Iterata AG Medical Services
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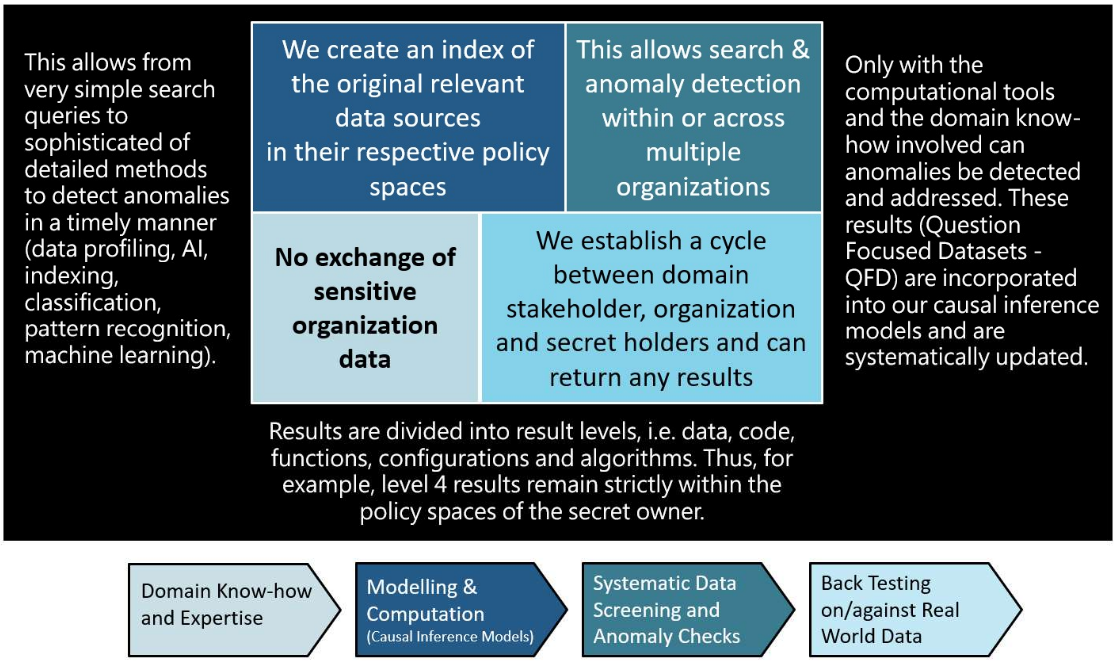
Anomaly Detection
High-Level Machine Learning for Images, Movies and Text

Iterata Health Platform supports several methods and powerful analytic tools for the identification of cluster and for the **systematic detection of anomalies**, which in turn supports the decision-making process.



High-Level Machine Learning	
Find Outliers in Numeric Data	Outliers (or anomalies) can be defined as data points that are much rarer than most other data points. This example uses a simple numeric dataset to show how to find anomalies, and to relate anomaly detection to the concept of "rarer probability".
Find Anomalies in Structured Data	This example demonstrates how AnomalyDetection can be used on a classic dataset containing numerical and nominal variables.
Train an Anomaly Detector for Images	This example shows how to create an anomaly detector for a specific dataset of images.
Fill in Missing Values in e.g. Astronomy Dataset	SynthesizeMissingValues allows for missing data to be imputed based on an estimation of the underlying distribution of the dataset.
Synthesize Missing Values in Numeric Data	This example shows how a distribution learned from data can be used to synthesize missing values. Load and visualize a two-dimensional numeric dataset.
Recover Head Poses by Reducing the Dimension	Values obtained after dimensionality reduction can be interpreted as latent variables of a generative process for the data. In some cases, these latent variables have simple interpretations. In this example, it can be seen how the orientation of 3D objects can be discovered from 2D projections of these objects. Generate a dataset of different head poses from 3D geometry data with random viewpoints.
Create a Custom Image Inpainter	Inpaint is a generic function to fill in missing values in an image. If the image domain is specific, one can obtain better results with a custom image inpainter. This example shows how to create such a custom inpainter using LearnDistribution and SynthesizeMissingValues.

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Machine Learning for Images, Movies and Text	
Improved Face Detection	Improved Face Detection is the base operation for several other face analysis and transformation operations, including face recognition, pose estimation, facial keypoint, morphing and more. FindFaces has been significantly improved to detect faces faster and more robustly, with fewer false positives.
FaceRecognition Perform Face Interpolation	In this example, FacialFeatures is used to find the position of facial landmarks, align faces and perform an interpolation or morphing among all faces. First, find all faces in the image.
Simple Face Recognition	A face recognition network can be trained in such a way that the Euclidean distance in the embedding feature space directly corresponds to face similarity. Using the embedding as facial descriptors, we can implement a simple face recognition algorithm without the need to train a new model.
Facial 3D Reconstruction ML	3D face reconstruction has applications in computer vision, such as facial pose and expression estimation. In this example, an unguided volumetric regression model from the Wolfram Neural Net Repository is used to estimate the 3D shape of a face. See more details for this network here.
A Model for Single-Image Depth Estimation	This neural net was trained to predict the relative depth map from a single image using a novel technique based on sparse ordinal annotations. Each training example only needs to be annotated with a pair of points and its relative distance to the camera. After training, the net is able to reconstruct the full depth map. See more details here.
A Model to Estimate Geo Location from an Image	This geolocation model classifies the location in which a photo was taken among more than 15,000 predefined locations around the world. The classes correspond to cells extracted from Google's S2 Geometry library. See more details here.
A Model for Super-Resolution	This net uses an architecture inspired by VGG in order to create super-resolution images. It takes an interpolated low-resolution image and refines the details to create a sharp upsampling. Get this network from the Wolfram Neural Net Repository. See details about this specific network here.
A Model to Translate Satellite Photos and Street Maps	Pix2pix is a conditional adversarial network capable of performing general-purpose image-to-image translation. The architecture enables an efficient aggregation of features of multiple scales through skip connections with concatenations and can be trained on different datasets to perform different translations. This particular model was trained to generate a street map from a satellite photo and is available in the Wolfram Neural Net Repository.
Train a Custom Image Classifier	Some classification tasks that are difficult for humans turn out to be quite easy for neural nets. For instance, many people cannot remember the difference between a camel and a dromedary. Using a simple fine-tuning procedure, a neural net can help. On the Wolfram Neural Net Repository, there are several models trained to identify the main object in an image. We have a model trained on the ImageNet classification dataset.
Train an Age Estimation Network	Combining resources from the Wolfram Neural Net Repository and the surgery capabilities of the Wolfram Language, train a net to estimate the age of a person. Get an image classification neural net from the repository.
Neural Network Sensitivity Map	Just like humans, neural networks have a tendency to cheat or fail. For example, if one trains a network on animal images and if all the "wolf" images exhibit snow in the background, then the snow becomes a "wolf" feature. Hence, the network uses the snow feature as a shortcut and may not have learned anything about the appearance of a wolf. As a consequence, a deer in snowy conditions may be misclassified as a wolf. To better understand any misclassification and to verify if a classification network has learned the desired features, the following analysis is of interest.

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	Classify an arbitrary image and note the classification probability. Then, cover parts of the image and note if the classification probability goes up or down. If the probability goes down, the covered area contains features that support the classification. If the probability goes up, the covered area contains features that inhibit the classification.
Fooling Neural Networks	Optical illusions can fool humans. Similarly, one can construct illusions for image classification networks. Load a pre-trained image classification network from the Wolfram Neural Net Repository.
Better & Faster Text Recognition	TextRecognize has been improved in the new Version 12.2, both for speed and error rate. The number overlaid on each pair of bars is the improvement percentage. This Version introduces more accurate text recognition and abilities for returning the recognized text at character, word, line or block level. Additionally, one can access several recognition properties, such as confidence, text location and more. In the world of music, tab notes (or tablature) are a way to notate the instrument fingering. This example shows how to use text recognition to read the notations from tab notes and generate a simulation of the music being played.
Built-in Object Recognition	Semantic object detection allows you to find instances of a specific object appearing in an image. Version 12 comes with a complete family of object detection functions.
Object Recognition & Tracking in Videos	This example will show how an object can be detected and tracked in a video.

Please do not hesitate to contact us

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