AI Models & APIs Research

AI Models

	Azure AI	Google Vertex AI	Google Cloud Vision AI
Ease of use	Easy, user friendly. Azure Image Analysis 4.0 has been recently introduced, which might change older custom vision functionalities.	Moderate. Requires some machine learning knowledge.	Very easy to use with a simple AI for basic tasks.
Custom model training	Yes (Custom Vision / Image Analysis 4.0). Pre-built & custom models available. Can create custom models by uploading & tagging images.	Yes (AutoML Vision). Can train models with your own data. https://cloud.google.com/vertex-ai/docs/image-data/automl-vision	Only uses pre-trained models. Little customisation available. AutoML is a part of Google Vertex AI but you can also access it through here (but would have to explicitly integrate it).
Integration	Works best with other Microsoft Azure services & tools.	Works well with Google Cloud services.	Connects easily with other Google services.
Real-time	Can analyse images instantly with Cognitive Services	Can process images in real-time for predictions.	Can quickly analyse images as they're uploaded.
Cost	Pay as you go. Custom models can be costly. But has student plan. Pricing Calculator | Microsoft Azure	Pricing more flexible, but costs more if you train complex models.	Offers a free tier. (Requires billing information). Cost depends on how many images you process.
Performance	Accurate when you provide clear, labelled examples. Well-labelled data. Performance may drop with smaller datasets.	Good for large projects with lots of images.	Good for tasks like text recognition and face detection.
Documentation support	Great, beginner-friendly documentation & community support. Azure AI Vision documentation - Quickstarts, Tutorials, API Reference - Azure AI services | Microsoft Learn	Good documentation but requires some ML knowledge. Vertex AI documentation | Google Cloud	Basic explanations. Lacks advanced examples. Cloud Vision API documentation | Google Cloud
In terms of our project/Advantages	• Can work well because Azure AI integrates with APIs easily.	• Offers free trial for 90 days • You don't need much experience in	• Has pre-built API's - upload an image and it returns detailed results e.g. labels,

	• Cost-effective, offers 12 month free for students • Can extract features from the image such as object detection, facial recognition • You can conduct supervised training to ensure the output fits project needs • Advanced training ensures the accurate precision when detecting tags on the images • You can quickly label images with suggested objects - saves time • User-friendly and simple to use.	machine learning to train the models • Can automatically train models, automatically generates confidence scores, requires minimum effort • Allows you to connect it to laravel	texts. So limited - works well with basic tasks but lacks custom model support. • Detects the animal in the image uploaded • provides confidence percentages • can connect model to Laravel
Disadvantages	• Does not accept .avif file format (the file format of the sample images provided) • Takes a while to train as each tag requires at least 15 images	• Needs additional middleware to communicate with Laravel backend.	• Does not accept .avif file format (the file format of the sample images provided)

Azure AI

How to Use Azure AI

APIs

What is an API (Application Programming Interface) - GeeksforGeeks

	Azure AI (Computer Vision)	**Azure AI (Custom Vision)**	**Google Vertex AI (AutoML)**	**Google Cloud Vision AI**
Capabilities	• Recognises and identifies objects, animals, landmarks, and scenes within static images. • Can label common items (e.g., "dog," "cat," "tree") without custom training.	• **Custom Image Classification:** Train models to recognise specific behaviours from static images (e.g., "standing," "lying down," "agitated posture"). • **Object Detection:** Identify individual animals or objects within the frame (e.g., feed stations, water troughs).	• **Custom Classification:** Train models to recognise specific postures or activities. • **Object Detection:** Identify animals and their positioning in static images.	• **Label Detection:** Identify general objects like animal species and posture indicators. • **Limited Pose Estimation:** Can sometimes infer "upright" or "lying down" based on pre-trained patterns.

		• **OCR for Labels** (if text is captured in the image)		• **Text Detection**
Custom behaviour detection	No (pre-trained only)	Yes (train own model)	Yes (with labelled datasets)	Limited to general patterns
Posture recognition	Limited	Yes (with pose labelling)	Yes (if trained for posture)	Basic posture detection only
Multi-animal detection	Can detect multiple objects	Yes	Yes	Limited
Integration with Laravel	Straightforward REST API	Excellent via REST API	Requires more configuration	Simple HTTP-based API
Pose/behaviour inference	Can guess orientation sometimes	Needs behaviour-specific training	Needs labelled dataset	Not reliable
Pre-trained animal detection	Can identify some common animals	No pre-trained animals	Needs labelled dataset	Pre-trained animal labels
Best for	Good at basic posture detection and animal presence recognition.	Best for custom animal behaviour models like "feeding posture" vs. "resting posture."	Large-scale livestock analysis & complex behaviours	Simple presence or absence detection
Weakness	Can't distinguish complex behaviours without Custom Vision.	Requires good labelled datasets to work accurately.	Documentation assumes you know some machine learning.	Can't infer behaviours without AutoML Vision support.