Mitchel Tom: 'A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E.'

1. Identifying the breed of horse in the image available on the Internet:

   Task T: a classification task where the goal is to predict the breed of a horse based on an image of the horse and distinguish between different breeds of horses.

   Experience E: Training on a big dataset of horse images.

   Performance measure P: Accuracy of the prediction of the breed of horse. The performance of the model in this task can be measured using accuracy, which is the number of correct predictions divided by the total number of predictions. Another common evaluation metric for classification tasks is F1 score, which balances precision and recall. Additionally, confusion matrix can be used to get a better understanding of the model's performance, including the number of true positives, false positives, true negatives, and false negatives.

   Type: Supervised (Classification)

2. Categorizing site visitors to introduce products more suited to them:

   Task T: A clustering task where the goal is to group site visitors based on their behavior, preferences, or demographic information.

   Experience E: Analyzing site visitor data such as behavior, preferences, or demographic information.

   Performance measure P: Quality of the grouping of site visitors into different clusters. The performance of the clustering model can be measured using a variety of metrics such as silhouette score, which measures the similarity of an observation to its own cluster compared to other clusters.

   Type: clustering

3. Checking requests to the server and preventing suspicious requests:

   Task T: An anomaly detection task where the goal is to identify requests that deviate from the normal pattern of requests to the server.

   Experience E: Learning the normal pattern of requests to the server and maybe some examples of bad or suspicious requests.

Performance measure P: Detection rate of suspicious requests and false positive rate. The performance of the anomaly detection model can be measured using metrics such as precision, recall, and F1 score.

Type: Supervised (Classification)

4. Identifying the trend of product price changes in the stock market:

Task T: A time series prediction task where the goal is to predict the future trend of a product's price based on its past prices.

Experience E: Analyzing past product price data and time series.

Performance measure P: Accuracy of the prediction of the future trend of the product price. The performance of the time series prediction model can be measured using metrics such as mean absolute error (MAE), mean squared error (MSE), and root mean squared error (RMSE), which measure the difference between the predicted and actual values. The coefficient of determination (R2) is another common performance metric, which measures the proportion of the variance in the dependent variable that is predictable from the independent variable.

Type: Supervised (Regression)