Object Tracking Assignment

1. Define Object Tracking and explain its significance in computer vision
Object tracking is the process of locating and following an object over time in a sequence of frames. It is significant for applications like surveillance, robotics, and autonomous driving.

2. Describe the challenges involved in object tracking. Provide examples and discuss potential solutions
Challenges include occlusions, motion blur, scale variation, and real-time processing. Solutions involve using robust algorithms like Deep SORT and Kalman filters to handle occlusions and motion variations.

3. Explain the difference between online and offline object tracking algorithms. Provide examples of each
Online tracking processes data in real-time (e.g., SORT), while offline tracking processes pre-recorded data (e.g., tracking in video analysis). Online is faster, but offline can be more accurate.

4. Discuss the role of feature selection in object tracking algorithms. Provide examples of commonly used features
Feature selection is crucial for identifying the most distinguishing characteristics of an object for accurate tracking. Common features include color, texture, and shape.

5. Compare and contrast the performance of traditional object tracking algorithms with deep learning-based approaches
Traditional algorithms (e.g., Kalman filter, optical flow) are efficient but less robust to occlusions and complex scenes. Deep learning-based approaches (e.g., Deep SORT) are more accurate and adaptable but computationally intensive.