

## Group 4 - Project Proposal

### Members:

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- **Project title:** Objects Detection from images
- **Data set:** <https://cocodataset.org/>
- **Project idea:**

The project aims to develop a robust object recognition system capable of identifying and classifying objects within images using machine learning techniques. The core objective is to leverage advanced image processing algorithms and deep learning models to accurately detect and label various objects, such as vehicles, animals, or everyday items, in diverse image datasets. This system will be designed to handle a wide range of object types and conditions, providing a scalable solution for applications in automated surveillance, image tagging, and real-time object tracking.

To achieve this, the project will involve training convolutional neural networks (CNNs) on large-scale image datasets. The system will be evaluated based on its precision, recall, and overall accuracy in object classification. Additionally, performance metrics will be analyzed to ensure the model's effectiveness across different environments and object categories. The project will also explore techniques to optimize the model's performance and address challenges such as occlusion, varying lighting conditions, and object size variations.

- **Software to use:**
  - Python: The primary programming language.
  - TensorFlow/Keras or PyTorch: Frameworks for building and training the CNN.
  - OpenCV: For image processing tasks.
  - NumPy and Pandas: For data manipulation.
  - Matplotlib/Seaborn: For data visualization.
  - Tools/Ides: Google Codelab or Jupyter Notebook
- **Papers to read:**
  - **“Object Detection with TensorFlow 2”** by Jason Brownlee. This tutorial provides a comprehensive guide to implementing object detection using TensorFlow 2 and can be found at [Object detection with TensorFlow 2](#)
  - **“Real-time Object Detection with YOLOv3”** on Medium. This guide covers the YOLOv3 (You Only Look Once) model for real-time object detection. Available at [YOLOv3 Guide](#)