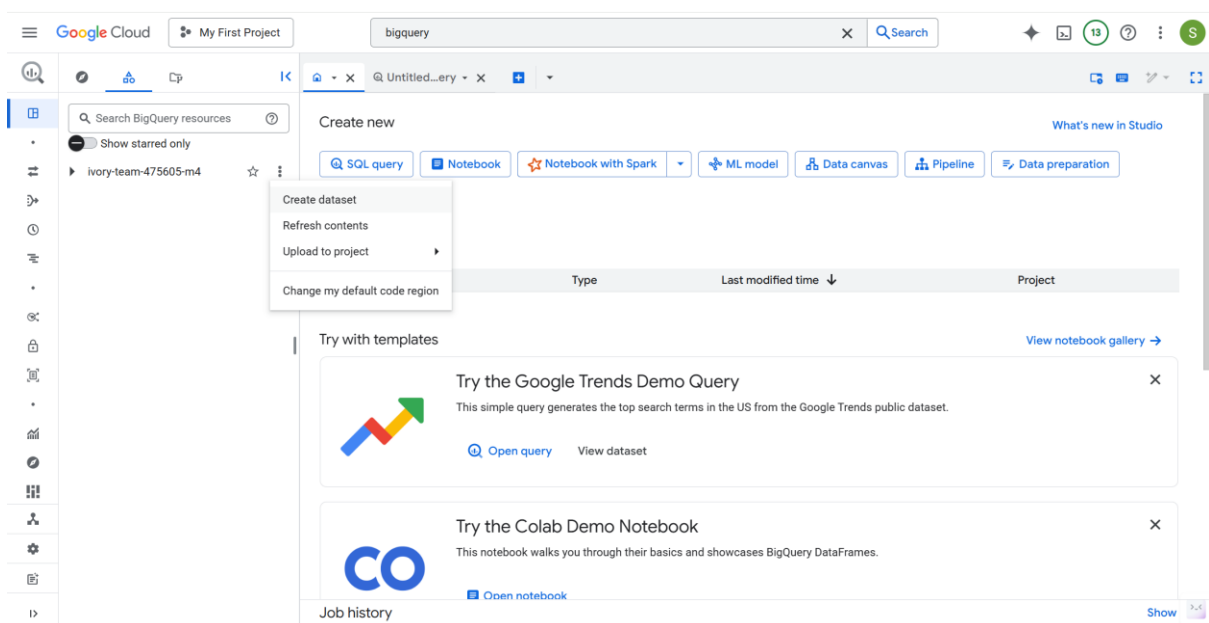


Tools Used: Vertex AI Studio (LLM Tuning), Gemini (1.5/2.x), Cloud Storage/BigQuery for labeled data, Vertex AI Endpoints, Cloud Shell for quick tests.

- **Workflow:**

- Prepare labeled dataset** (features → Low/Medium/High).
- Import to Vertex AI Studio → Tuning** and choose **Classification**.
- Fine Tuning:** Vertex handles data split, optimization, checkpoints, and metrics (Accuracy/Loss).
- Evaluate** in Studio; pick the best checkpoint.
- Deploy** tuned model to a **Vertex AI endpoint**.
- Infer** via prompt/API to classify new households in real time.

1. Creating a dataset first in BIGQUERY



2. Creating a table

The top screenshot shows the Google Cloud BigQuery Studio interface. The 'Create new' menu is open, and the 'Table' option is selected. A notification at the bottom states: "house_price" created. Go to dataset.

The bottom screenshot shows the 'house_price_table' dataset preview. The table has 17 rows and 10 columns: Row, Square_Foot..., Num_Bedroo..., Num_Bathro..., Year_Built, Lot_Size, Garage_Size, Neighborhood..., and House_Price. The data is as follows:

Row	Square_Foot...	Num_Bedroo...	Num_Bathro...	Year_Built	Lot_Size	Garage_Size	Neighborhood...	House_Price
1	3671	1	2	2012	4.911960066	0	1	814427.8614
2	3419	1	1	1972	2.805281408	1	1	703413.1109
3	4797	1	2	1979	2.162668703	2	1	986006.8617
4	1775	1	2	1955	4.241154678	2	1	406069.2709
5	3195	1	1	1962	3.913258464	2	1	663904.9927
6	3560	1	1	2005	1.512688443	0	1	740148.1938
7	2207	1	3	1962	4.563921775	1	1	492112.0397
8	4996	1	3	2014	4.252063779	1	1	1102533.649
9	2179	1	2	1977	1.757371479	0	1	443005.6236
10	1198	1	3	2002	4.673098313	2	1	334276.2178
11	3794	1	1	1987	2.076859625	0	1	783176.6366
12	2040	1	2	1952	0.900453717	2	1	379109.0941
13	4800	1	1	1974	4.58262025	2	1	1018026.994
14	2387	1	2	1991	1.92464042	2	1	508927.8042
15	566	1	3	2010	1.087255689	0	1	158454.8392
16	4824	1	1	1961	0.778485658	0	1	924012.9418
17	1422	1	1	1958	4.837204224	1	1	313266.8365

3. selecting the above created dataset to start tuning the model

Google CloudMy First Projectbigquery

house-price-bq-dataset

SourceAnalyzeLineage

VIEW DATA GUIDE

Select a data source

CSV file: Can be uploaded from your computer or on Cloud Storage. [Learn more](#)

BigQuery: Select a table or view from BigQuery. [Learn more](#)

☐ Upload CSV files from your computer

☐ Select CSV files from Cloud Storage

☒ Select a table or view from BigQuery

Select a table or view from BigQuery

Use a BigQuery table or view as your data source. You'll need [permission to access the dataset](#) and get the [dataset ID](#) and [table ID](#). [Learn more](#)

BigQuery path *

Browse

Search by table name or path using the format: projectid.datasetid.tableid.

What happens next?

The selected BigQuery table will be associated with your dataset. Making changes to the referenced BigQuery table will affect the dataset before training.

Continue

Select path

Enter property name or value

Search

Name	Description	Project
<input checked="" type="radio"/> house_price_table	-	ivory-team-475605-m4
Dataset: house_price		

SelectCancel

4. Tuning our model rather than training the model

house-price-bq-dataset

SourceAnalyzeLineage

Analyze

Encryption typeGoogle-managed

INTEGER6 (75%)

FLOAT2 (25%)

Generate Statistics

Filter Enter property name or value

Column name	BigQuery type	BigQuery mode	Missing % (count)	Distinct values
Garage_Size	INTEGER	NULLABLE	-	-
House_Price	FLOAT	NULLABLE	-	-
Lot_Size	FLOAT	NULLABLE	-	-
Neighborhood_Quality	INTEGER	NULLABLE	-	-
Num_Bathrooms	INTEGER	NULLABLE	-	-
Num_Bedrooms	INTEGER	NULLABLE	-	-
Square_Footage	INTEGER	NULLABLE	-	-
Year_Built	INTEGER	NULLABLE	-	-

Related resources

Training jobs and models

Use this dataset and annotation set to train a new machine learning model with AutoML or custom code. Selecting **AutoML on Pipelines** will create a Run on Vertex AI Pipelines. Run information will be found on the [Runs tab](#) under Pipelines.

Train new model

AutoML on Pipelines

Other

5. Tuning our model

Google Cloud

My First Project

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

Search

13

?

S

Create a tuned model

Docs

1 Model details

2 Tuning dataset

Start tuning

Supervised fine-tuning customizes a large model to your tasks and can improve the model's quality and efficiency. [Learn more](#)

Supervised fine-tuning is a good option when you have a well-defined task with available labeled data. For example, it can improve model performance for the following types of tasks:

- Classification
- Summarization
- Extractive question answering
- Chat

Model details

Tuned model name *

Base model

Region

Tuning setting

Number of epochs

Learning rate multiplier

Adapter size

6. Adding the files in JSONL format

1. Training file – has 1000+ records
2. Validation file – 10 records or so

Google Cloud

My First Project

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

Search

13

?

S

Create a tuned model

Docs

Model details

2 Tuning dataset

Start tuning

Tuning dataset

The dataset is a JSONL file where each line contains a single example or a Vertex Managed Dataset. The [number of recommended examples](#) varies by task. View the [data preparation documentation](#) to learn how to prepare one or [download a sample dataset for Gemini models](#).

☐ Upload file to Cloud Storage
☒ Existing file on Cloud Storage
☐ Vertex Managed Dataset

Cloud Storage file path * [Browse](#)

The JSONL file containing the dataset

Model validation

Generates validation metrics during tuning to help you measure model performance. [View sample dataset](#)

☒ Enable model validation

Validation dataset

The validation dataset is a JSONL file containing model prompt and response examples (one per line). You can use 10 to 5000 examples.

Validation dataset * [Browse](#)

Tuning done successfully

7. So now we got income class model on top of base model gemini 2.5

The screenshot shows the Google Cloud Vertex AI interface. The left sidebar contains navigation options: Dashboard, Model Garden, Vertex AI Studio (New), GenAI Evaluation (New), Tuning (selected), Agent Builder, Agent Garden, Agent Engine, RAG Engine, Vertex AI Search, Vector Search, Notebooks, Colab Enterprise, Workbench, Provisioned Throughput, Pipelines, and Tutorials. The main panel is titled 'Tuning' and has a 'Create tuned model' button. It shows 'Managed tuning' selected over 'Custom tuning'. A text block explains that in Vertex AI Studio, you can tune and distill foundation models. Below this, a 'Region' dropdown is set to 'europe-west1 (Belgium)'. There are buttons for 'View models: Latest' and 'Discontinuing'. A table lists the tuning jobs:

Name	Base model	Method	Status	Created	Updated	Notification
income-class-model	gemini-2.5-flash-lite	Supervised	✔ Succeeded	Oct 21, 2025, 10:05:36 PM	Oct 21, 2025, 10:45:30 PM	Test

The screenshot shows the 'Tuning details: income-class-model' page. It has tabs for 'Monitor', 'Dataset', and 'Details'. The 'Monitor' tab is active, showing 'Tuning progress' as 'Succeeded'. Below this are three charts: 'Accuracy', 'Number of predictions', and 'Loss'. The 'Checkpoints' section explains that a checkpoint is a snapshot of a model's state and provides a table of checkpoints:

Checkpoint ID	Step	Epoch	Predeployed endpoint	Accuracy (Training)	Accuracy (Validation)	Number of Inferences (Training)	Number of Inferences (Validation)	Test
1	30	4	income-class-model	0.85	0.872	3987	3987	Test
2	60	8	income-class-model	0.942	0.967	3990	3987	Test
3	90	12	income-class-model	0.965	0.973	3990	3987	Test
4	120	16	income-class-model	0.993	0.994	3987	3987	Test
5	150	20	income-class-model	0.999	1	3990	3987	Test
6	180	24	income-class-model	1	1	3990	3987	Test

8. Adding it in model registry

9. And deploying it using endpoint

Models are built from your datasets or unmanaged data sources. There are many different types of machine learning models available on Vertex AI, depending on your use case and level of experience with machine learning. [Learn more](#)

Region: europe-west1 (Belgium)

Filter: Enter a property name

Name	Default version	Deployment status	Description	Type	Source	Updated	Labels
income-class-model	1	Deployed		Large model	Vertex AI Studio	Oct 21, 2025, 10:10:19 PM	google-ver...: gemini-2.5...

Deploy your model

Endpoints are machine learning models made available for online inference requests. Endpoints are useful for timely inferences from many users (for example, in response to an application request). You can also request batch inferences if you don't need immediate results.

[Deploy to endpoint](#)

Name	ID	Status	Models	Deployment resource pool	Region	Monitoring	Most recent monitoring job
income-class-endpoint	5900034370227404800	Active	1		europe-west1	Disabled	

10. Testing the model using “OPEN IN PROMPT DESIGN” option

11. Test prompt using our INCOME-CLASS-ENDPOINT MODEL

Age 56

Income 29330

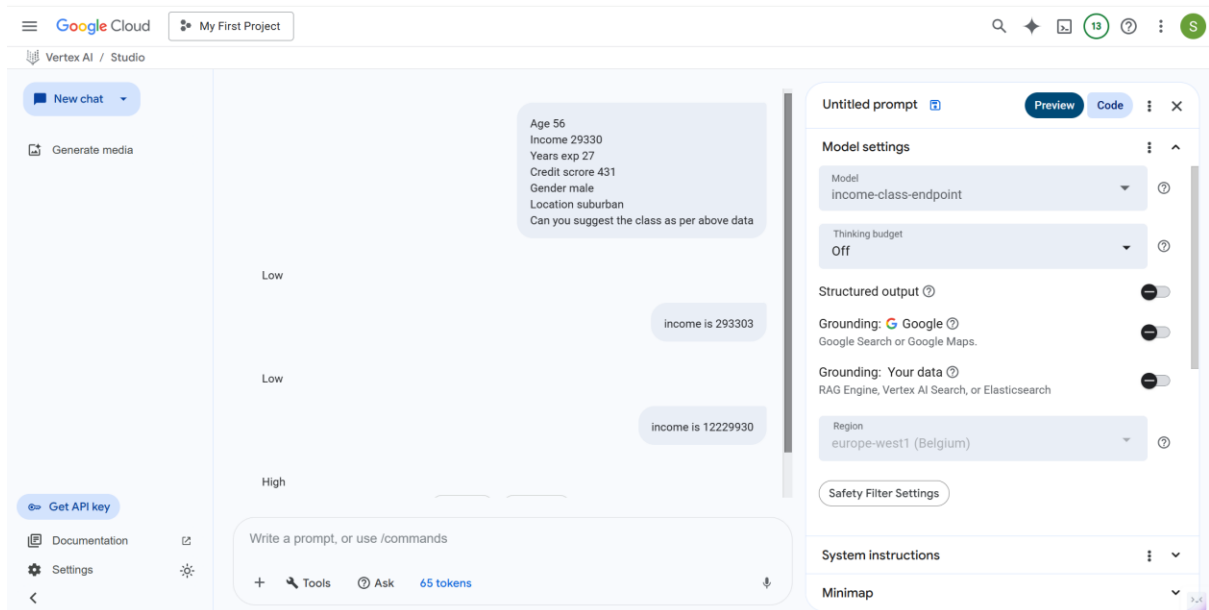
Years exp 27

Credit score 431

Gender male

Location suburban

Can you suggest the class as per above data



Answer: Low – Correct answer

Endpoint ID for reference purposes.

