

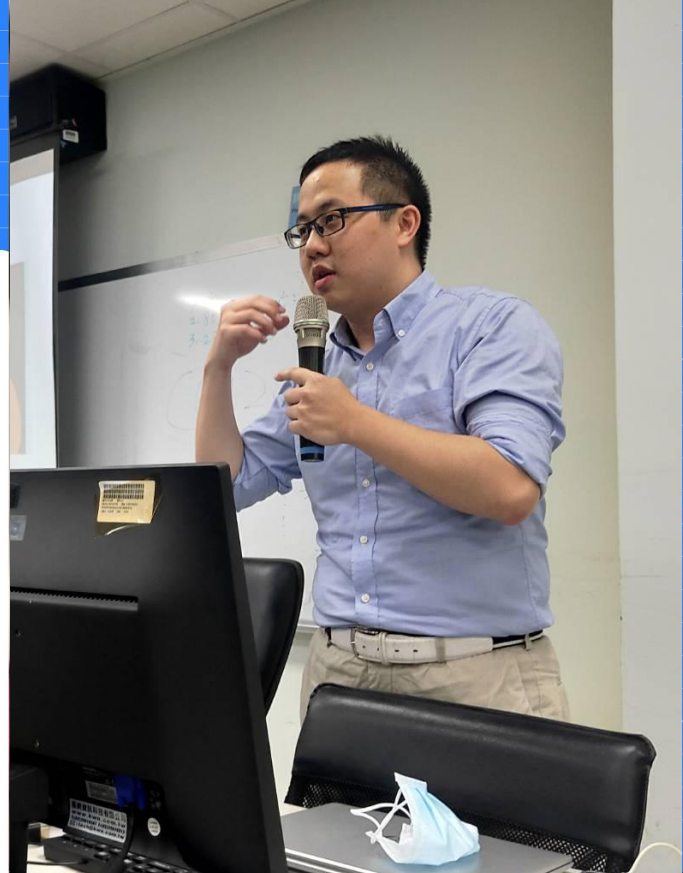
# devfest 2022

```
book-nav-toggle'  
dden='' fixed='' aria-label='Hide  
Hide side navigation'
```

## Let's Play the No-Code Computer Vision Platform Vertex AI Vision

[linktr.ee/youjun](https://linktr.ee/youjun)

 Google Developer Groups  
Taipei



Youjun Yu(余佑駿)  
Sr. Data Scientist, Nextlink Technology

# AGENDA

1. Google AI/ML Overview
2. What is Vertex AI Vision
3. How it works
4. Product features
5. Use Cases
6. Demo
7. Hands-on
8. Limitation



[bit.ly/devfest\\_taipei\\_2022\\_vision\\_ai](https://bit.ly/devfest_taipei_2022_vision_ai)

[linktr.ee/youjun\\_talk](https://linktr.ee/youjun_talk)

在開始之前 ...

**各位有GCP 帳號和專案嗎?**

我們今天是要來實作的阿!! 各位!!



好,我準備好了

在開始之前 ...

**各位有GCP 帳號和專案嗎?**

我們今天是要來實作的阿!! 各位!!

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2022



`class='time talk-ended single-`  
`class='talk-name'>...`  
`class='description'>...`

# Google AI/ML Overview



# Google Cloud AI/ML Strategy

[👉 AI & Machine Learning Products | Google Cloud](#)

## Tools / Stage / for different business market and audience

Solution	senario or tools
<b>ML API</b>	for tech (e.g. develop)
<b>AutoML Services</b>	build GUI for <b>ML API</b> . (e.g. document AI, NLP, image, Vision, Table, etc.)
<b>AI Platform</b>	integrate all <b>AutoML Service</b> . (ready to deprecate)
<b>Vertex AI</b>	integrate <b>AutoML</b> , Kubeflow, and TensorFlow Extended (TFX)

PaaS for tech & non-tech

[👉 AI and Machine Learning Solutions | Google Cloud](#)

## Total Solutions

Solution	senario or tools
<b>Contact Center AI (CCAI)</b>	integrate Dialogflow, STT, TTS, NLP
<b>Document AI</b>	integrate Vision OCR, Human-in-the-Loop
<b>Intelligent products (Preview)</b>	integrate Intelligent Products, Pre-built app templates for optimizing MRO
<b>Product Discovery</b>	integrate Vision Product Search, Recommendations AI, Retail Search

# Google Cloud AI/ML 如何平易近人

## Your Data + Your Models



App Engine



Cloud TPU



Cloud Dataproc



Kubernetes Engine



Compute Engine

## Your Data + Google Models



AutoML Video Intelligence



Cloud AutoML



AutoML Natural Language



AutoML Translation



AutoML Tables



AutoML Vision

## Google Data + Google Models



Cloud Natural Language API



Cloud Text-to-Speech



Dialogflow



Recommendations AI



Cloud Inference API



Cloud Vision API



Cloud Translation API



Cloud Video Intelligence API



Cloud Speech-to-Text

# Google Cloud AI/ML 如何平易近人

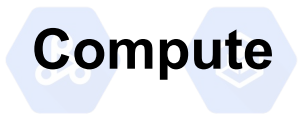
Your Data + Your Models



App Engine



Cloud TPU



Compute Engine

Cloud Dataproc

Kubernetes Engine



Compute Engine

Your Data + Google Models



AutoML Video Intelligence



Cloud AutoML



AutoML

AutoML Natural Language

AutoML Translation



AutoML Tables AutoML Vision



Google Data + Google Models



Cloud Natural Language API



Cloud Text-to-Speech



Dialogflow



Recommendation AI



ML API



Cloud Vision API



Cloud Translation API



Cloud Video Intelligence API



Cloud Speech-to-Text

Customization

Build

your own models

Train by

Google's state-of-the-art models

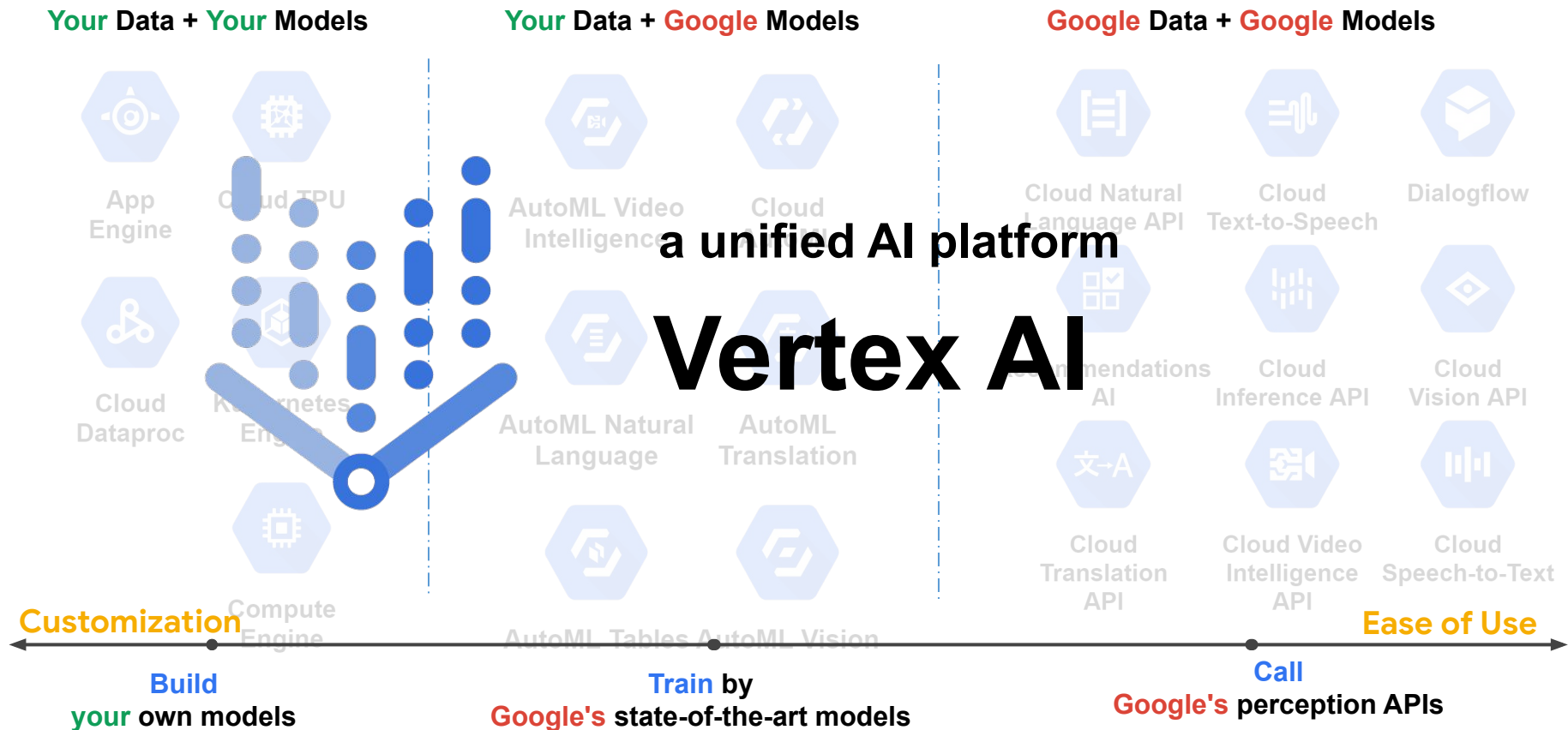
Call

Google's perception APIs

Ease of Use

Pre-trained  
Machine Learning API  
(ML API)

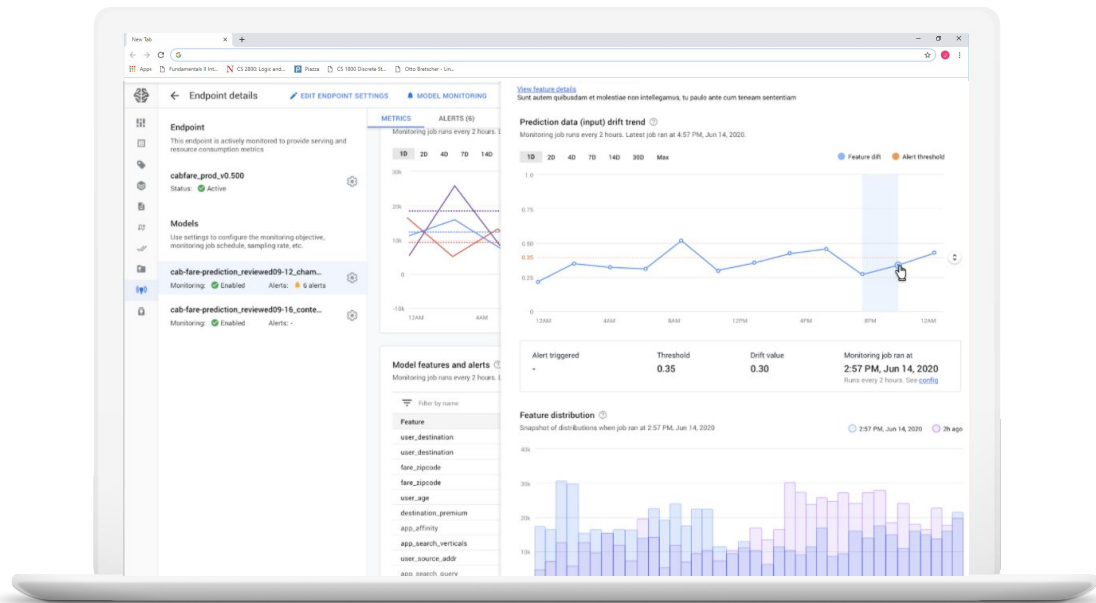
# Google Cloud AI/ML 如何平易近人





# Vertex AI

Build, deploy, and scale ML models faster, with pre-trained and custom tooling within a unified AI platform.

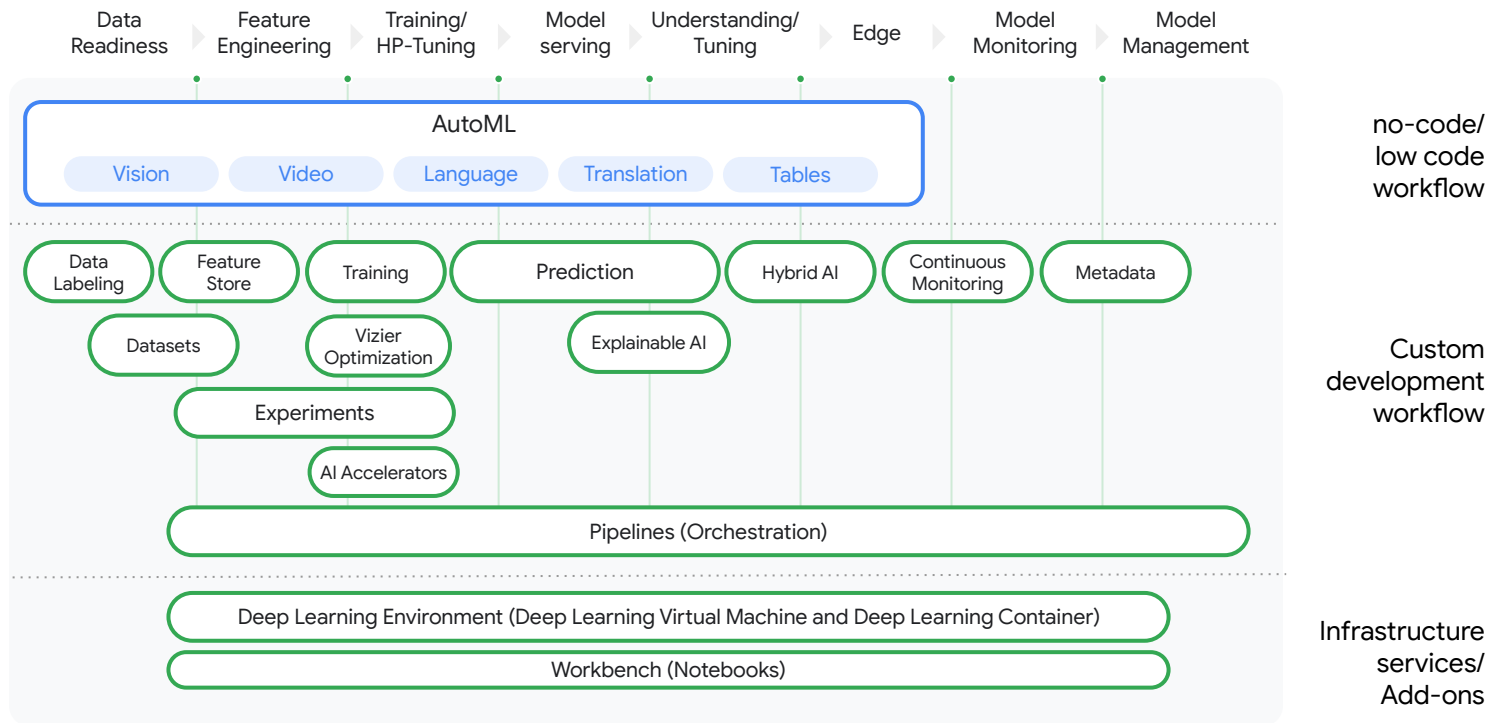


# Vertex AI Overview

## One comprehensive end-to-end platform for everything AI



Vertex AI

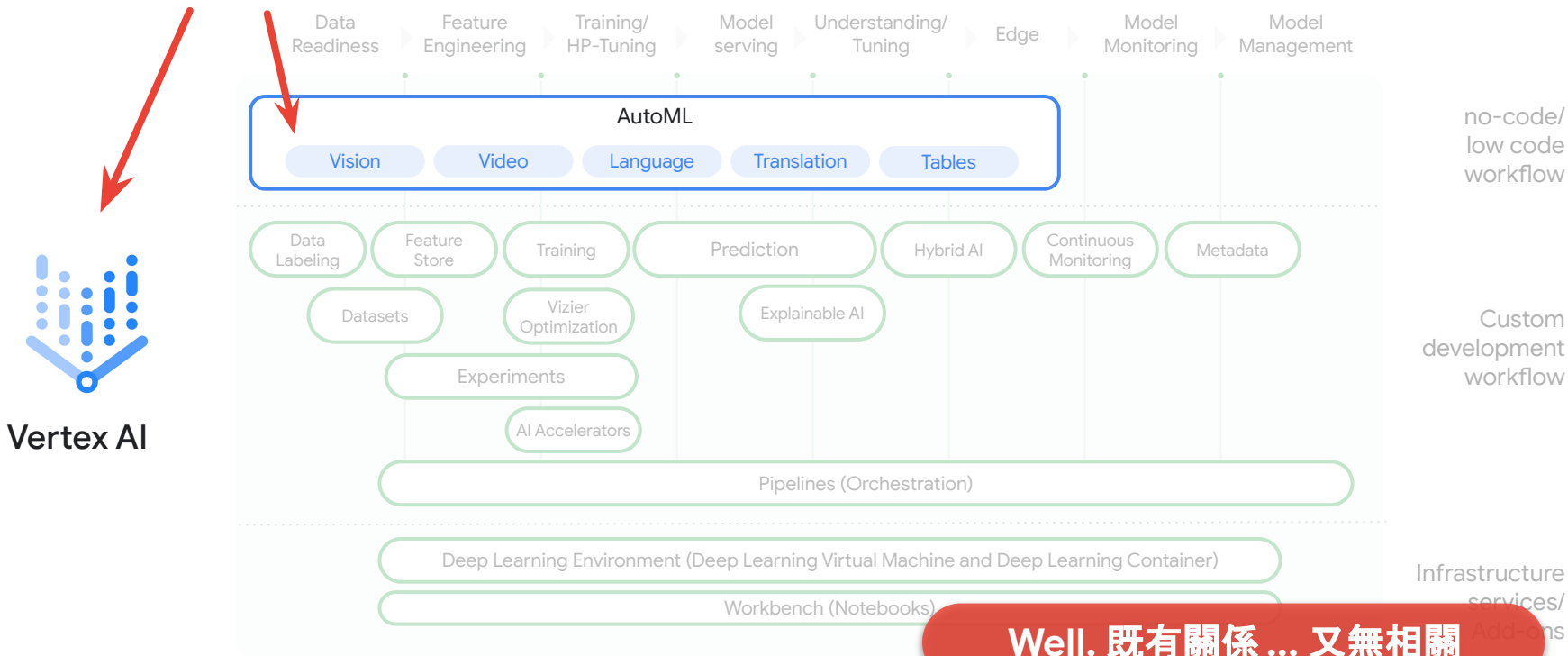


# Vertex AI Overview

欸... 那今天的主角「Vertex AI Vision」

和他們有關係嗎?

One comprehensive end-to-end platform for everything AI



Well, 既有關係 ... 又無相關

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`class='time talk-ended single-`  
`class='talk-name'>...`  
`class='description'>...`

# What is Vertex AI Vision

Introduce from Google Cloud Next '22

突然就 public preview 了!!



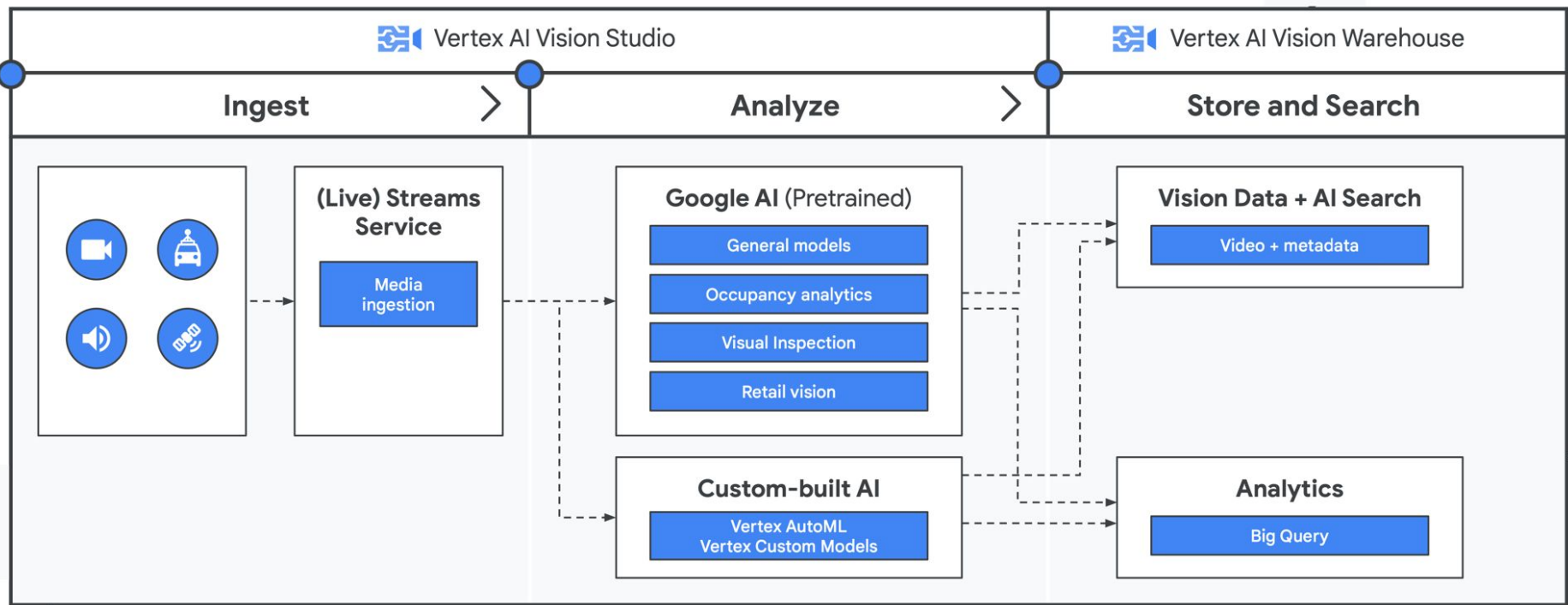
```
class= devsite-book-nav-toggle  
-haspopup='menu' hidden='' fixed='' aria-label='Hide  
navigation' data-title='Hide side navigation'  
-expanded='true'><span class='material-icons  
</span></button>
```

“ 保有 Vertex AI 的精神，提供「end-to-end 的解決方案」，將既有的 Video Intelligence API 再進化並整合 AutoML Video，為影像、直播打造一個開發應用服務的平台 ”

– 昨晚趕工的講者



# 先 High-Level 認識這個服務



# Vertex AI Vision Studio

The screenshot displays the Vertex AI Vision Studio interface. At the top, there is a navigation bar with the Google Cloud logo, the current project name 'Vision-AI-Platform-Sandbox', a search bar, and user profile information. Below the navigation bar, the main interface is divided into three sections:

- Left Panel (Navigation):** Contains a sidebar with categories: Overview, Application development (with sub-items: Studio, Applications, Streams, Warehouses), and Other products (with sub-items: ML APIs, Vertex AI training, Visual Inspection AI).
- Middle Panel (Connectors and Models):** Displays a list of available components for the application:
  - Connectors:** Streams (Stream video from multiple sources), Vision AI Warehouse (Assets stored on Google Cloud), and BigQuery (Store structured insights data).
  - Pre-trained models:** Person/vehicle detector (Draw boxes around people and cars), Person blur (Anonymize human figures), and General object detector (Draw boxes around known objects).
  - Specialized models:** Occupancy analytics (Advanced person/vehicle counting).
  - Custom models:** Import from Vertex AI (Import or create a new model).
- Right Panel (Canvas):** Shows a large empty workspace for building the application. A tip is displayed: "To build your application, select connectors/processors on the left". Below the tip is a diagram illustrating the workflow: a box representing a connector is connected to a box representing a processor, with a hand icon pointing to the processor box. The tip text reads: "Tip: Start by adding Video streams. Then, add a processor as an output."

# Vertex AI Vision Warehouse

Google Cloud Platform

Vertex AI Vision

Smart city warehouse

VIEW DETAILS

Home

Studio

Applications

Streams

Models

Warehouses

**Filters**

Specify how you want to refine your search results. [Learn more](#)

**Stream name**

Search stream name

**Date range**

Today

**Time of day**

Afternoon (11 AM - 5 PM)

**Vehicle count**

5 - 10

+ ADD RANGE (OR)

**People count**

Min - Max

+ ADD RANGE (OR)

**Search criteria**

+ ADD CRITERIA (AND)

SEARCH CLEAR ALL

**Time for assets to live is 14 days. After 14 days, the assets will be deleted from the warehouse.** [EDIT](#)

camera-1-main-and-10th  
Dec 14, 2022, 4:31:36 PM - 4:39:11 PM

camera-5-oak-and-10th  
Dec 14, 2022, 4:22:58 PM - 4:28:22 PM

camera-3-pine-and-10th  
Dec 14, 2022, 4:21:10 PM - 4:24:58 PM

camera-4-pine-and-7th  
Dec 14, 2022, 4:08:58 PM - 4:14:14 PM

camera-2-main-and-8th  
Dec 14, 2022, 4:04:36 PM - 4:08:55 PM

camera-1-main-and-10th  
Dec 14, 2022, 4:00:21 PM - 4:05:44 PM

# BigQuery for analysis

The screenshot displays the BigQuery web interface. On the left is a navigation sidebar with categories: Analysis (SQL workspace, Data transfers, Scheduled queries, Data QnA, Analytics Hub), Migration (SQL translation), Administration (Capacity management, BI Engine), and Release Notes. The main area is titled 'smartertown' and contains a SQL query editor with a 'RUN' button. A status message at the top right indicates 'This script will process 17 MB when run.' Below the editor, the 'Query results' section is active, showing a table with 11 columns and 8 rows. The columns include 'currentTime', 'diffPosLine...', 'diffNegLine...', and several 'diffPosLine...' and 'diffNegLine...' columns. The table data shows various time stamps and numerical differences. At the bottom, there are options for 'PERSONAL HISTORY', 'PROJECT HISTORY', and a 'REFRESH' button.

```
1 DECLARE BinSize INT64;
2 SET BinSize = 60; /* Aggregated time binning size */
3
4 WITH finalTable AS
5 (WITH derivedTable AS
6 (WITH baseTable AS
7 (SELECT
8   outputs.ingestion_time AS ingestion_time,
9   outputs.annotation.currentTime AS currentTime,
10  JSON_QUERY_ARRAY(outputs.annotation.stats["crossingLineCounts"]) AS crossingLineCounts
11 FROM
12  `smartertown_test.smartertown_table` AS outputs)
13 SELECT
14  baseTable.currentTime AS currentTime,
15  baseTable.ingestion_time AS ingestion_time,
```

Row	currentTime	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...
1	2022-08-12 22:15:01.669888 U...	null	null	null	null	null	null	null	null	null	null
2	2022-08-12 22:15:30.069819 U...	0	2	0	0	4	1	0	0		
3	2022-08-12 22:16:30.069815 U...	1	2	2	1	2	1	0	0		
4	2022-08-12 22:17:30.069841 U...	1	0	1	0	2	1	0	0		
5	2022-08-15 16:19:28.720403 U...	-2	-4	-3	-1	-8	-3	0	0		
6	2022-08-15 16:19:30.320325 U...	0	0	0	0	0	0	0	0		
7	2022-08-15 16:20:30.320280 U...	0	2	2	1	3	0	0	0		
8	2022-08-15 16:21:30.320326 U...	0	1	0	1	4	1	0	0		

Results per page: 50 | 1 - 50 of 179 | < < > >

PERSONAL HISTORY PROJECT HISTORY REFRESH

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2022

```
" class='time talk-ended single-  
' class='talk-name'>...</td>  
' class='description'>...</td>
```

# How it works



# All You Need is 3 Steps: 1. 介接資料源

## 1. Ingest real-time data

Vertex AI Vision's architecture allows you to quickly and conveniently stream real-time video ingestion infrastructure in a public Cloud.

# Ingest videos

建立 Streams Connector。

The screenshot displays the Google Cloud console interface for a project named "my-cloud-project". The main application is "Smart city traffic analysis", which is currently in the "DEPLOY" state. The "Streams" connector is selected, showing it has 600 sources. The left sidebar lists various connectors and models, including Vision Warehouse, BigQuery, and several pre-trained models like Person/vehicle detector, Person blur, Object detector, and PPE detector. The right panel shows the "Streams" configuration area, which is currently empty, indicating "No streams" are added. A message prompts the user to add streams to set up streaming video. Below this, there is a "+ ADD STREAMS" button. The "Output" section is also empty, with a "+ ADD OUTPUT" button.

Google Cloud my-cloud-project Search Products, resources, docs (/)

Smart city traffic analysis DEPLOY DEACTIVATE VIEW DETAILS Streams

Connectors

- Streams Stream video from multiple sources
- Vision Warehouse Assets stored on Google Cloud
- BigQuery Store structured data insights

Pre-trained models

- Person/vehicle detector Draw boxes around people and cars
- Person blur Anonymize human figures
- Object detector Draw boxes around known objects
- PPE detector Check for protective equipment

Specialized models

- Occupancy analytics Advanced people/vehicle counting

Vertex AI models

- Import from Vertex AI

Streams 600 sources

No streams

To set up streaming video, you'll need to add your registered streams to this application

+ ADD STREAMS

Output

+ ADD OUTPUT

# Ingest videos

The screenshot shows the Google Cloud AI Platform interface for a project named 'Smart city traffic analysis'. The left sidebar contains various connectors and models, with 'Streams' highlighted. The main content area displays a 'Streams' card with '600 sources' and a 'No streams' message. The message states: 'To set up streaming video, you'll need to add your registered streams to this application'. A blue button labeled '+ ADD STREAMS' is prominently displayed with a hand cursor pointing to it. A green callout bubble at the bottom of the image contains the text '選擇 Streams 影像來源' (Select Streams video source).

Google Cloud my-cloud-project Search Products, resources, docs (/)

Smart city traffic analysis DEPLOY DEACTIVATE VIEW DETAILS Streams Sources

**Streams**  
600 sources

**No streams**  
To set up streaming video, you'll need to add your registered streams to this application

**+ ADD STREAMS**

**+ ADD OUTPUT**

選擇 Streams 影像來源

# Ingest videos

可進行多選，讓每個進來的影像  
通過一樣的框架

**Add streams**

You can only add streams to your application if they are located in this Google Cloud project, and they share the same region as your application (us-central1).

Select from existing streams  
 Register new streams

**Select from existing streams**

[REFRESH](#)

Filter

<input checked="" type="checkbox"/>	Name	Status	Region
<input checked="" type="checkbox"/>	camera-1-main-and-10th	Active	us-central1
<input checked="" type="checkbox"/>	camera-2-main-and-8th	Active	us-central1
<input checked="" type="checkbox"/>	camera-3-pine-and-10th	Active	us-central1
<input checked="" type="checkbox"/>	camera-4-pine-and-7th	Active	us-central1
<input checked="" type="checkbox"/>	camera-5-oak-and-10th	Active	us-central1
<input checked="" type="checkbox"/>	camera-6-arbor-and-9th	Active	us-central1
<input checked="" type="checkbox"/>	camera-7-grove-and-11th	Active	us-central1

1-7 of 600 < >

**ADD STREAMS** CANCEL

# Ingest videos

After you have created a stream you can begin to ingest data using that stream.

Some limitations and considerations apply to ingested video:

影像可以是 Local Video, 或是透過 Real Time Streaming Protocol (RTSP) 提供。

- The input video source must have the following specifications:
  - [H.264 encoding](#)
  - < 1080p resolution
  - ~25 FPS
- **If the video doesn't meet these specifications Vertex AI Vision may not process the input well.**
- **Audio is dropped during ingestion.**
- If the stream is part of an app connected to a warehouse, video parameters (such as FPS or resolution) must be the same for the whole stream ; variations in RTSP video data parameters or local video data parameters are not supported.
- Due to model startup latency, ingested videos may have the first few seconds of content missing. This amount of time can reach up to fifteen seconds.

# All You Need is 3 Steps: 2. 利用模組編排影像分析與處理的方式

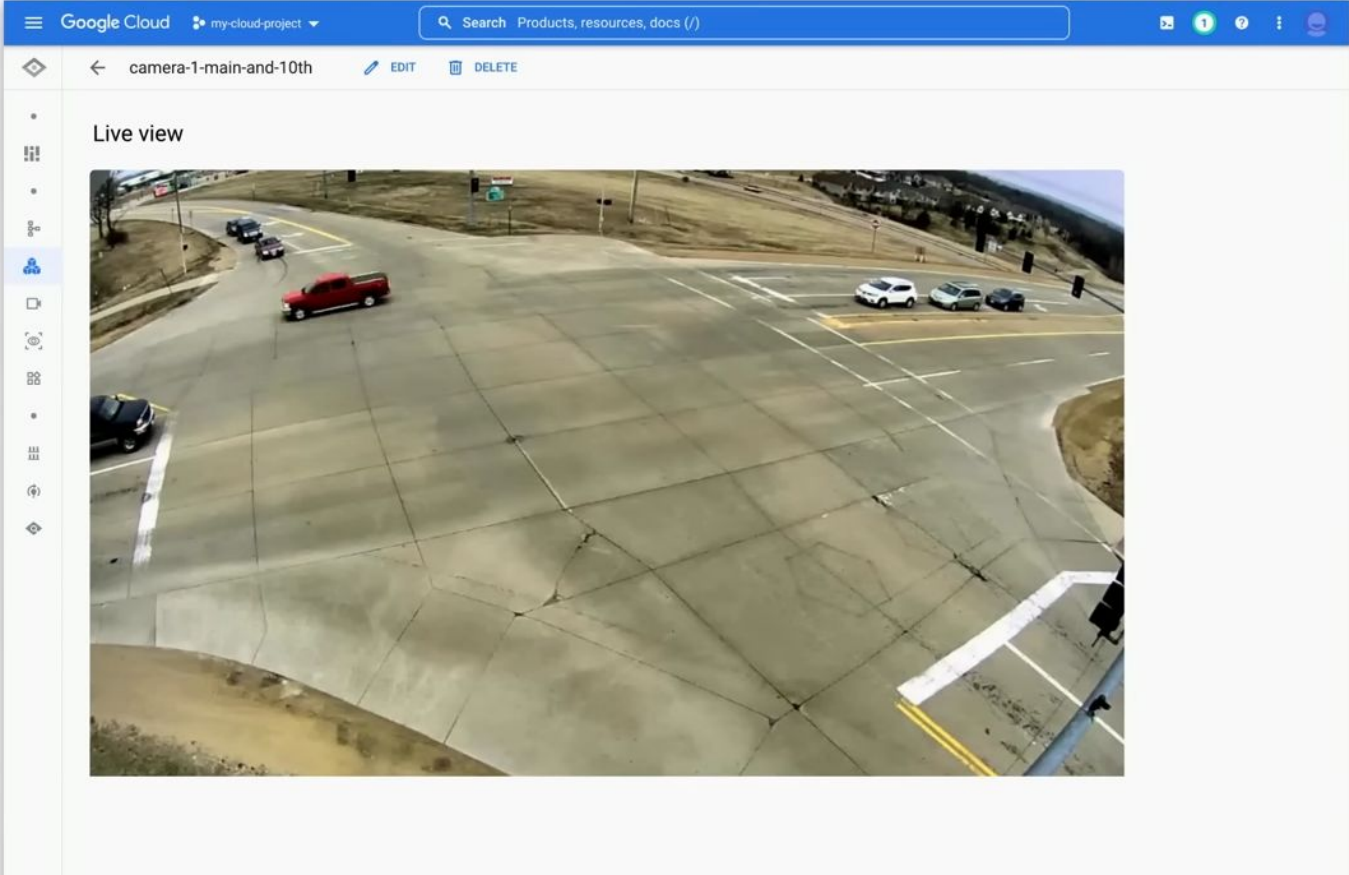
## 1. Ingest real-time data

Vertex AI Vision's architecture allows you to quickly and conveniently stream real-time video ingestion infrastructure in a public Cloud.

## 2. Analyze data

After data is ingested, Vertex AI Vision's framework provides you with easy access and orchestration of a large and growing portfolio of general, custom, & specialized analysis models.

# Analyze data



# Analyze data

Occupancy Analytics 可以去偵測影像中出現的人、車，並加上區域或是輔助線作數量的計算。

The screenshot displays the Google Cloud AI Platform interface for a project named 'Smart city traffic analysis'. The main content area shows a 'Streams' section with a list of video sources. A modal window is open, highlighting the 'Occupancy analytics' model under the 'Specialized models' category. The modal includes an illustration of a yellow car and a person, and a description of the model's capabilities.

**Streams**

**Sources**

Source Name	Action
camera-1-main-and-10th	X
camera-2-main-and-8th	X
camera-2-pine-and-10th	X
line-and-7th	X
lak-and-10th	X
rbor-and-9th	X
rove-and-11th	X

**Specialized models**

- PPE detector**  
Check for protective equipment
- Occupancy analytics**  
Advanced people/vehicle counting

**Vertex AI models**

- Import from Vertex AI

**Occupancy analytics**

Detect people and vehicles within a video or image – plus zone detection, dwell time, and other advanced features.

# Analyze data

Google Cloud my-cloud-project Search Products, resources, docs (/)

Smart city traffic analysis DEPLOY DEACTIVATE VIEW DETAILS

**Connectors**

- Streams: Stream video from multiple sources
- Vision Warehouse: Assets stored on Google Cloud
- BigQuery: Store structured data insights

**Pre-trained models**

- Person/vehicle detector: Draw boxes around people and cars
- Person blur: Anonymize human figures
- Object detector: Draw boxes around known objects
- PPE detector: Check for protective equipment

**Specialized models**

- Occupancy analytics: Advanced people/vehicle counting

**Vertex AI models**

- Import from Vertex AI

**Streams**  
600 sources

**Occupancy analytics**  
People, cars

**Occupancy analytics**

**Object types**

- Vehicles
- People

**Active zones and lines**

No active zones or lines set up

Draw polygons to specify where in your video streams you want to count vehicles and people. Or, draw lines to count line-crossing events.

[CREATE ACTIVE ZONES / LINES](#)

**Dwell time**

Enable dwell time monitoring

Identify vehicles or people that have stayed within the frame (or active zone) for long periods of time. This can help with analyzing wait times, congestion, etc. [Set up event notifications](#)

Dwell time 是指物件必須在畫面停留一段時間，才做計數的計算。可用於停等時間，或是評估壅塞程度

# All You Need is 3 Steps: 3. 依後續使用情境, 儲存結果

## 1. Ingest real-time data

Vertex AI Vision's architecture allows you to quickly and conveniently stream real-time video ingestion infrastructure in a public Cloud.

## 2. Analyze data

After data is ingested, Vertex AI Vision's framework provides you with easy access and orchestration of a large and growing portfolio of general, custom, & specialized analysis models.

## 3. Store and query output

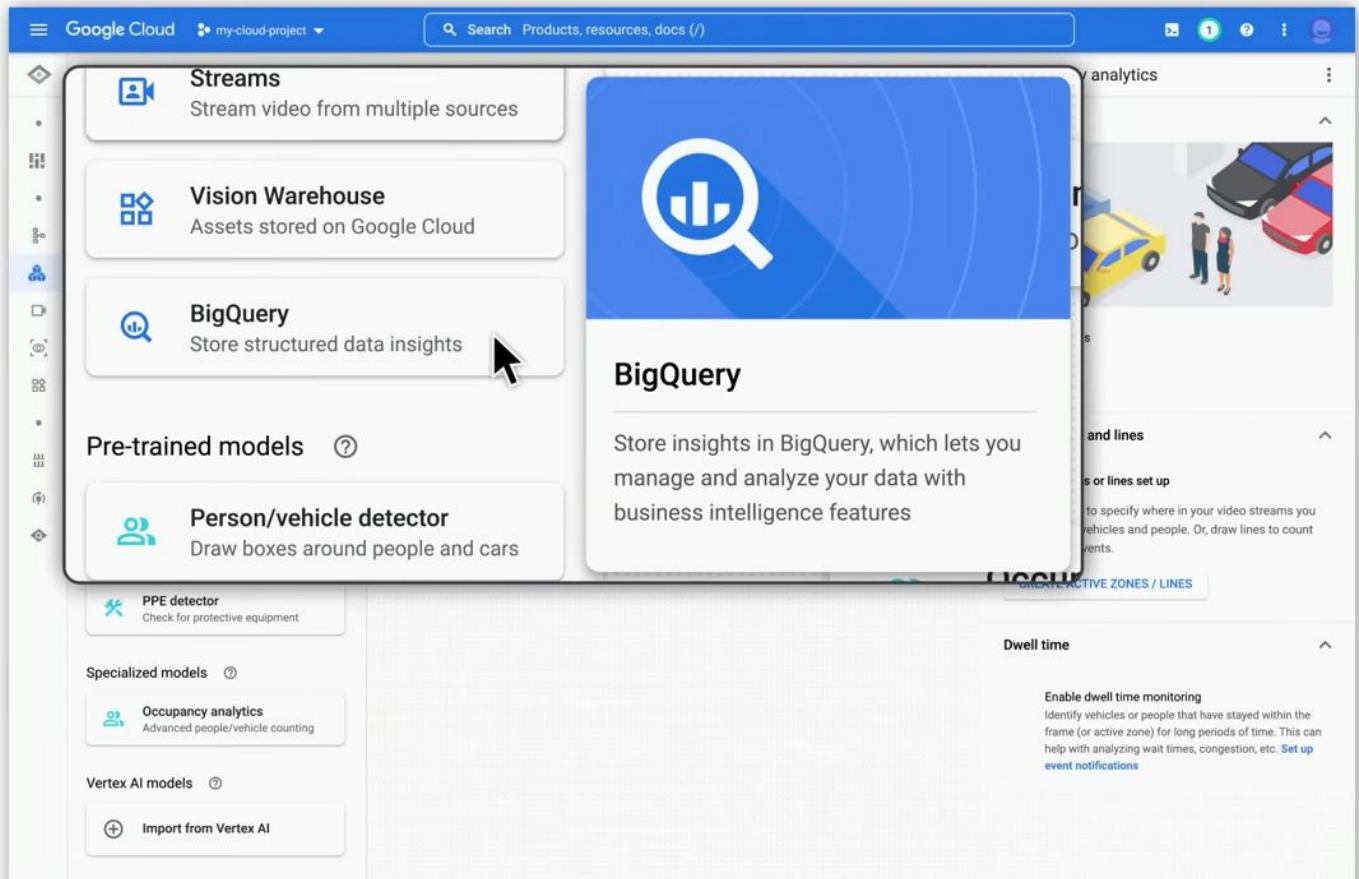
**After your app analyzes your data you can send this information to a storage destination (Vision Warehouse or BigQuery), or receive the data live(use API).** With Vision Warehouse you can send your app output to a warehouse that generalizes your search work and serves multiple data types and use cases.

Vision Warehouse

BigQuery

output streaming (API)

# Store and query output



The screenshot displays the Google Cloud console interface. On the left, a sidebar lists various services: Streams, Vision Warehouse, BigQuery, Pre-trained models, and Person/vehicle detector. The main content area shows a list of pre-trained models under the 'Person/vehicle detector' category, including 'PPE detector' and 'Occupancy analytics'. A tooltip for 'BigQuery' is overlaid on the screen, providing details about storing insights and analyzing data with business intelligence features. The background shows a video analytics dashboard with a 3D car model and a person.

**Streams**  
Stream video from multiple sources

**Vision Warehouse**  
Assets stored on Google Cloud

**BigQuery**  
Store structured data insights

**Pre-trained models**

- Person/vehicle detector**  
Draw boxes around people and cars

**PPE detector**  
Check for protective equipment

**Specialized models**

- Occupancy analytics**  
Advanced people/vehicle counting

**Vertex AI models**

- Import from Vertex AI

**BigQuery**  
Store insights in BigQuery, which lets you manage and analyze your data with business intelligence features

**analytics**

**and lines**

**s or lines set up**

to specify where in your video streams you vehicles and people. Or, draw lines to count vents.

**Dwell time**

**Enable dwell time monitoring**  
Identify vehicles or people that have stayed within the frame (or active zone) for long periods of time. This can help with analyzing wait times, congestion, etc. [Set up event notifications](#)

# Store and query output

The screenshot displays the Google Cloud AI Platform interface for a project named "Smart city traffic analysis". The main workspace shows a workflow diagram with three nodes connected vertically:

- Streams**: 600 sources
- Occupancy analytics**: People, cars
- BigQuery**: Store structured data insights

The left sidebar contains a "Connectors" section with the following options:

- Streams**: Stream video from multiple sources
- Vision Warehouse**: Assets stored on Google Cloud
- BigQuery**: Store structured data insights (highlighted by a mouse cursor)

Below the connectors are sections for "Pre-trained models" (Person/vehicle detector, Person blur, Object detector, PPE detector) and "Specialized models" (Occupancy analytics). The "Vertex AI models" section includes an "Import from Vertex AI" option.

On the right, the "BigQuery" settings panel is visible, showing the "Settings" section with the following configuration:

- Save metadata to a single table**: Insights from all the selected nodes will be stored as timestamped rows. [See example](#)
- Store metadata from:**
  - All processors and connectors
  - Occupancy analytics
  - Bicycle detector

A "BROWSE" button is located below the settings.

# Store and query output

結果放入 BigQuery 就可以做有很多分析的操作。  
甚至結合BQML, 進行數量的預測, 再整合 Lookr  
Studio(Data Studio) 做報表呈現

The screenshot displays the BigQuery console interface. On the left is a navigation sidebar with categories like Analysis, Migration, and Administration. The main area shows a SQL editor with a query that declares a variable, sets a bin size, and performs a complex selection from a table. Below the editor, the 'Query results' section is active, showing a table with 11 columns and 8 rows of data. The table includes columns for 'currentTime' and various 'diff' metrics. At the bottom, there are controls for 'PERSONAL HISTORY', 'PROJECT HISTORY', and a 'REFRESH' button.

```
1 DECLARE BinSize INT64;
2 SET BinSize = 60; /* Aggregated time binning size */
3
4 WITH finalTable AS
5 (WITH derivedTable AS
6 (WITH baseTable AS
7 (SELECT
8   outputs.ingestion_time AS ingestion_time,
9   outputs.annotation.currentTime AS currentTime,
10  JSON_QUERY_ARRAY(outputs.annotation.stats["crossingLineCounts"]) AS crossingLineCounts
11 FROM
12  `smartertown_test.smartertown_table` AS outputs)
13 SELECT
14  baseTable.currentTime AS currentTime,
15  baseTable.ingestion_time AS ingestion_time,
```

Row	currentTime	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...	diffPosLine...	diffNegLine...
1	2022-08-12 22:15:01.669888 U...	null	null	null	null	null	null	null	null
2	2022-08-12 22:15:30.069819 U...	0	2	0	0	4	1	0	0
3	2022-08-12 22:16:30.069815 U...	1	2	2	1	2	1	0	0
4	2022-08-12 22:17:30.069841 U...	1	0	1	0	2	1	0	0
5	2022-08-15 16:19:28.720403 U...	-2	-4	-3	-1	-8	-3	0	0
6	2022-08-15 16:19:30.320325 U...	0	0	0	0	0	0	0	0
7	2022-08-15 16:20:30.320280 U...	0	2	2	1	3	0	0	0
8	2022-08-15 16:21:30.320326 U...	0	1	0	1	4	1	0	0

# Store and query output

The screenshot displays the BigQuery interface. On the left is a navigation sidebar with categories like Analysis, Migration, and Administration. The main area shows a SQL query editor with a query that declares a bin size and selects data from a table. Below the editor is a 'Query results' section with a table of data. A modal overlay is positioned over the results table, offering two options: 'Explore with Sheets' and 'Explore with Data Studio'. The 'Explore with Data Studio' option is highlighted with a mouse cursor.

```
1 DECLARE BinSize INT64;
2 SET BinSize = 60; /* Aggregated time binning size */
3
4 WITH finalTable AS
5 (WITH derivedTable AS
6 (WITH baseTable AS
7 (SELECT
8   outputs.ingestion_time AS ingestion_time,
9   outputs.annotation.current_time AS current_time,
10  JSON_QUERY_ARRAY(outputs.annotation) AS annotations
11 FROM
12   `smartertown_test.smartertown_test.outputs` AS outputs)
13 SELECT
14   baseTable.current_time AS current_time,
15   baseTable.ingestion_time AS ingestion_time,
```

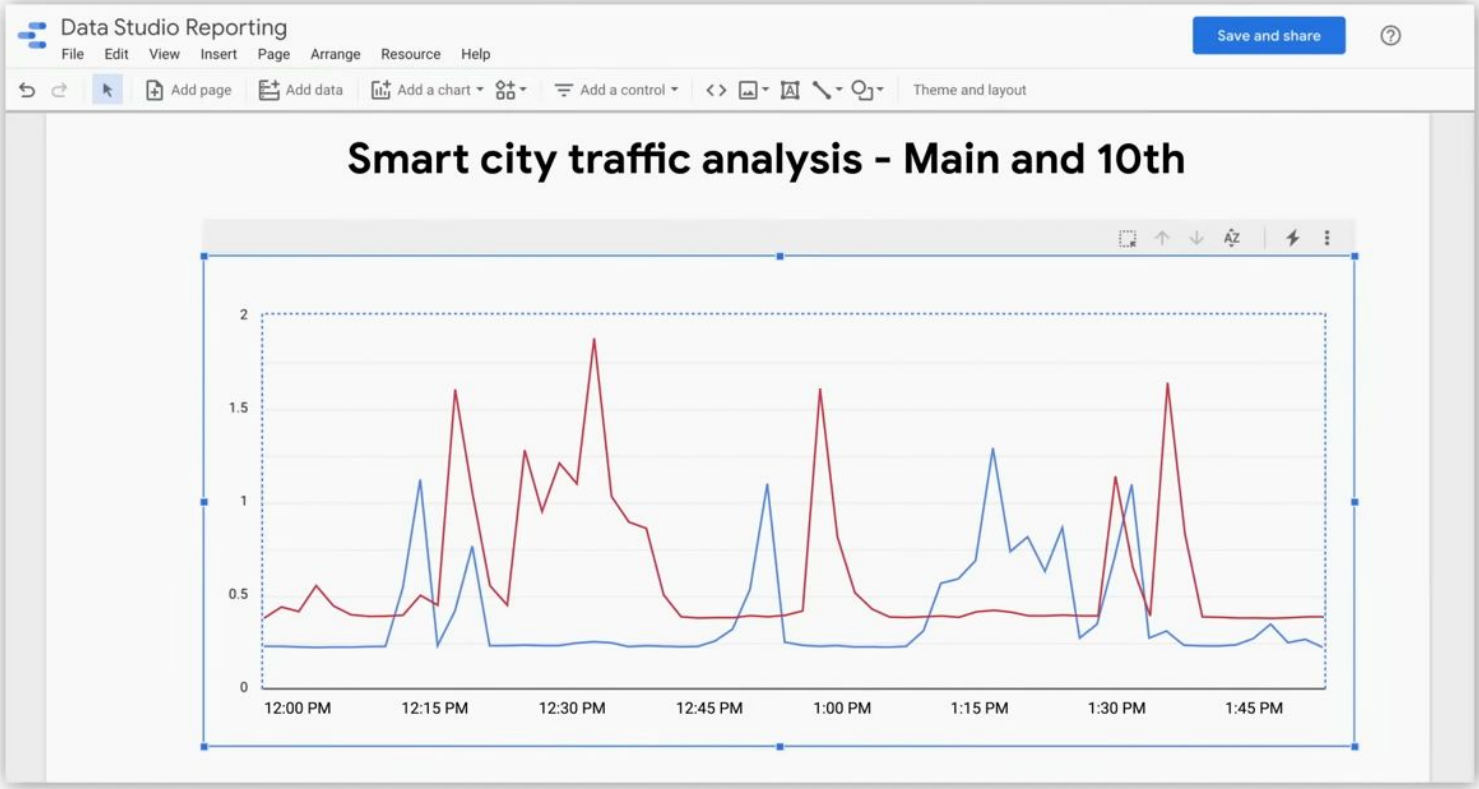
Row	currentTime
1	2022-08-12 22:15:01.669888 U...
2	2022-08-12 22:15:30.069819 U...
3	2022-08-12 22:16:30.069815 U...
4	2022-08-12 22:17:30.069841 U...
5	2022-08-15 16:19:28.720403 U...
6	2022-08-15 16:19:30.320325 U...
7	2022-08-15 16:20:30.320280 U...
8	2022-08-15 16:21:30.320326 U...

Explore with Sheets  
Analyze big data with a live connection in a familiar spreadsheet tool.

Explore with Data Studio [↗](#)  
Visualize results and create live dashboards from your data.

Results per page: 50 | 1 - 50 of 179 | < > >>

# Store and query output





**Vertex AI Vision**

**Reduce time to build  
and deploy from  
weeks to hours**

**Run Applications at a  
fraction of the cost**

devfest  
2022

" class="time talk-ended single-  
" class="talk-name">...  
" class="description">...

# Product features



# Model 類型

謎：

官方文件和 Console 上面的模型蠻多的，可不可以講一下阿？

- person blur
- person / vehicle detector
- occupancy analytics
- object detector
- motion filtering
- PPE detector

The screenshot shows the Google Cloud Vertex AI Vision console navigation menu. At the top, it says "Google Cloud" with "Overview" and "Solut" (part of Solutions) to the right. Below that, "Vertex AI Vision" is highlighted, with "Overview" and "Guides" to its right. A search bar with a filter icon and the word "Filter" is present. The menu is organized into sections: "Vertex AI Vision" (with a triangle icon) containing "Overview"; "Learn about models" (with a triangle icon) containing "Occupancy analytics guide", "Person blur guide", "Person / vehicle detector guide", "Motion filtering guide", "Object detector guide", and "PPE detector guide"; "Quickstarts" (with a triangle icon) containing "Build an app in the console"; and "Get started" (with a triangle icon) containing "Set up a project and a development environment". A back arrow is visible at the bottom right of the menu.

The screenshot shows the Google Cloud Vertex AI Vision console displaying a list of models. It is divided into three sections: "Pre-trained models" (with a help icon), "Specialized models" (with a help icon), and "Custom models" (with a help icon). Under "Pre-trained models", there are four items: "Person/vehicle detector" (Draw boxes around people and cars), "Person blur" (Anonymize human figures), "Object detector" (Draw boxes around known objects), and "PPE detector" (Detect PPE equipment). Below this is a "SHOW LESS" link. Under "Specialized models", there is one item: "Occupancy analytics" (Advanced person/vehicle counting). Under "Custom models", there is one item: "Import from Vertex AI" (Import or create a new model).

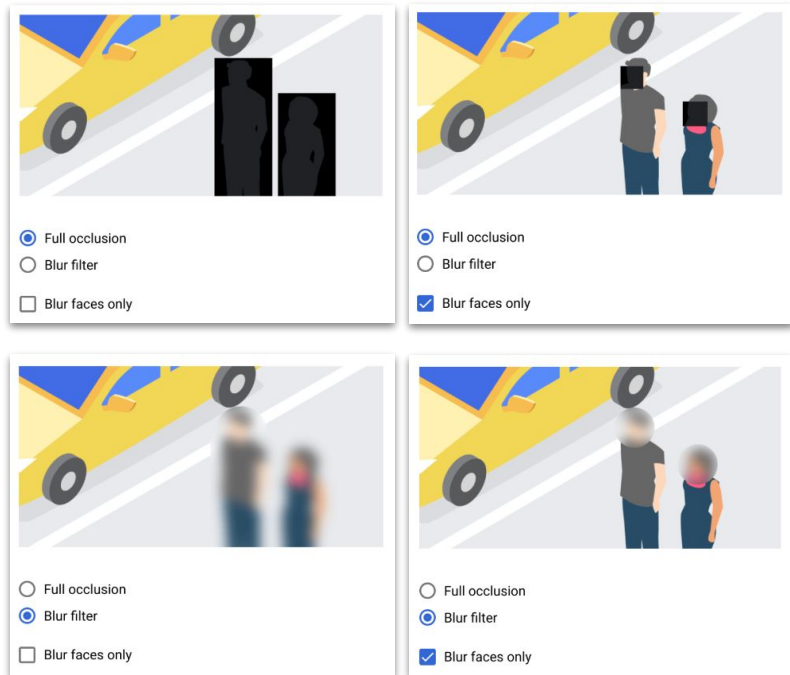
# person blur

偵測影像中的人或是臉部，利用馬賽克或是黑色區塊進行遮蓋。  
加強個人隱私權，使影像資料可以被放心的利用。

===> 可以將加工後的影像或是圖像輸出。

使用上要注意的地方

- 光線不好的地方，會影響偵測與模糊的品質。
- person blur 模型當前的輸出幀率是固定的每秒5幀，與輸入視頻幀率無關。
- 輸入視頻分辨率沒有限制。但是，使用 person blur 模型時，影像會縮小到 1280x720 像素。因此遠離相機的較小面孔不會模糊(相機視圖尺寸的 2%)。
- **避免擁擠的場景**，盡可能使用在人位於場景中心且人臉足夠大時，該模型運行最佳。
- **人物模糊模型針對保護用戶隱私進行了優化。因此，該模型可能會為影像提供過大(較為保守)的模糊區域。**為避免過多的黑色區域，可以選擇將模糊方法從完全遮擋切換為模糊濾鏡。

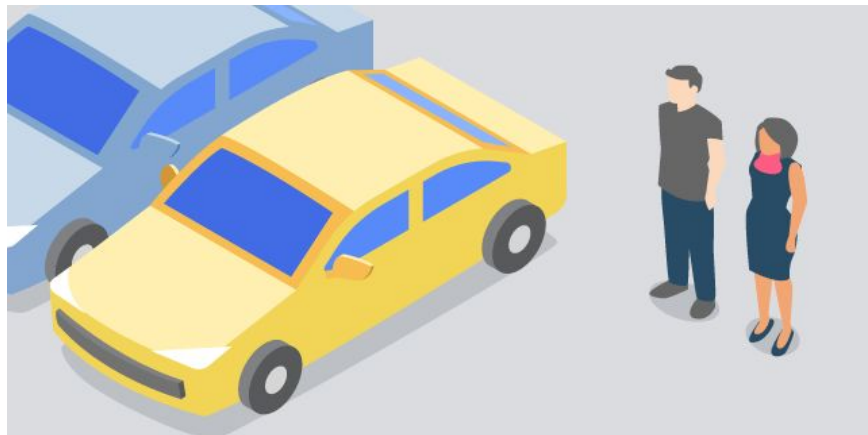


(輸出幀率是固定的每秒5幀)

# person / vehicle detector

顯示當前處理幀中檢測到的人和車的數量。

Output stream 的輸出幀率是恆定為每秒一幀。



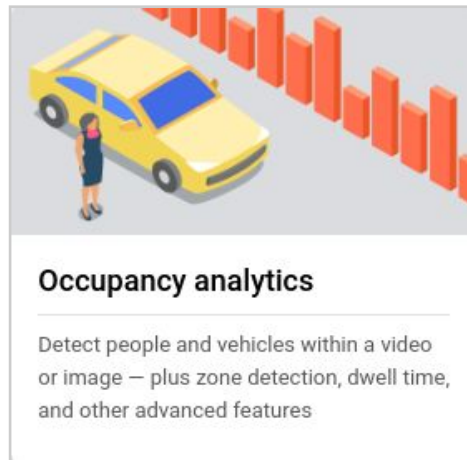
Car:2, people:2

# occupancy analytics

是 person / vehicle detector 的進階版。

Occupancy Analytics 模型提供了進階功能, 包含「Active zones、Line crossing、Dwell time detection」。

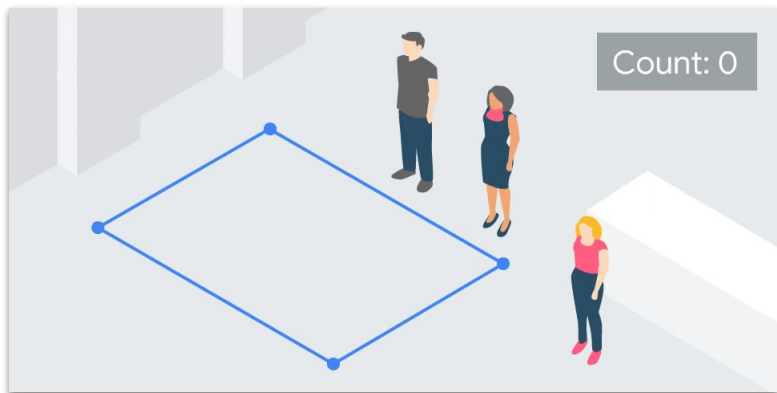
- Active zones let users count people or vehicles in specific user-defined zones.
- Line crossing provides the ability to count the direction in which an object crosses a particular line.
- Dwell time detection builds on active zones and provides the ability to detect whether or not objects have remained in a zone for a minimal amount of time.



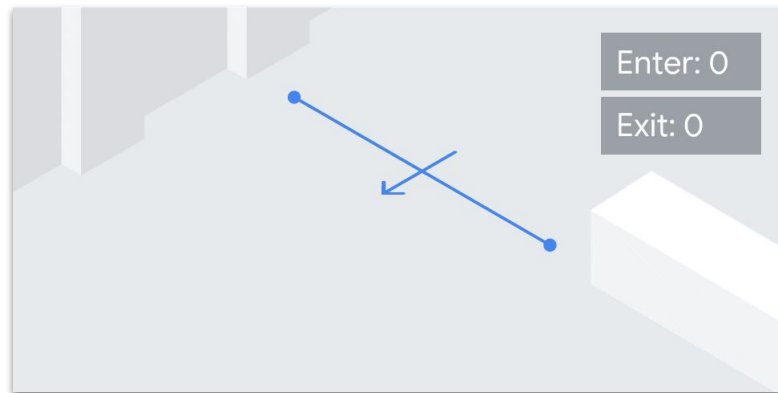
(輸出幀率是固定的每秒3幀)

# occupancy analytics (cont.)

Active zones



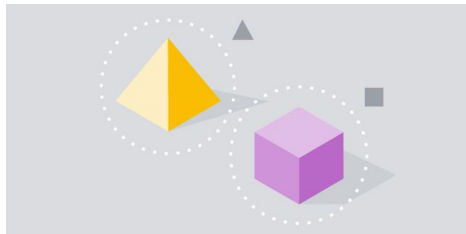
Line crossing



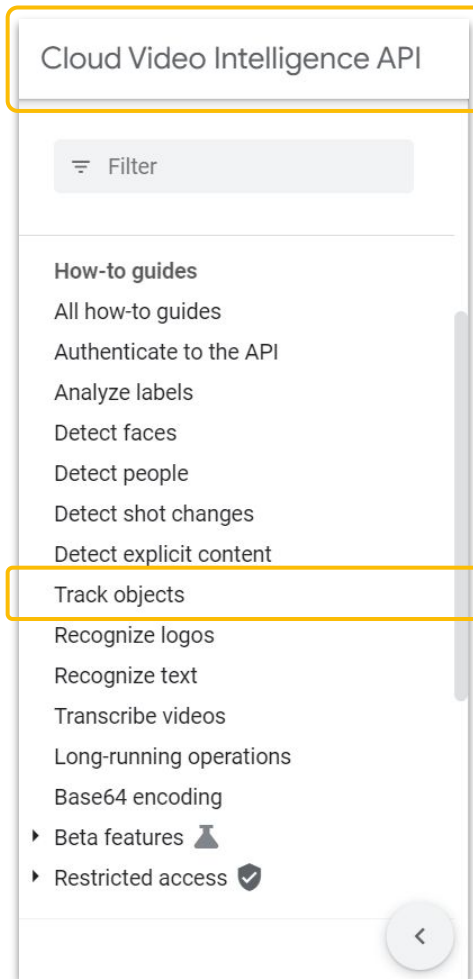
而 dwell time detection 會基於 active zone 再做停等時間的條件計算。

# object detector

檢測和分類多個物件，回傳包括每個物件的位置。



其實這就是利用 video intelligence API 實現的功能。



# motion filtering

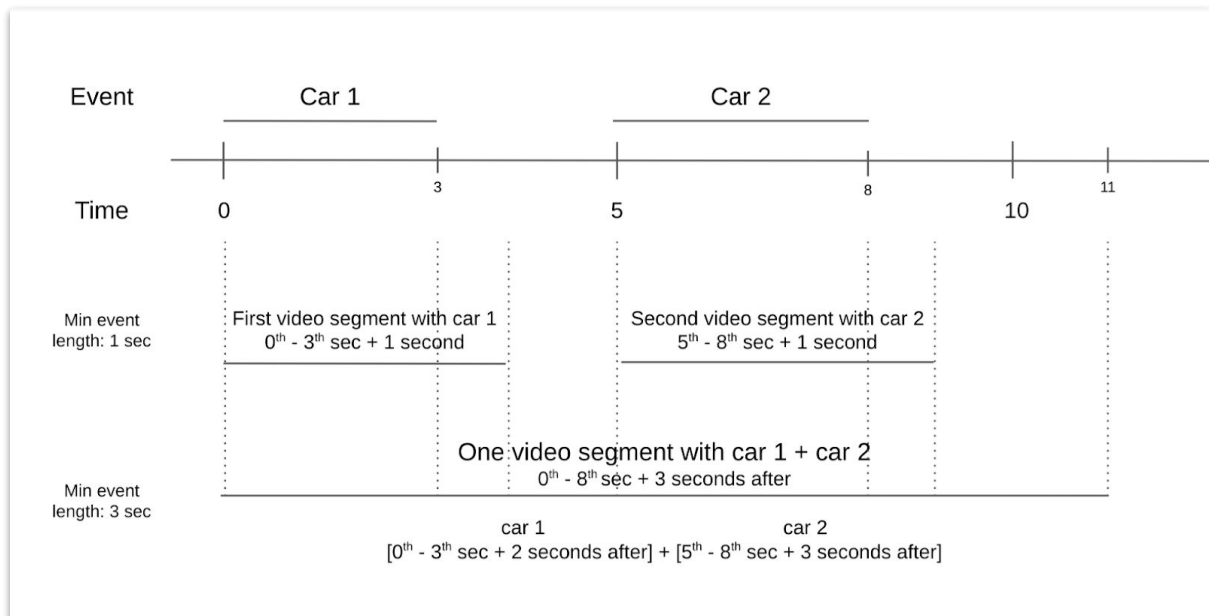
motion filtering 模型可以將長影像修剪成包含運動事件的小片段，以此減少後續資料處理的時間。

此模型允許設置 Motion sensitivity、Minimum event length、Lookback window 和 Cooldown period，以根據您的用例調整運動事件的輸出。

==> 類似擷取精彩鏡頭的精華、回顧。

## 使用建議

- 將相機直接面對在感興趣的物件上。避免在畫面背景中包括不重要的移動物體。(如移動的樹木、持續的車流或移動物件的陰影)
- 不會檢測到太小的動作。
- 確保目標物件足夠大。



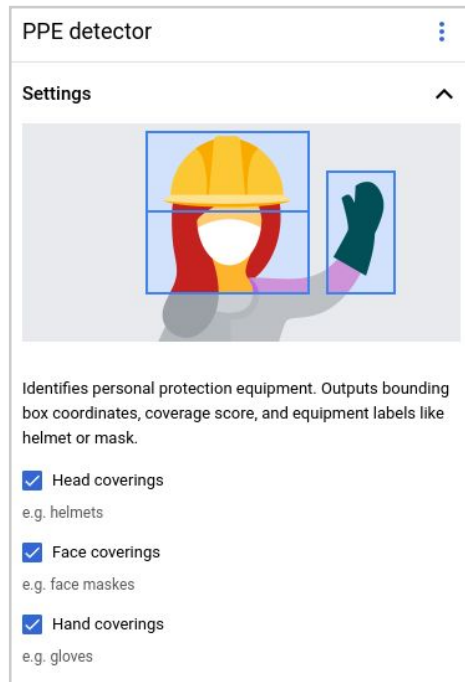
# PPE detector

Personal Protective Equipment (PPE, 個人防護裝備) 模型可幫助驗證在工作場所或社區環境中, 應該配戴以防止危險的設備是否存在。

該模型會檢測人身上的 PPE 物件。目前可以檢測的設備類型包含「手套、口罩和頭盔」。

該模型檢測 PPE 物品, 以及這些物品是否覆蓋了相應的人體部位, 回傳 [0, 1] 的覆蓋率分數。

- 解析度: 建議的最大為 1920 x 1080, 建議的最小為 160 x 120。
- 最小可檢測物體尺寸: 模型會忽略場景中任何占圖像尺寸 5% 以下的物體。
- 照明: 影像照明應正常。極端亮度或黑暗會導致檢測器性能下降。
- PPE 物品放置: **PPE 模型側重於分析人們是否正確使用 PPE 物品。** 因此, 如果有人沒有穿戴 PPE 物品, 模型會忽略該物品。
- PPE 項目類型: **該模型側重於建築防護設備, 而不是醫療 PPE 項目。** 因此, 檢測器在醫療中心或醫院中可能無法正常工作。
- 自定義 PPE 類型: **PPE 模型目前不支持客戶定義的 PPE 項目。** 該模型目前僅支持檢測頭盔、口罩和手套。



(輸出幀率是固定的每秒1幀)

# PPE detector (cont.)

👍: 在可能的情況下，讓檢測對象靜止不動並面對相機。



Image source: [Ani Kolleshi](#) on [Unsplash](#)



Image source: [Ahsanization](#) on [Unsplash](#)



Image source: [Anastasiia Chepinska](#) on [Unsplash](#)

👎: 避免關鍵 PPE 項目在圖像中太小。

👎: 避免使用從不常見的視角或不規則角度顯示 PPE 物品。



Image source: [Josue Isai Ramos Figueroa](#) on [Unsplash](#)



Image source: [Niclas Moser](#) on [Unsplash](#)



# Demo Time



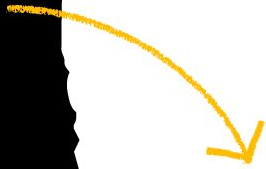


# Take a Break & Ready to Hands-on

 Google Developer Groups



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```
" class='time talk-ended single-  
' class='talk-name'>...  
class='description'>...
```



# Use Cases



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`class='time talk-ended single-`  
`class='talk-name'>...</code>  
class='description'>...</code>`

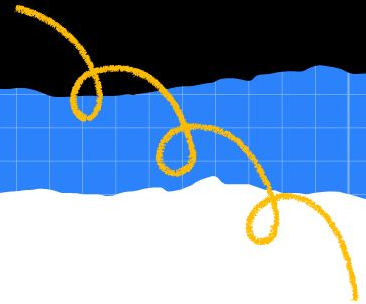


# Limitation

沒這麼厲害，不做期待沒有傷害XD



```
on class= devsite-book-nav-toggle
-haspopup='menu' hidden='' fixed='' aria-label='Hide
navigation' data-title='Hide side navigation'
-expanded='true'><span class='material-icons
' /></span></button>
```



**Thank You**

