

AI Phase 1 Report

القسم / الشعبة	المستوى الدراسي	ID	إسم الطالب
علوم الحاسب	الثالث	202000012	أحمد أشرف حسني يوسف
علوم الحاسب	الثالث	202000536	عبدالرحمن محمود علي يوسف
علوم الحاسب	الثالث	202000552	عبدالله محمد عطا حسن
علوم الحاسب	الثالث	201900739	محمد ناصر محمد محمود
علوم الحاسب	الثالث	202000972	مينا ممدوح نبيل انيس
علوم الحاسب	الثالث	202001086	يوسف حسن محمد عبد الرحيم

Project idea and overview:

Project idea: Automated Object Detection using Decision Trees & Random Forests.

Overview: Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class (such as humans, buildings, or cars) in digital images and videos.

Well-researched domains of object detection include face detection and pedestrian detection. Object detection has applications in many areas of computer vision, including image retrieval and video surveillance.

Applications:

1-Google Images

2-Syte

3-InfiViz

Literature review of academic publications:

Articles:

1-<https://ieeexplore.ieee.org/abstract/document/8901325>

2-

https://openaccess.thecvf.com/content/CVPR2021/html/Joseph_Towards_Open_World_Object_Detection_CVPR_2021_paper.html

Scientific Papers:

1-<https://arxiv.org/pdf/1905.05055.pdf%C2%A0%E0%BC%88PS>

2-https://www.researchgate.net/profile/Rafael-Padilla/publication/343194514_A_Survey_on_Performance_Metrics_for_Object-Detection_Algorithms/links/5f1b5a5e45851515ef478268/A-Survey-on-Performance-Metrics-for-Object-Detection-Algorithms.pdf

Books:

1-

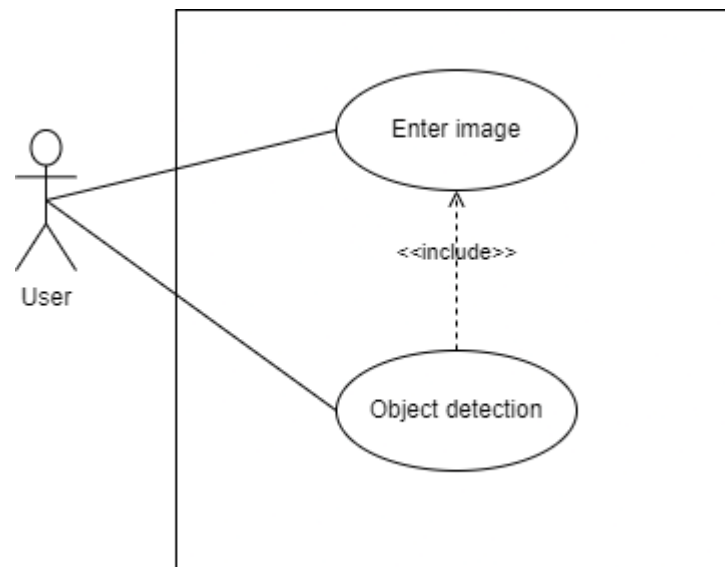
https://books.google.com.eg/books?hl=ar&lr=&id=upsxl3bOZvAC&oi=fnd&pg=PT9&dq=object+detection+books&ots=9ldTiRyB3V&sig=ooG6lA8kOa1wMEWrbcnNB4cdoE4&redir_esc=y#v=onepage&q=object%20detection%20books&f=false

2-

https://books.google.com.eg/books?hl=ar&lr=&id=3gJlX_NmNG4C&oi=fnd&pg=PR11&dq=object+detection+books&ots=0w-oFREeJO&sig=tpZM6sVMVmsJfKv9cESEwlxlK4&redir_esc=y#v=onepage&q=object%20detection%20books&f=false

[Proposed solution & Dataset:](#)

Proposed solution:



Datasets employed:

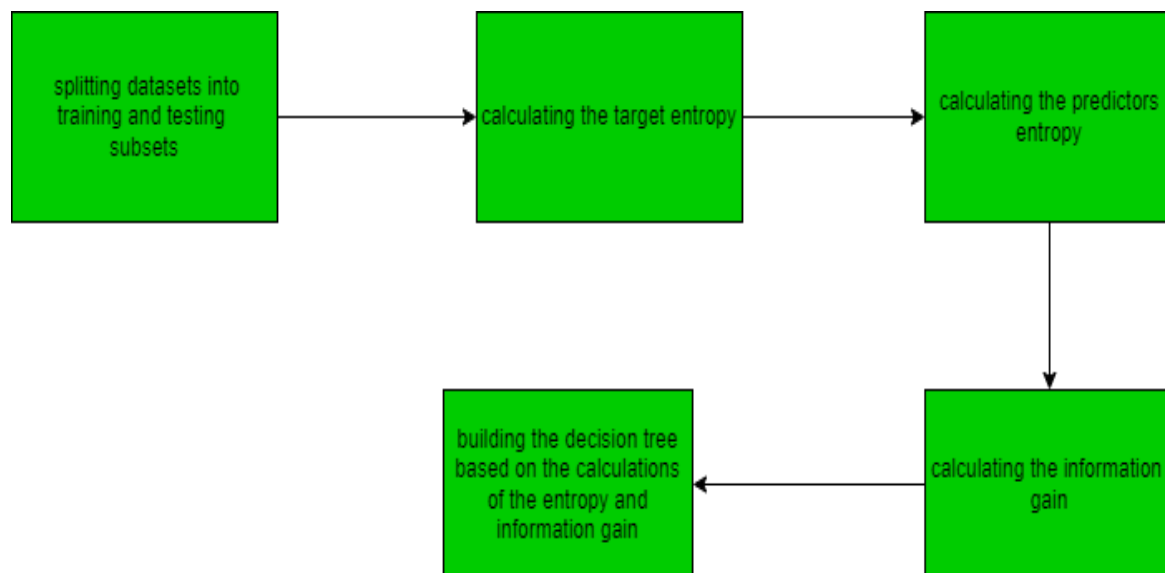
- 1-<https://www.kaggle.com/datasets/ahmadahmadzada/images2000>
- 2-<https://www.kaggle.com/datasets/kshitij192/cars-image-dataset>
- 3-<https://www.kaggle.com/datasets/balraj98/apple2orange-dataset>
- 4-<https://images.cv/dataset/banana-image-classification-dataset>

Applied algorithms:

Decision tree:

A decision tree is a supervised machine learning technique that models decisions, outcomes, and predictions by using a flowchart-like tree structure. Such a tree is constructed via an algorithmic process (set of if-else statements) that identifies ways to split, classify, and visualize a dataset based on different conditions.

Decision tree block diagram:



Random forest:

Random Forest is a classifier that contains a number of decision trees on various subsets of the given dataset and takes the average to improve the predictive accuracy of that dataset. Instead of relying on one decision tree, the random forest takes the prediction from each tree and based on the majority votes of predictions, and it predicts the final output. The greater number of trees in the forest leads to higher accuracy and prevents the problem of overfitting.

Random forest block diagram:

