

## ML Technique to ID real-world objects

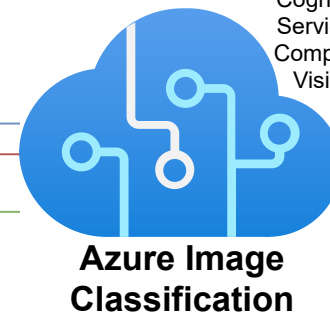
- Models predict category/class of object
  - Set of inputs (features) to predict labels with probability scores
  - Trained on pixel values (features) and labels of categorized images
- Can be combined with deep learning techniques and convolutional neural networks
  - Complicated and requires expertise to build from scratch
  - Available in Azure Custom Vision Cognitive Services

Concepts

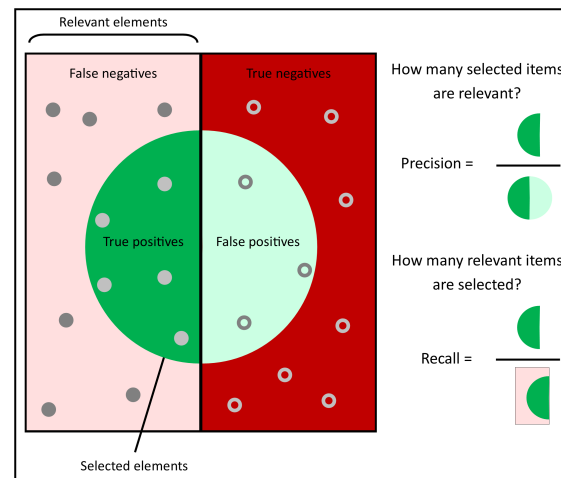
Build an ML Model

Cognitive Services:  
Computer Vision

Services



Use Cases



## Step 1: Provision a Resource

- Computer Vision (CV) resource:** Dedicated training/ prediction or both resources. Use CV only, or manage access/ utilization/ tracking/ billing of resource separately. Cannot use authentication key/ service endpoint interchangeably.
- Cognitive Services (CS) resource:** Dedicated training/ prediction or both resources. Combine Custom Vision or other services, or manage access/ utilization/ tracking/ billing of resource together. One endpoint and authentication key for resources.
- Provide client application authentication key and HTTP address endpoint for ML service consumption

## Step 2: Train the Model with labelled historical data

- Iteratively train the model in the Azure portal or with code via the software development kits (SDKs)
- Hold out some data for model evaluation (performance testing)

## Step 3: Evaluate model performance with metrics

- Determine model performance by comparing predictions with actual (hold out) data.
- Precision
  - Percentage of identified classification that were correct. Model identified 100 images belonging to category A, and 90 were indeed A then precision = 90%.
- Recall
  - Percentage of actual classifications that were correct. Model identified 80 images belonging to category A, but there are 100 images of A then recall = 80%
- Average Precision (AP)
  - Overall metric that includes precision and recall

## MS AZ Computer Vision

- Subset of Analyze Image of Computer Vision
- No need to manage individual servers for ML modelling and classification
- Auto-scale
- Azure managed identities
- Regional resiliency

- Businesses that need to process and classify images
- Product identification
- Disaster investigation:** Infrastructure management
- Medical diagnosis:** Xrays or MRI
- Anomaly detection for defects:** Manufacturing
- Image classification:** Fashion website, screenshots, insurance claims

## Step 4: Publish model to client application for consumption

- Provide the following details for deployment
  - Project ID: Unique ID of Custom Vision project
  - Model name: Name of model
  - Prediction endpoint: HTTP address of endpoints for prediction resource and published model
  - Prediction key: Authentication key for published model