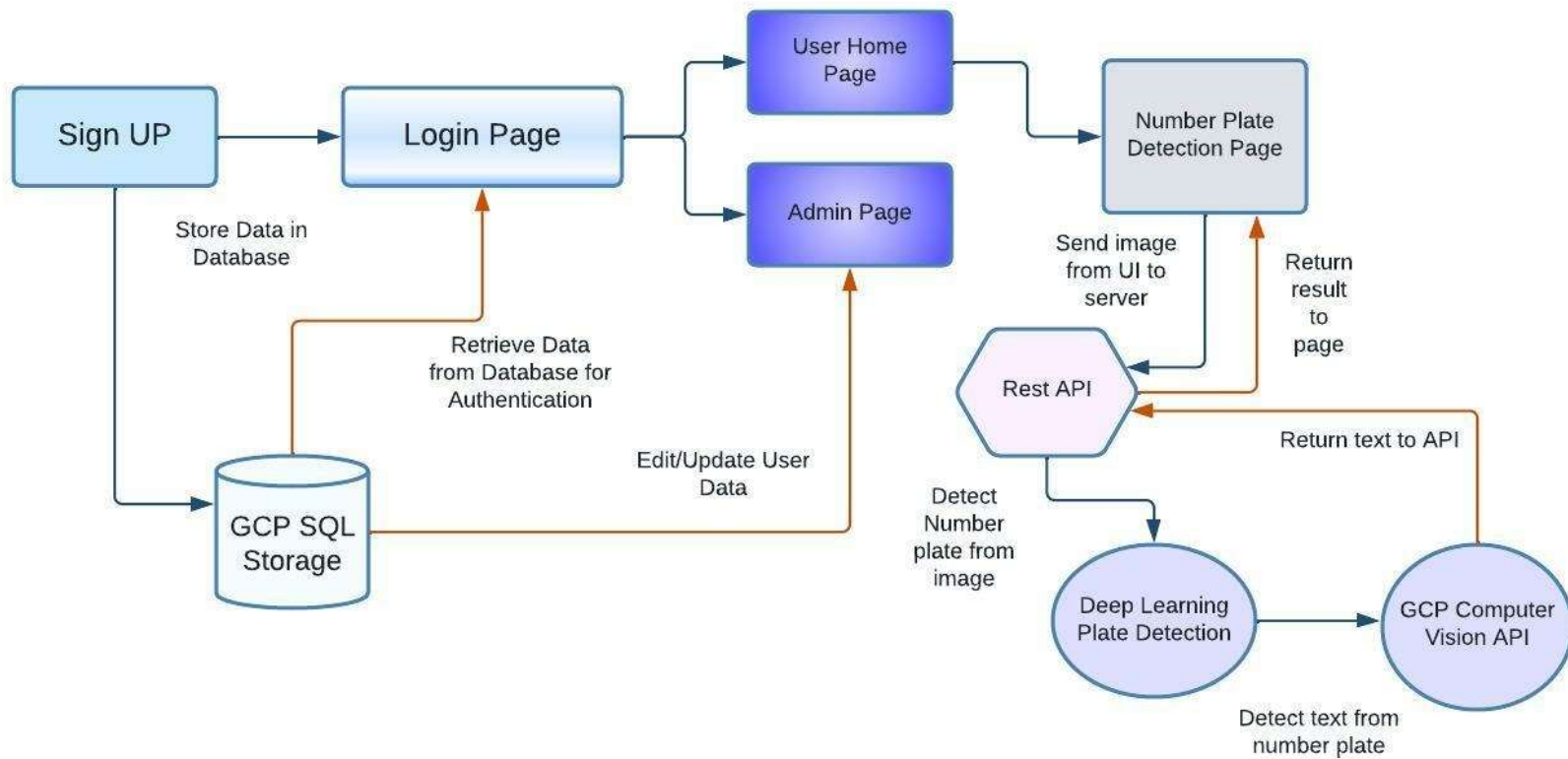


Agenda

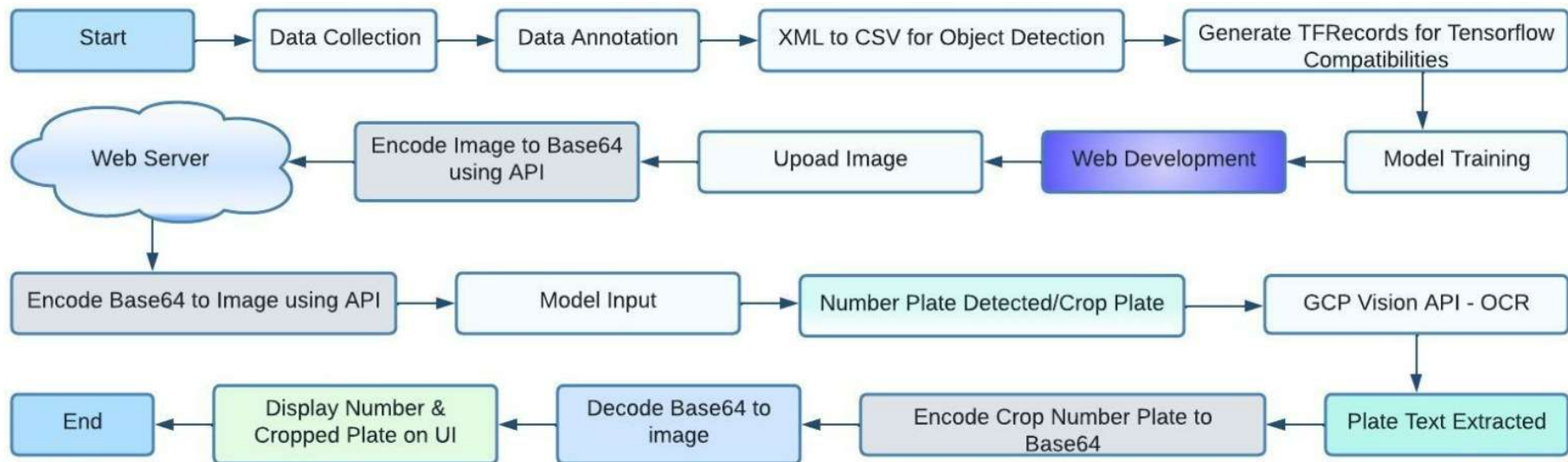
- Project Introduction
- Cloud SQL for Data Storage
- Cloud Vision API & Deep Learning
- Deployment
- Conclusion



Project Architecture



Project Flow





Result input to Google
Cloud Vision API



Detected text : KA 01 MR 8041

Deep Learning Algorithm

Library: TensorFlow 2.8

Deep Neural Network: SSD_Inception_v2 with
42ms Image Frame Processing speed with 28
COCO mAP

(Object Detection Task)

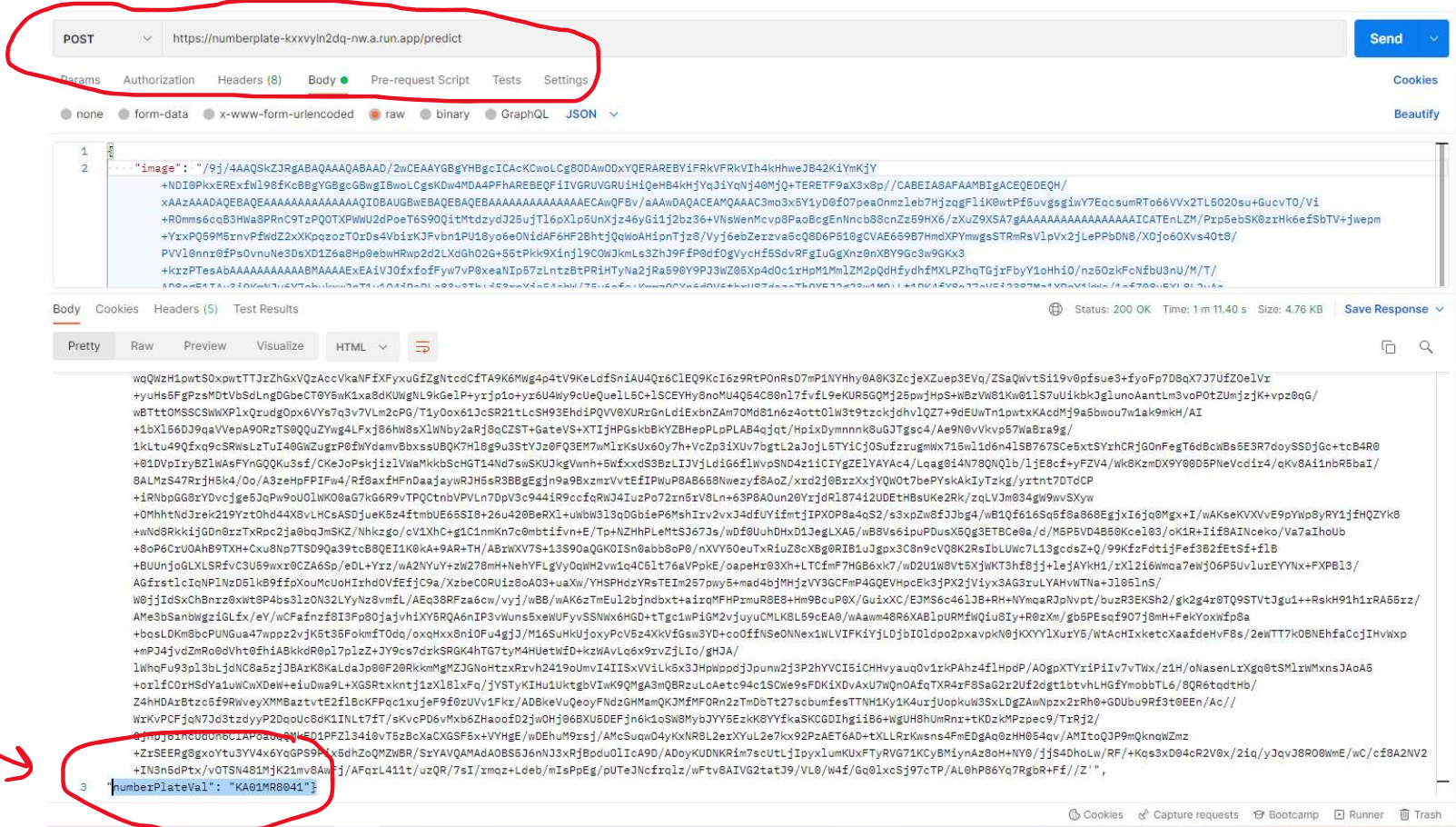
Google Vision API

Integrates Google Vision features,
including image labeling, face, logo, and
landmark detection, **optical character
recognition (OCR)**, and detection of
explicit content, into applications.

REST API CRUD Operations

REQUEST	Link	
[GET]	https://numberplate-kxxvyl2dq-nw.a.run.app/user	Displays ALL Users Data
[POST]	https://numberplate-kxxvyl2dq-nw.a.run.app/user	Insert New Users Data
[DELETE]	https://numberplate-kxxvyl2dq-nw.a.run.app/user/delete	Delete Specific user data by identifying mail
[POST]	https://numberplate-kxxvyl2dq-nw.a.run.app/user/update	Update user data
[POST]	https://numberplate-kxxvyl2dq-nw.a.run.app/plates	add Detected Number Plates to Database
[GET]	https://numberplate-kxxvyl2dq-nw.a.run.app/plates	Displays all NumberPlates Data

Image Number Plate Recognition & Cloud Vision API output Over Deployed app using Postman (Image in B64 Format)

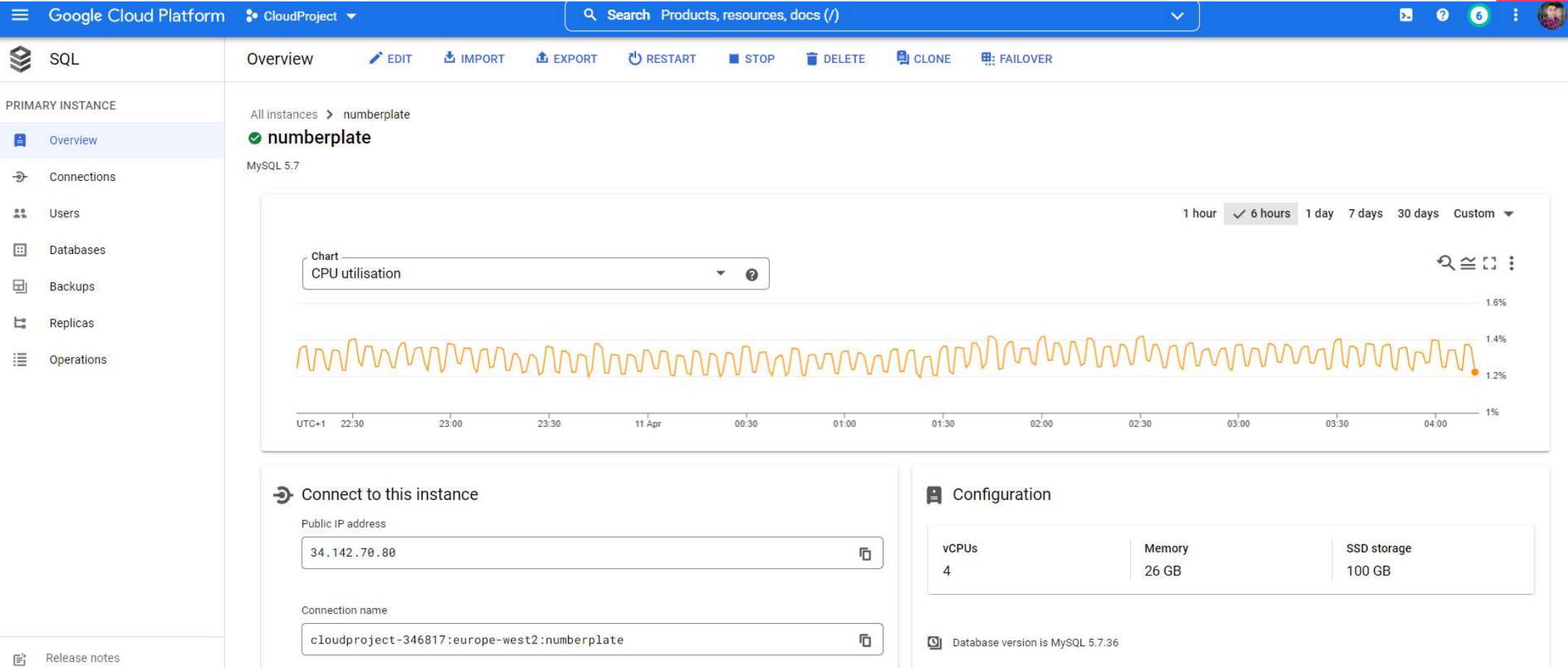


Google cloud SQL Output

The screenshot displays a REST client interface with a GET request to the URL `https://numberplate-kxxvyln2dq-nw.a.run.app/user`. The response is shown in the 'Body' tab, formatted as JSON. The status is 200 OK, with a response time of 266 ms and a size of 426 B. The JSON output is an array of four user objects, each containing an ID, a name, an email address, and a phone number.

```
1 [
2   [
3     1,
4     "Dnyanesh",
5     "dnyaneshwalwadkar10@gmail.com",
6     "123434343545"
7   ],
8   [
9     2,
10    "Sonal",
11    "dnyaneshwalwadkar10@gmail.com",
12    "123434343545"
13  ],
14  [
15    3,
16    "Daniilas",
17    "dnyaneshwalwadkar10@gmail.com",
18    "123434343545"
19  ],
20  [
21    4,
22    "Daniilas",
23    "dnyaneshwalwadkar10@gmail.com",
24    "123434343545"
25  ]
26 ]
```

Cloud SQL



Load Balancing

Google Cloud Platform

CloudProject

Search Products, resources, docs (/)

Network services

Load balancing

Cloud DNS

Cloud CDN

Cloud NAT

Traffic Director

Service Directory

Cloud Domains

Private Service Connect

Marketplace

Release Notes

Load balancer details

EDIT

DELETE

VIEW IN NETWORK TOPOLOGY

dnyanesh

Faster web performance and improved web protection with Cloud CDN and Cloud Armor. [Learn more](#)

DETAILS

MONITORING

CACHING

Frontend

Protocol	IP:Port	Certificate	SSL Policy	Network Tier
HTTP	34.95.92.4:80	-		Premium

Host and path rules

Hosts	Paths	Backend
All unmatched (default)	All unmatched (default)	loadbalancing

Backend

Backend buckets

1. loadbalancing

Storage bucket name	Cloud CDN	Edge security policy
eu.artifacts.cloudproject-345422.appspot.com	Disabled	None

CLOUD Run -> Deployed Application

Logs Details about Running Application

The screenshot shows the Google Cloud Platform interface for a Cloud Run service named 'numberplate'. The top navigation bar includes the Google Cloud Platform logo, 'CloudProject', a search bar, and a dropdown menu. Below the navigation bar, the 'Cloud Run' section is active, showing 'Service details'. The service is in the 'europe-west2' region and has a URL of 'https://numberplate-kxxvyn2dq-nw.a.run.app'. The 'REVISIONS' tab is selected, displaying a table of revisions. The 'numberplate-00004-rip' revision is the current one, with 100% traffic. The 'TRIGGERS' tab is also visible. The 'DETAILS' tab shows the 'numberplate-00004-rip' revision with its general information, including the image URL, build, source, port, and command arguments. The 'CAPACITY' section shows the CPU allocation, CPU count, memory, concurrency, request timeout, and execution environment.

Name	Traffic	Deployed	Revision URLs (tags)	Actions
numberplate-00004-rip	100% (to latest)	2 hours ago	+	⋮
numberplate-00003-cld	0%	2 hours ago		⋮
numberplate-00002-yak	0%	2 hours ago		⋮
numberplate-00001-nok	0%	3 hours ago		⋮

General	CONTAINER	VARIABLES & SECRETS	CONNECTIONS	SECURITY	YAML
General					
Image URL	gcr.io/cloudproject-346817/numberplate@sha256:7af...				
Build	(no build information available)				
Source	(no source information available)				
Port	8080				
Command and arguments	(container entrypoint)				
Capacity					
CPU allocation	CPU is only allocated during request processing				
CPU	4				
Memory	4GiB				
Concurrency	80				
Request timeout	300 seconds				
Execution environment	First generation (default)				

We can Revise Deployed application for adding or removing features

Trigger Application to allow authentication invocations or managing traffic

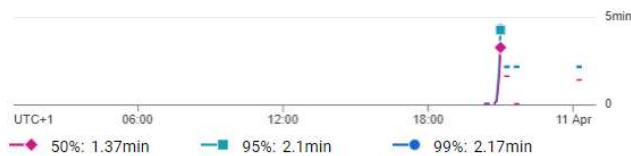
Authentication and Roles management on Deployed app

CLOUD Run -> Application Metrics

Request count ?



Request latencies ?



Container instance count ?



Billable container instance time ?



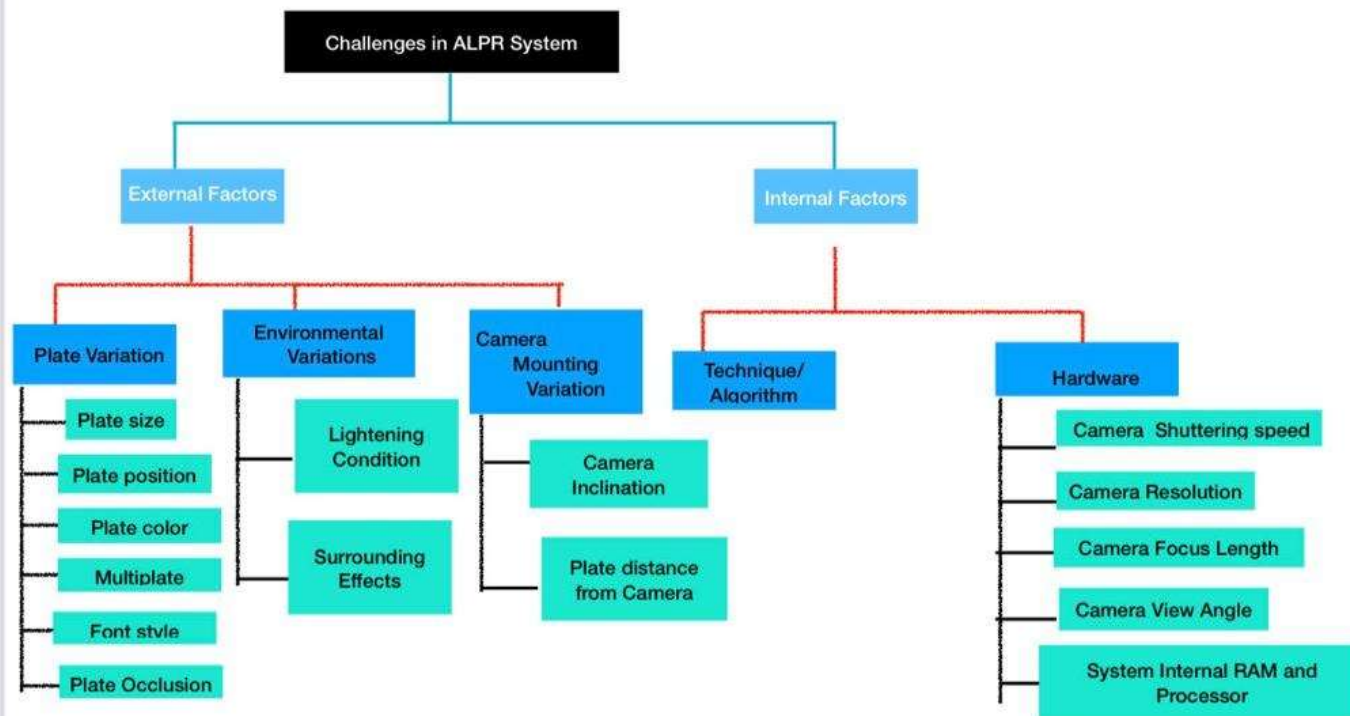
Container CPU utilisation ?



Container memory utilisation ?



CHALLENGES IN AUTOMATIC NUMBER PLATE RECOGNITION SYSTEM (ALPR SYSTEM)



Conclusion

- Automatic Number Plate Recognition is a technology that uses optical character recognition to read vehicle registration plates. Initially, ANPR was used by police forces around the world for law enforcement purposes.
- However, it soon entered the security market as more and more providers saw the benefits of utilising this solution for applications such as electronic toll collection, parking management and smart parking
- We plan to scale the application to runtime recognitions with video support in the near future.
- The integration of Deep Learning & Machine Learning models with web applications with the support of the Cloud is ideal for a wide range of applications.
- Integrating and deploying GCP is easy, and all application logs are readily accessible. The GCP APIs encompass a wide range of problems, including AI, databases, and virtual machines.



Thank You

Let's build Future