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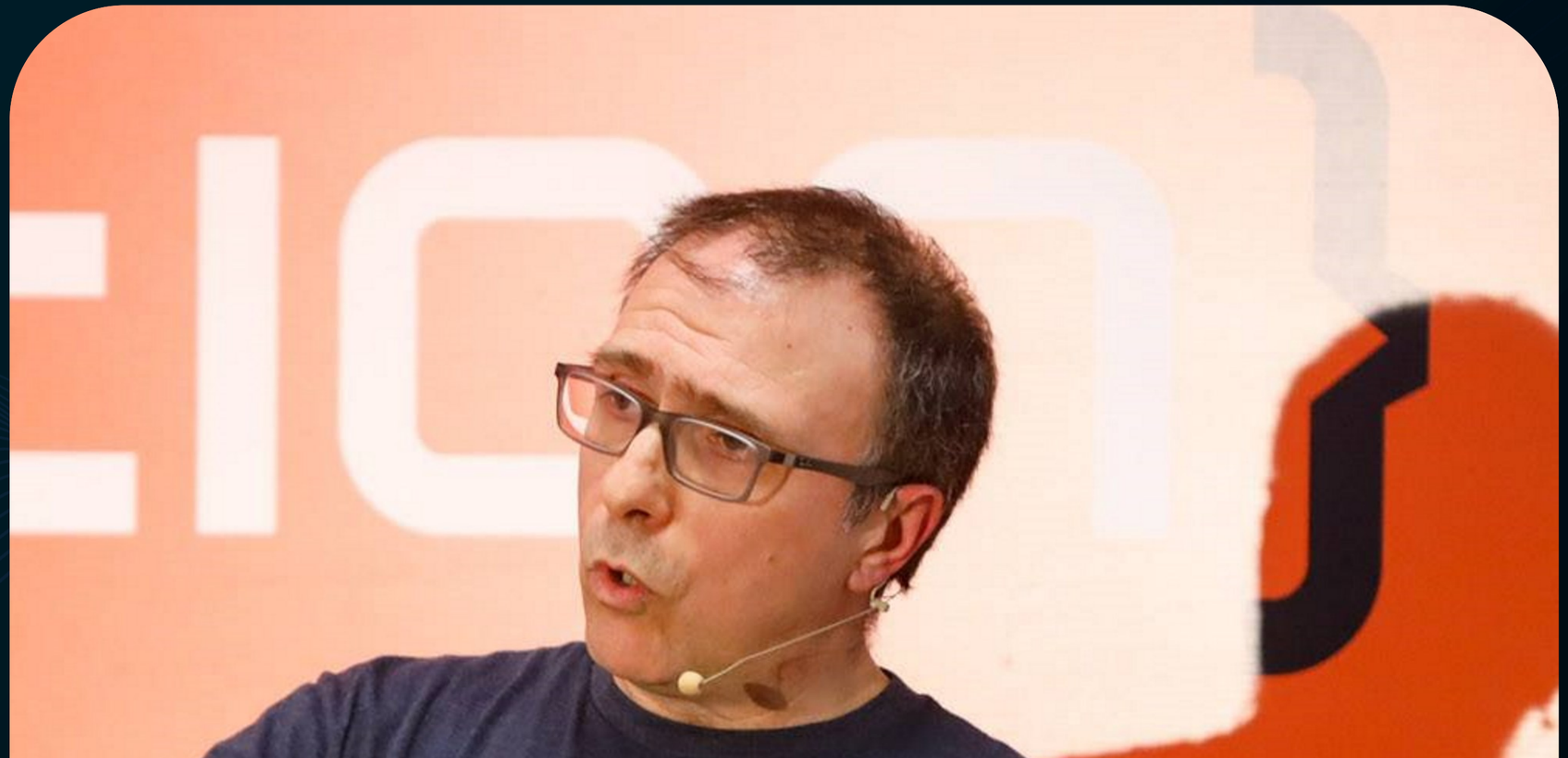
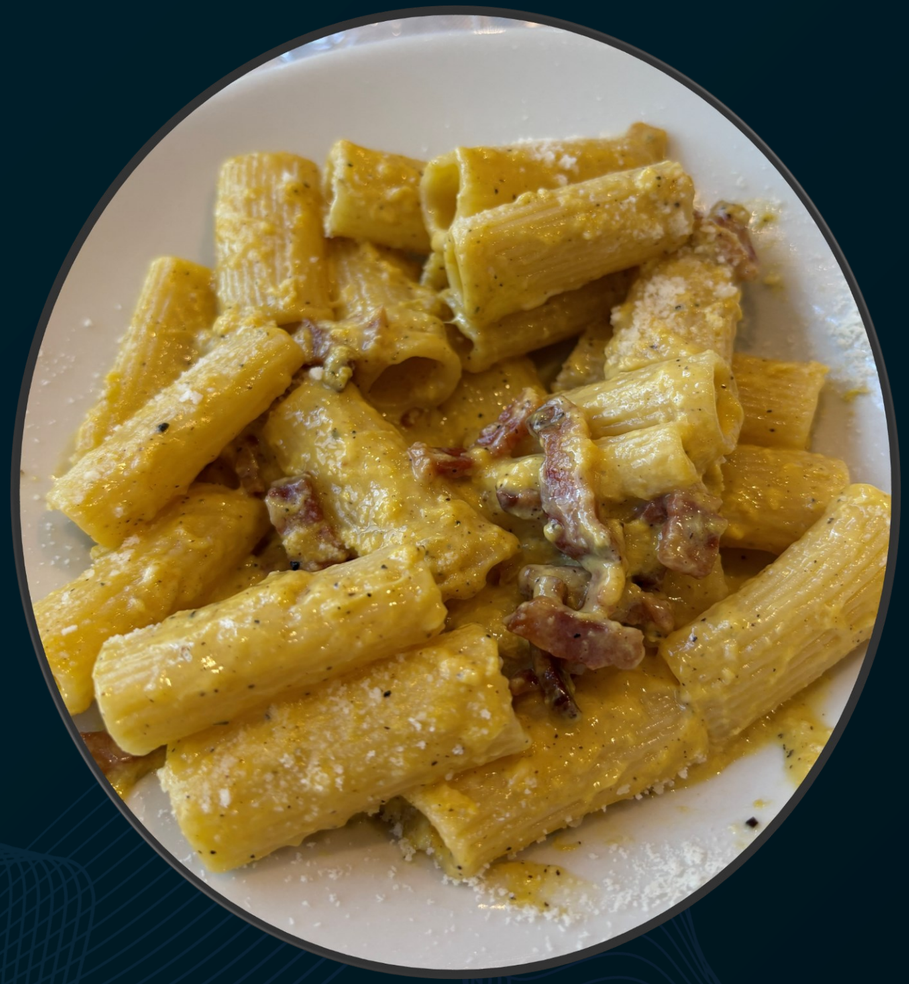
From pasta to pizza: how to use Azure Custom Vision to recognize your favorite dishes!

Massimo Bonanni - Technical Trainer @ Microsoft

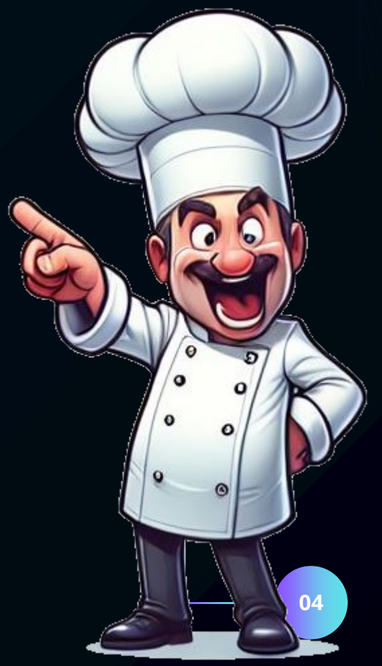


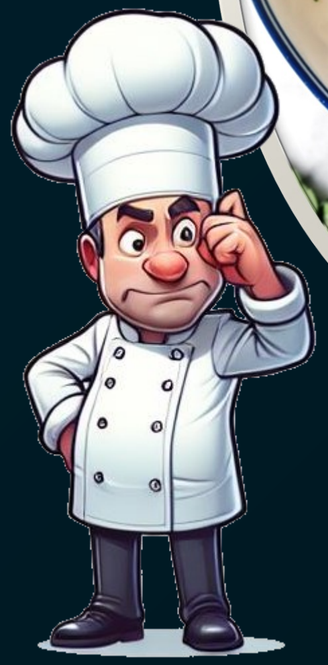


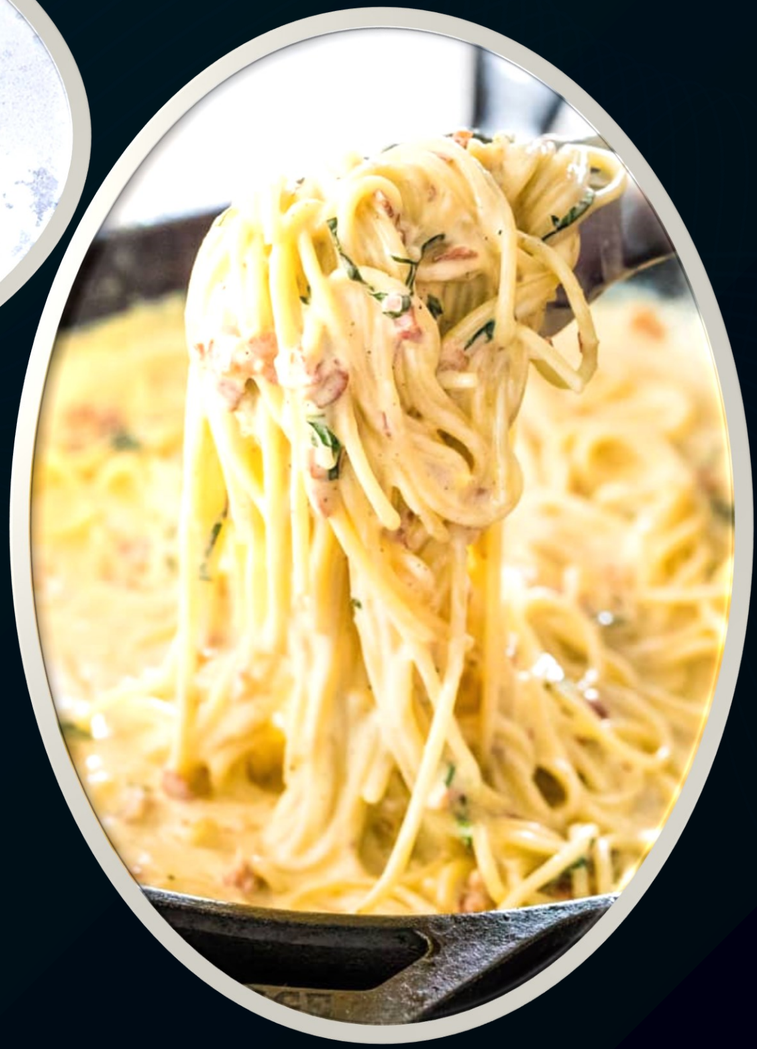
What is Carbonara?

Carbonara is a classic Italian pasta dish made with eggs, Pecorino Romano cheese, pancetta (or guanciale), and black pepper.

The ingredients are combined to create a creamy sauce without the use of cream, with the heat of the pasta cooking the eggs into a silky consistency.



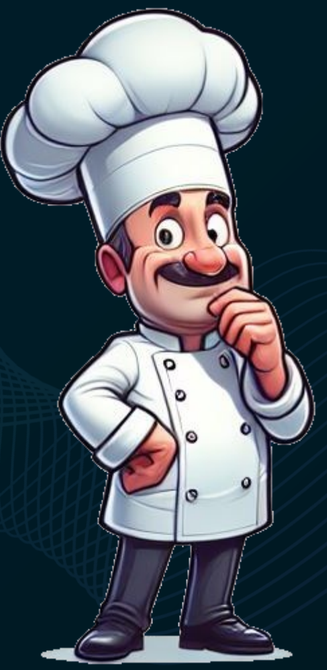


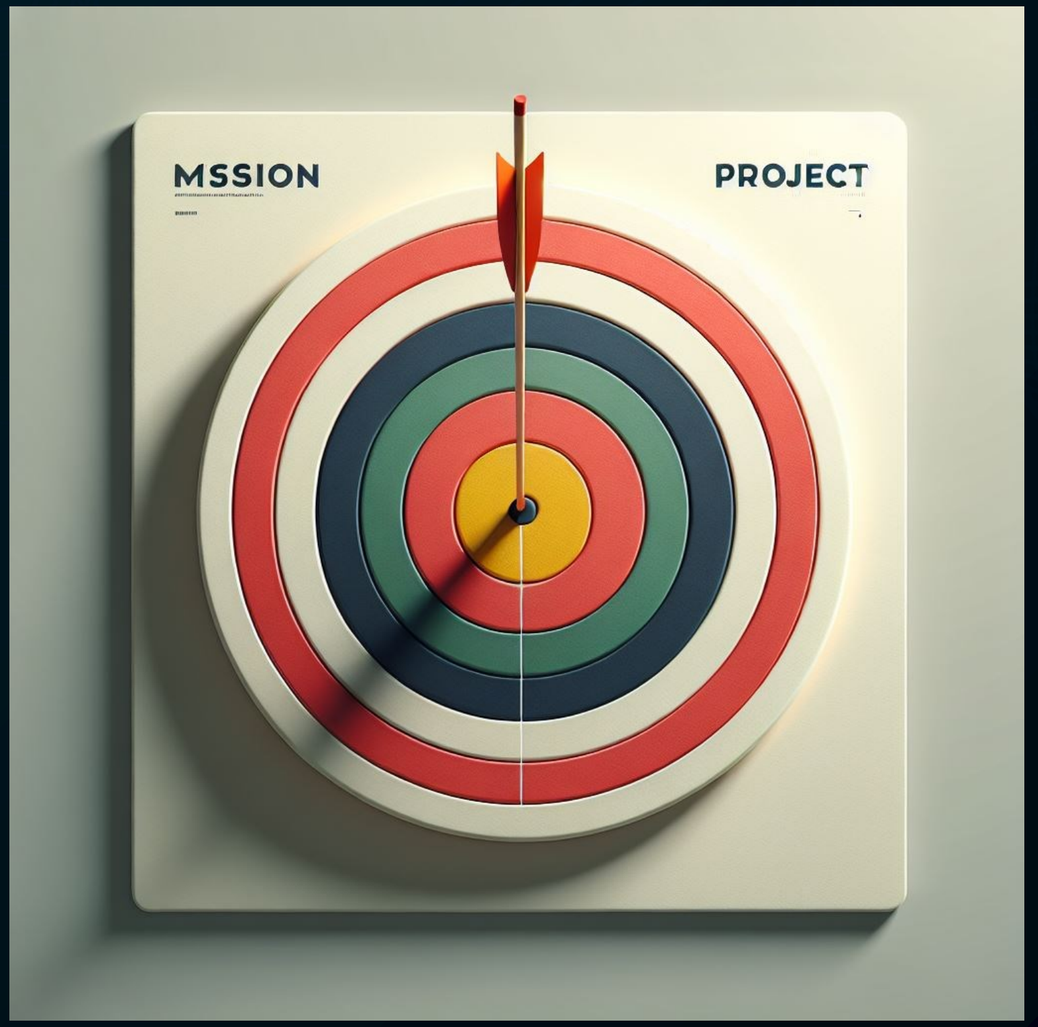


Those aren’t Carbonara pasta dishes !!!

Our Mission!!

We want to fight the fake carbonara dishes, so **we want to create** a software solution that allows us, given an image, to understand if that image represents a carbonara or not.





Requirements

We are not experts in AI

Azure AI Services are designed to make it easy for anyone to harness the power of artificial intelligence, even without being an AI expert.

AI Services provide simple APIs and user-friendly tools that streamline the integration of AI into your projects.

You can quickly add features like speech recognition or image analysis without needing deep technical knowledge.

We want to spend the minimum necessary

Serverless computing helps you save money by only charging for the exact resources you use, rather than paying for idle server time.

You automatically scale based on demand, ensuring you only spend what’s needed, making it a cost-effective solution for variable workloads.

What are AI Services?

- **Pre-built AI models:** Ready-to-use models for tasks like image recognition, language understanding, and data analysis.
- **User-friendly tools:** Intuitive APIs and interfaces allow easy integration of AI without deep technical expertise.
- **Scalability:** Automatically scale AI services to meet demand, ensuring efficiency for both small and large projects.
- **Customizable:** Adapt and fine-tune models to meet specific business needs or industry requirements.
- **Cost-effective:** Pay only for the AI resources you use, optimizing budget and reducing unnecessary spending.

Custom Vision vs Image Analysis

Custom Vision

Azure AI Custom Vision is an image recognition service that lets you build, deploy, and improve your own image identifier models.

You can use Custom Vision through a client library SDK, REST API, or through the Custom Vision web portal.

Image Analysis

The Azure AI Vision Image Analysis service can extract a wide variety of visual features from your images.

Image Analysis supports custom models. You can do either image classification or object detection.

You can use it through a client library SDK or by calling the REST API directly or using Vision Studio web portal.

Custom Vision vs Image Analysis

Areas	Custom Vision service	Image Analysis 4.0
Tasks	Image classification Object detection	Image classification Object detection
Base model	CNN	Transformer model
Labeling	Customvision.ai	AML Studio
Web Portal	Customvision.ai	Vision Studio
Libraries	REST, SDK	REST, Python Sample
Minimum training data needed	15 images per category	2-5 images per category
Training data storage	Uploaded to service	Customer's blob storage account
Model hosting	Cloud and edge	Cloud hosting only, edge container hosting to come

Training & Prediction

Labeling

= carbonara

= amatriciana

= other

Train model

Training Phase

HTTP/S

Published model

{i}

RESPONSE

Prediction Phase

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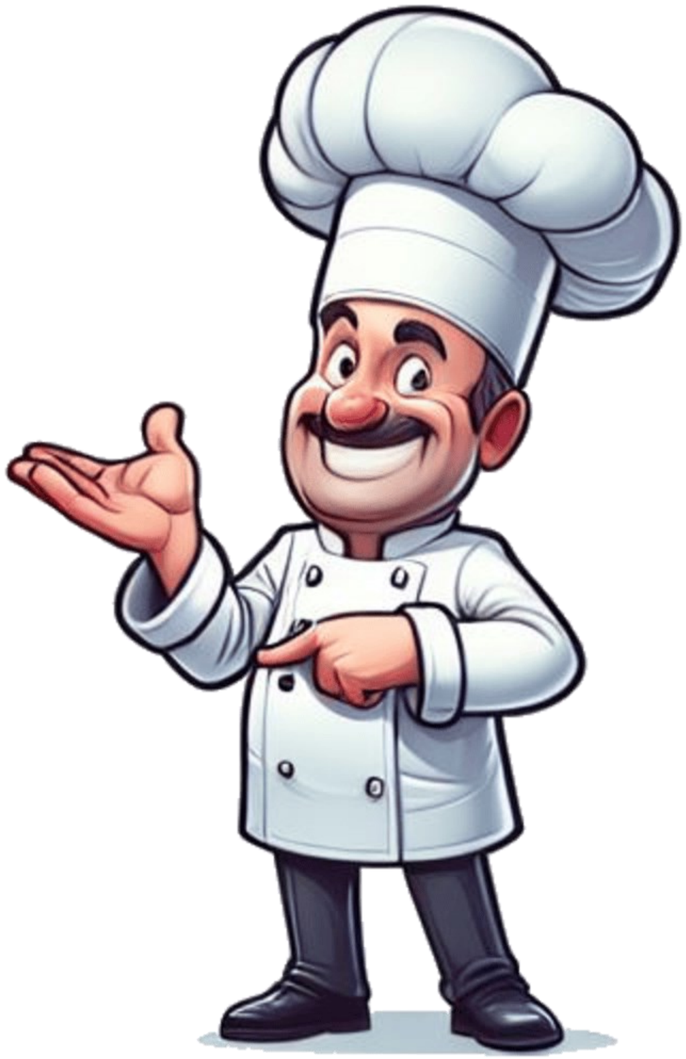
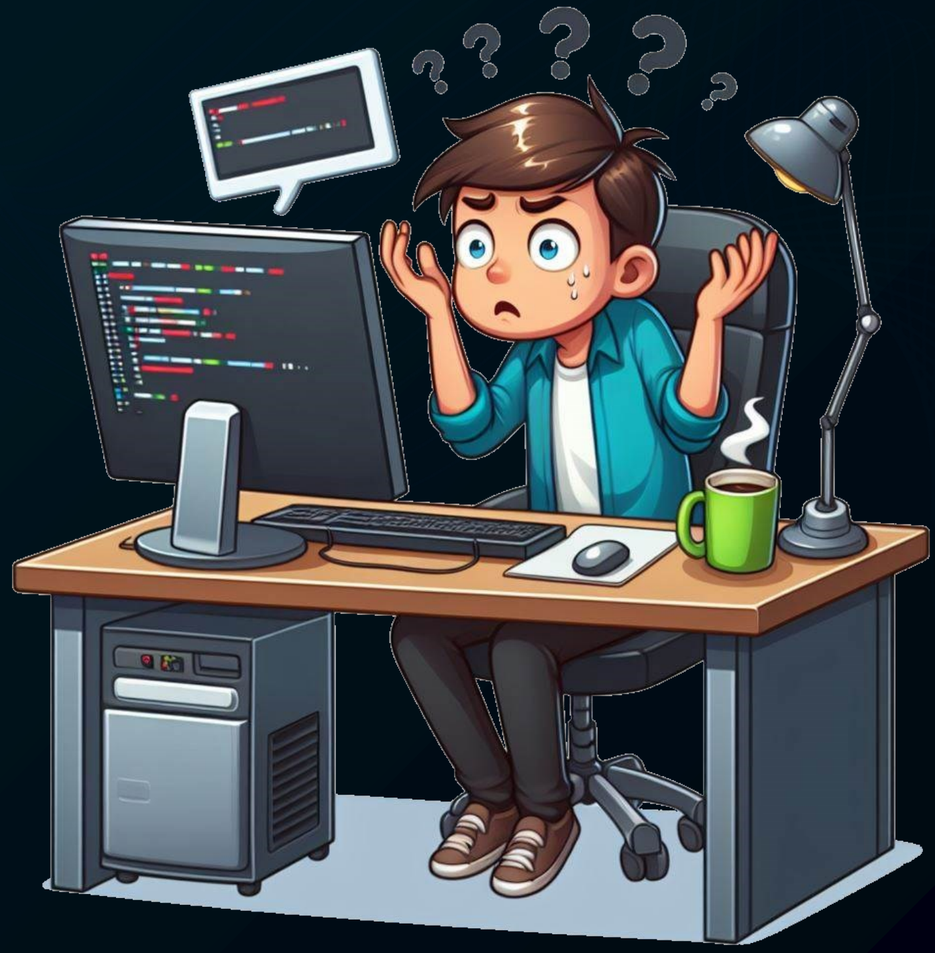
Creating Carbonara Recognizer Model



AI Services APIs/SDKs

Comprehensive REST APIs: Azure AI Services offer a wide range of REST APIs for various AI capabilities, including custom vision and Image Analysis.

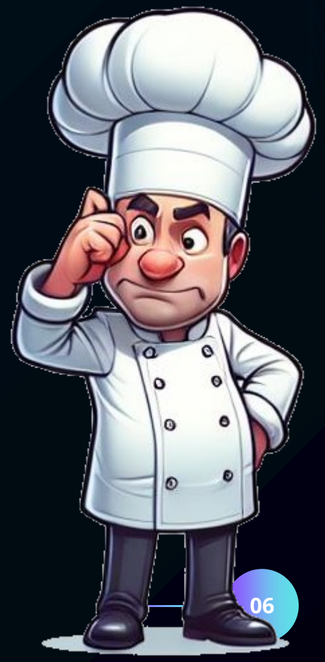
Multi-language SDKs: Azure AI Services provide SDKs in multiple programming languages such as Python, Java, .NET, and JavaScript. These SDKs simplify the process of integrating AI services into applications.



C# Custom Vision client library

The Custom Vision SDK for C# allows developers to integrate Azure's Custom Vision capabilities into their .NET applications.

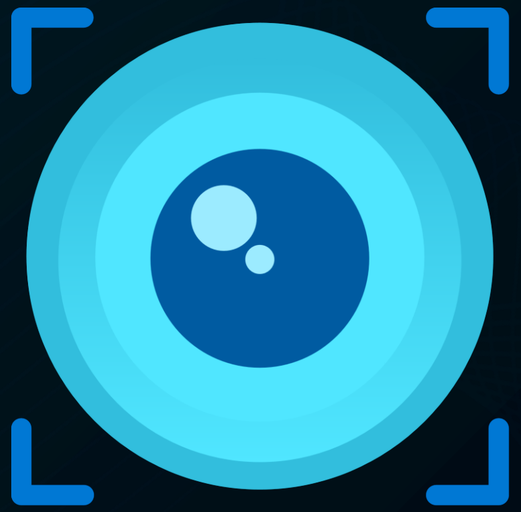
- **Create and manage projects**: Easily set up and organize your image classification projects.
- **Train models**: Upload images, tag them, and train your models directly from your C# application.
- **Make predictions**: Use the trained models to analyze new images and get predictions programmatically.



You can install the necessary NuGet packages:

- Training API:
  `Microsoft.Azure.CognitiveServices.Vision.CustomVision.Training`
- Prediction API:
  `Microsoft.Azure.CognitiveServices.Vision.CustomVision.Prediction`

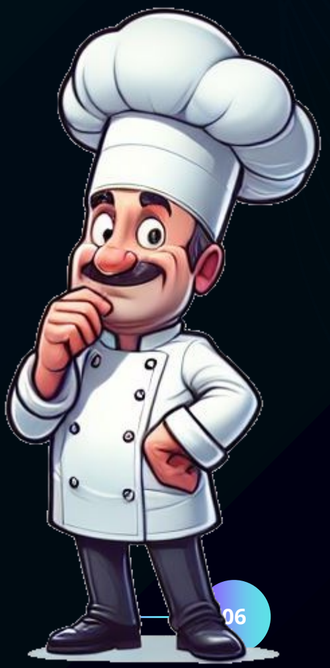
C# Image Analysis client library



The Image Analysis client library for C# is in beta release.

The current version doesn’t support Image Analysis Custom Models (you need to implement the HTTP call to the REST endpoint)

You can find in NuGet as **`Azure.AI.Vision.ImageAnalysis`**



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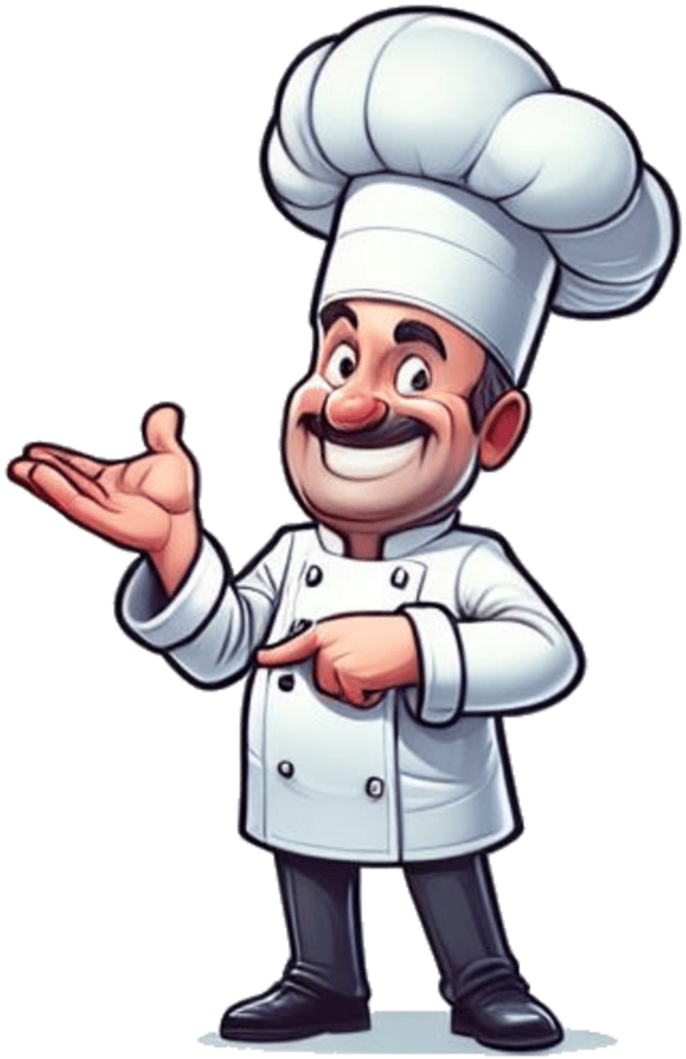
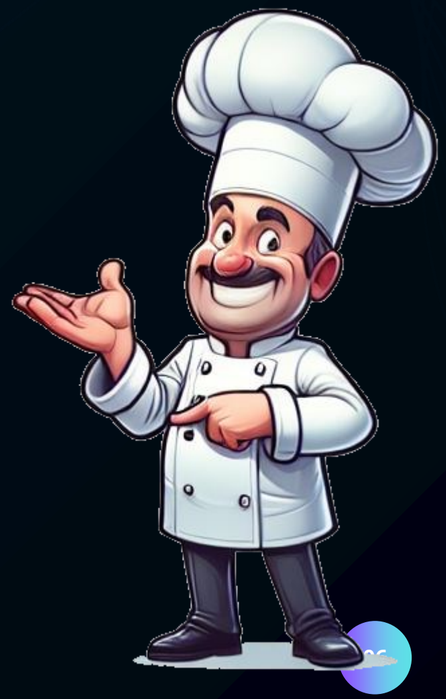
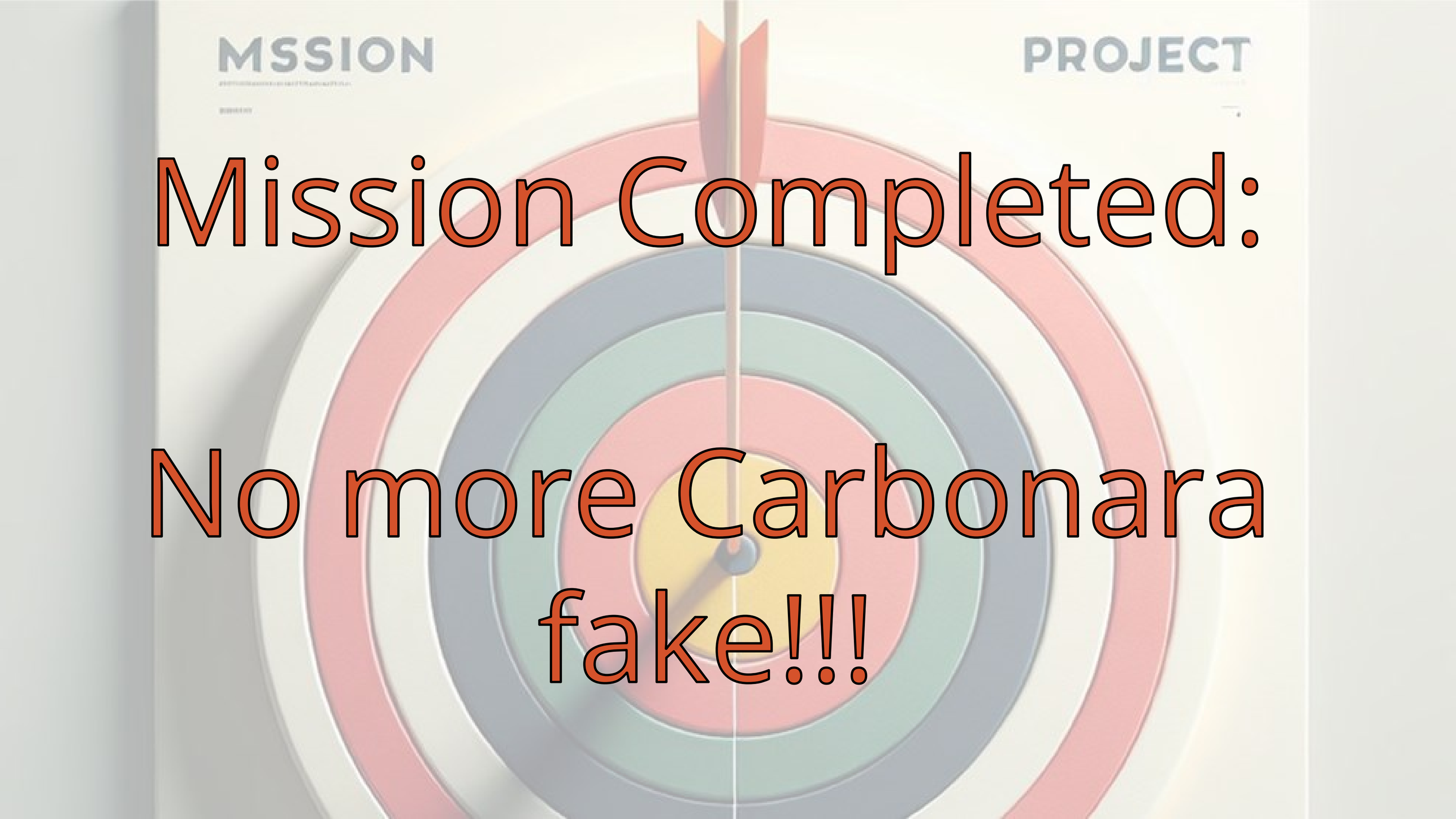
Serverless Carbonara Recognizer



Conclusions

- AI Services allow you to have AI functionalities without knowing AI
- Custom Vision and Image Analysis allow you to customize the model used using your own images and your own classification
- Using Serverless, you focus on the business problems without worrying about the infrastructure and spending what you use





Mission Completed:

No more Carbonara fake!!!

THANK YOU

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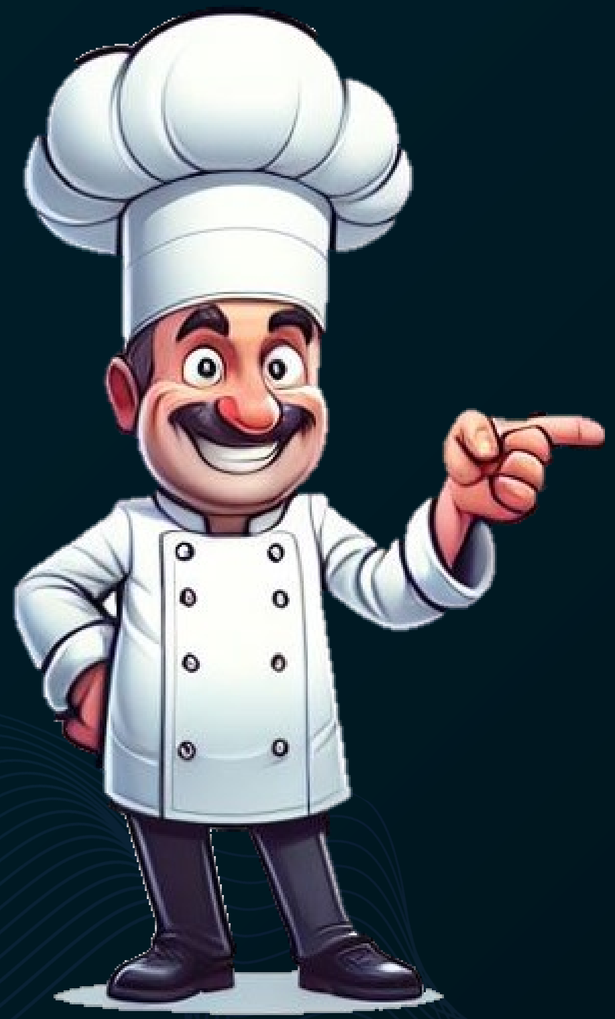
DATA SATURDAYS

Data Saturday Sofia 2024

05 | October | 2024

Free Ticket

Labs building, Sofia Tech Park



References

Get started with Azure AI Services (Learning Path)

Microsoft Azure AI Fundamentals: Computer Vision (Learning Path)

What is Custom Vision?

What is Image Analysis?

Compare Custom Vision to alternative Azure services

Custom Vision Web Portal

Carbonara Recognizer GitHub Repo