



UPS TECHNOLOGY GROUP

Hackathon 2024

Team 2: Next-Day Ninjas

8/1/2024



Introductions



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API & Backend Development



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AI & Backend Development



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Database & Backend
Development



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UTG ISM Intern - EMS
Frontend Development

Agenda



- Project Summary



- Technical



- Business



- Demonstration



- Q&A

Project Summary

Overview

The Problem

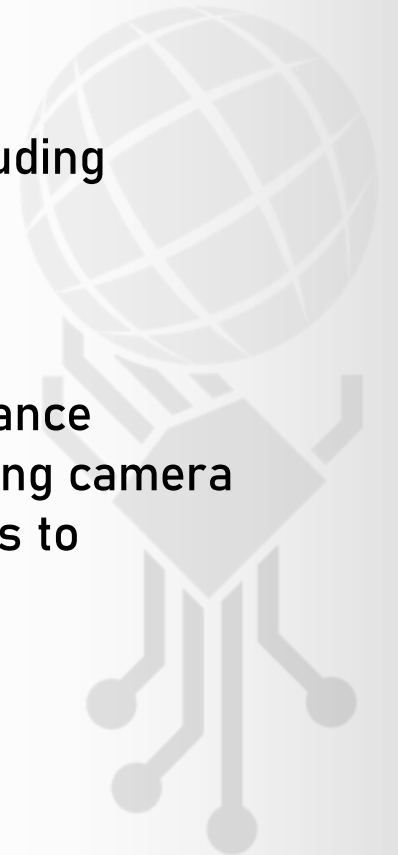
- UPS faces challenges with the accuracy of feeder trailer and asset tracking, including identification of asset numbers, logos, and locations.

The Solution

- The implementation of property cameras combined with AI technology could enhance information identification, increase automation, and improve efficiency. The existing camera infrastructure, utilizing AI, could assist in identifying trailer numbers and markers to accurately pinpoint vehicles.

Project Category

- Supply Chain and Transportation Network



Solution

Technical



Image Bucket



Vertex AI
Multimodal



Firestore Database



Angular App



Google Maps & Dashboard

API

Image Bucket

Google Cloud

Select a project

Search (/) for resources, docs, products, and more

Search

9

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S

Cloud Storage

Buckets

Monitoring

Settings

Marketplace

Release Notes

<1

Bucket details

GO TO PATH

REFRESH

LEARN

Sweeps/

Claims Smart Tutor/

Dispatch Pickup Groups/

Full Product Description From URL for HTS/

Improve Results When Searching Overgoods/

In-house Interactive Learning Platform/

Maintaining Accuracy Of UPS Assets/

Day 1 - Inbound OCR/

Day 1 - Outbound OCR/

Day 2 - Inbound OCR/

Day 2 - Outbound OCR/

Package Car Cubic Pickup Capacity/

Package Match For Hold 2+ Days/

Pickup Work Planning Forecast/

Upload My Forms Unnecessary Manual Entries/

Filter by name prefix only

Filter

Filter objects and folders

Show

Live objects only

	Name	Size	Type	Create		
<input type="checkbox"/>	SY_00009.JPG	644.5 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00013.JPG	657.5 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00017.JPG	660 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00030.JPG	668.2 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00034.JPG	628.7 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00037.JPG	641.7 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00038.JPG	676.2 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00042.JPG	654 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00088.JPG	577.6 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00090.JPG	593.8 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00098.JPG	585.6 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00102.JPG	604.6 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00123.JPG	582.2 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00144.JPG	597.5 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00151.JPG	573.8 KB	image/jpeg	Jul 12	Download	More
<input type="checkbox"/>	SY_00160.JPG	609.6 KB	image/jpeg	Jul 12	Download	More



Vertex AI Multimodal Model

```
vertexaiAPI > JS index.js > ...
22 functions.cloudEvent('cloudStorageTrigger', async (cloudEvent) => {
31   await multiPartContent(file);
32 })
33
34 const vertexAI = new VertexAI({ project: project, location: location });
35
36 // Instantiate Gemini models
37 const generativeModel = vertexAI.getGenerativeModel({
38   model: textModel,
39   safetySettings: [{ category: HarmCategory.HARM_CATEGORY_DANGEROUS_CONTENT, threshold: HarmBlockThreshold.BLOCK_MEDIUM_AGGRESSIVE }],
40   generationConfig: { maxOutputTokens: 256 },
41 });
42
43 const generativeVisionModel = vertexAI.getGenerativeModel({
44   model: visionModel,
45 });
46
47 const generativeModelPreview = vertexAI.preview.getGenerativeModel({
```

PROBLEMS OUTPUT DEBUG CONSOLE **TERMINAL** PORTS COMMENTS

```
3Sh8h2JdMKt6SoUNMnSm => {
  trailerNumber: '842570',
  unitNumber: '91110',
  timestamp: '2024-07-16T04:19:04.614Z',
  lat: '38.221390874395055',
  lng: '-85.56891135481983'
}
60xuVRASwxlbGI5UyBgY => {
  trailerNumber: '53102',
  unitNumber: '238441',
  timestamp: '2024-07-16T04:19:40.027Z',
  lat: '38.22136137340717',
  lng: '-85.56893817690752'
}
8AZbhfroZBPVJ1m0jouD => {
```



Firestore Database

Google Cloud

qwiklabs-gcp-02-32920a975641

fire

Search

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Firestore

Database

Firestore Studio

Indexes

Import/Export

Disaster Recovery

Time-to-live (TTL)

Security Rules

Insights

Usage

Key Visualizer

Release Notes

All databases > DATABASE (default)

PANEL VIEW

QUERY BUILDER

/ > trucks > 3Sh8h2JdMKt6SoUNMnSm

(default)

trucks

3Sh8h2JdMKt6SoUNMnSm

+ START COLLECTION

locations

trucks

yourCollectionName

+ ADD DOCUMENT

2QUmSxaV0JTAXvqINuTS

38hAEG8fD6jB0U1vrcpX

3Sh8h2JdMKt6SoUNMnSm

60xuVRASwxlbGI5UyBgY

8AZbhfroZBPVJ1m0jouD

DFZwKesm3jxamXkw6CPy

DcqTkPxQi96HoY1zW9MJ

+ START COLLECTION

+ ADD FIELD

lat: "38.221390874395055"

lng: "-85.56891135481983"

timestamp: "2024-07-16T04:19:04.614Z"

trailerNumber: "842570"

unitNumber: "91110"



NestJS API

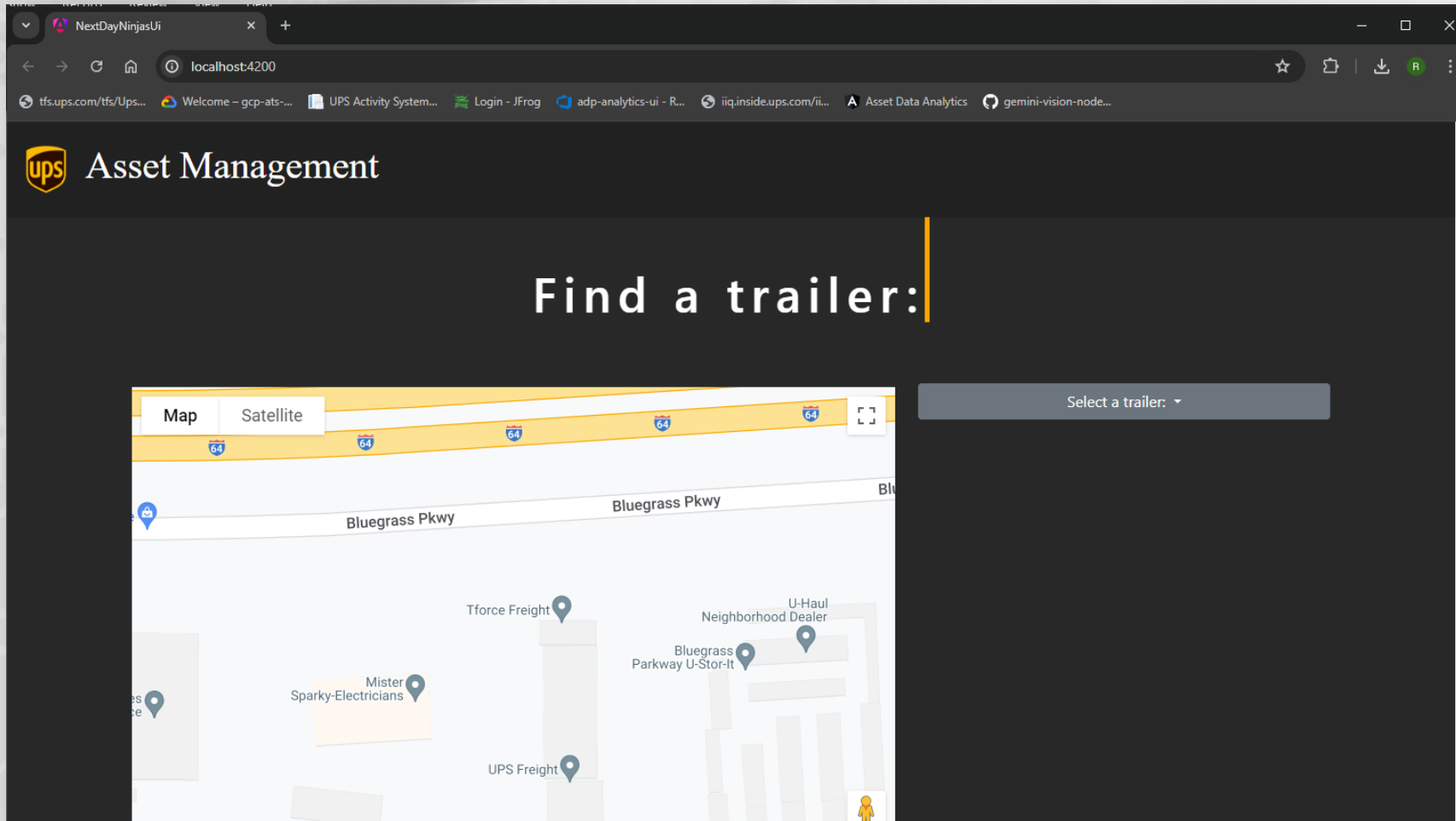
TS app.controller.ts X

Next-Day-Ninjas > nest-day-ninja-api > src > TS app.controller.ts > ...

```
1 import { Body, Controller, Get, Param, Post } from "@nestjs/common";
2 import { AppService } from '../app.service';
3 import { Location } from '../models/models';
4
5 @Controller()
6 export class AppController {
7   constructor(private readonly appService: AppService) {}
8
9   @Get('/getTruckData')
10  getTruckData(){
11    return this.appService.getTruckData();
12  }
13
14  @Get('/getEquipmentData')
15
16  getLocationData( @Param("trailerNum") trailerNum: string){
17    return this.appService.getLocationData(trailerNum);
18  }
19
20  @Post('/addLocationData')
21  addLocationData ( @Body() body: Location){
22    return this.appService.addLocationData(body.lat, body.lgt, body.trailerNum);
23  }
24
25 }
26
```



Angular App with Google Maps Dashboard



Solution

Business

Reduces the need for manual data entry of asset locations



Enhances accuracy of known assets by removing risk of human error



Simple and easy to use interface



Improves efficiency of the process to catalog all known assets in any given yard



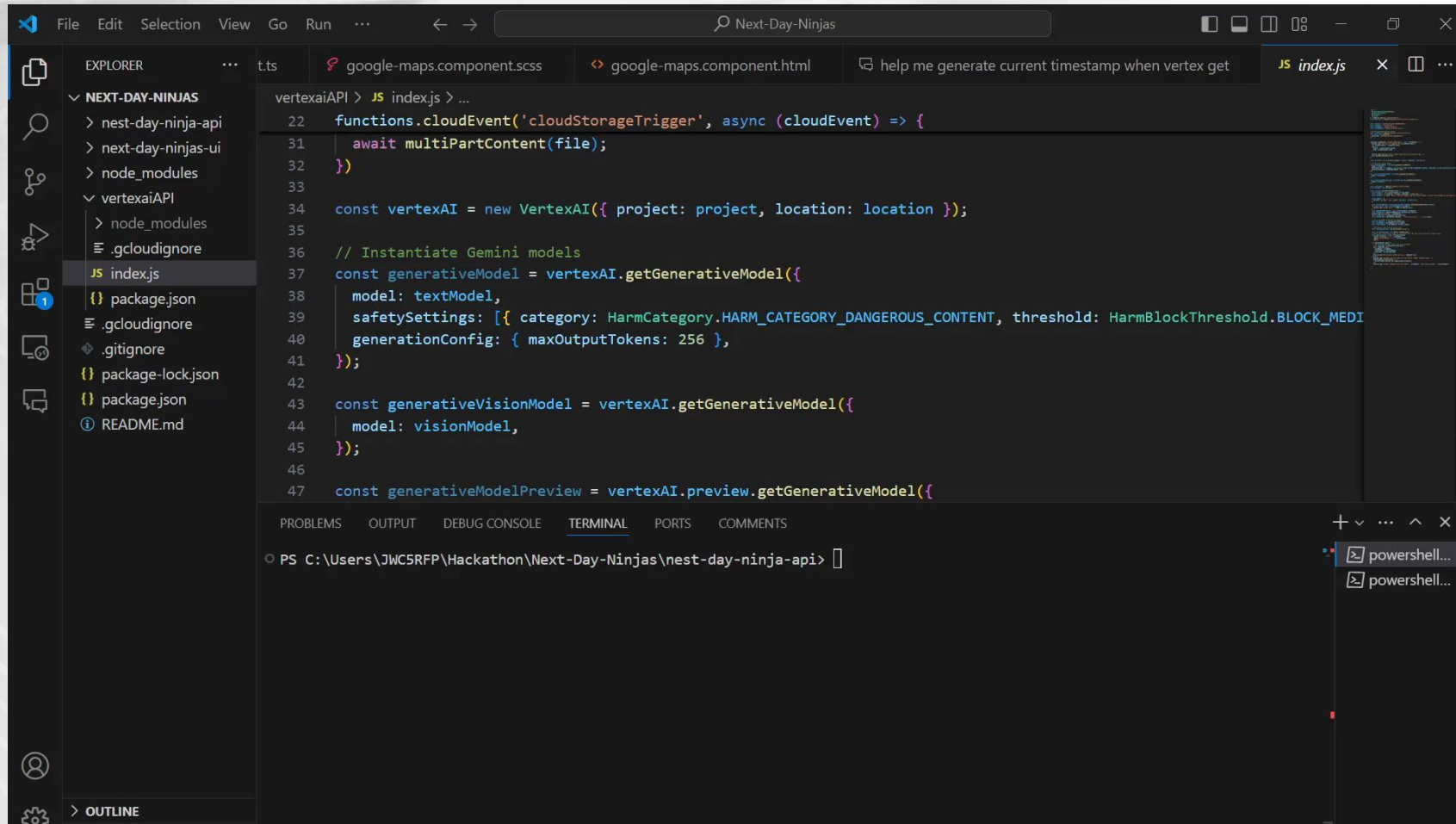
Provides up to date locations of equipment



Incurs no additional hardware cost as the system uses preexisting security cameras



Demo/Prototype

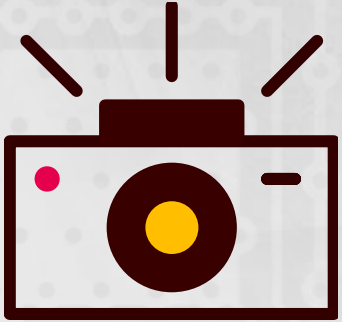


The screenshot shows a Visual Studio Code editor window with the following components:

- Explorer Panel:** Displays the project structure for 'NEXT-DAY-NINJAS'. The 'vertexaiAPI' folder is expanded, showing 'node_modules', '.gcloudignore', 'index.js', 'package.json', '.gitignore', 'package-lock.json', 'package.json', and 'README.md'.
- Main Editor:** Displays the 'index.js' file. The code includes a Google Maps component and a Vertex AI integration. The code is as follows:

```
vertexaiAPI > JS index.js > ...
22 functions.cloudEvent('cloudStorageTrigger', async (cloudEvent) => {
31   await multiPartContent(file);
32 })
33
34 const vertexAI = new VertexAI({ project: project, location: location });
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36 // Instantiate Gemini models
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40   generationConfig: { maxOutputTokens: 256 },
41 });
42
43 const generativeVisionModel = vertexAI.getGenerativeModel({
44   model: visionModel,
45 });
46
47 const generativeModelPreview = vertexAI.preview.getGenerativeModel({
```
- Terminal Panel:** Shows the command prompt for the 'nest-day-ninja-api' directory: `PS C:\Users\JWC5RFP\Hackathon\Next-Day-Ninjas\nest-day-ninja-api>`
- Output Panel:** Shows two instances of 'powershell...'.

Future Improvements



Use camera data
and GPS to
determine bay to
bay accuracy



Ability to view
assets in a
single yard



Show smart
vehicle/trailer
data on
selected asset



Fine tune the
model to be more
accurate



THANK YOU





Questions?