CV – Literature Survey

1.

**Paper Title:** Body Posture Detection Using Computer Vision

**Methodology used:** The methodology used in the paper for body posture detection involves the integration of OpenCV and OpenPose MobileNet Technology. OpenCV serves as a powerful framework for real-time computer vision, providing essential functions for image processing and analysis. The OpenPose framework is employed to detect keypoints on the human body, which represent major joints and body parts. By utilizing MobileNet, a lightweight deep learning model, the system efficiently processes these keypoints while maintaining accuracy, making it suitable for mobile and embedded applications.

The implementation begins with capturing video frames or images, which are then analyzed to extract keypoint locations. The spatial relationships between these keypoints are assessed to determine the overall body posture, allowing for the classification of various postures such as standing, sitting, or walking. This approach not only enhances human-computer interaction but also has significant applications in fields like surveillance, healthcare, and entertainment. However, the paper acknowledges challenges related to real-time performance and the need for further research to improve the accuracy and reliability of the posture detection system.

**Pros:**

1. **Robustness:** The discussed approach is noted to be reliable and robust in recognizing human body postures from video and image content.
2. **Wide Applications:** The methodology has significant applications in various fields such as surveillance, healthcare, and entertainment, enhancing human-computer interaction.
3. **Advancements in Technology:** The use of OpenPose MobileNet Technology allows for efficient processing and recognition of body postures, contributing to the ongoing development in the field of computer vision.

**Cons:**

1. **Real-Time Performance Issues:** The paper mentions that there are still challenges to be addressed regarding real-time conditions and performance, indicating that the current model may not be fully optimized for immediate application.
2. **Limitations in Recognition Accuracy:** The effectiveness of the posture detection may vary based on environmental factors and the complexity of human movements, which can affect recognition rates.
3. **Need for Further Research:** The paper acknowledges that many issues remain unresolved, suggesting that further advancements and refinements are necessary to achieve a perfect model for body posture detection

2.

**Paper Title:** Sitting Posture Recognition Based on OpenPose

**Methodology used:** The methodology employed in this study involves the development of a sitting posture recognition system that utilizes OpenPose for feature extraction and a convolutional neural network (CNN) for classification. Initially, video data is captured from classroom monitors, which provides a real-time view of students' sitting postures. OpenPose, an open-source library developed by Carnegie Mellon University, is then used to extract key posture features by identifying 18 body joints and the connections between them. These extracted features are organized into datasets that represent both correct and incorrect sitting postures, which serve as the training set for the CNN.

Once the datasets are prepared, the Keras deep learning framework is utilized to construct and train the CNN. The model undergoes training over 100 epochs, during which it learns to differentiate between various sitting postures based on the features extracted by OpenPose. The trained model is subsequently tested on separate validation datasets to evaluate its accuracy and effectiveness in recognizing sitting postures in real-time. The results demonstrate that the system can accurately identify students' sitting postures, providing a practical solution for promoting better sitting habits and addressing health concerns related to poor posture among adolescents.

**Pros:**

1. **High Accuracy:** The system achieved an accuracy of up to 90% on both the test and verification sets after training for 100 epochs, indicating effective posture recognition capabilities.
2. **Real-time Monitoring:** The use of video monitoring allows for continuous assessment of students' sitting postures, enabling timely feedback and correction.
3. **Non-invasive:** Unlike sensor-based methods, this approach does not require additional hardware, making it more accessible and easier to implement in classroom settings.

**Cons:**

1. **Dependence on Video Quality:** The effectiveness of the system may be influenced by the quality of the video feed, including lighting conditions and camera angles, which can affect posture detection accuracy.
2. **Limited to Visible Postures:** The system may struggle to recognize postures that are partially obscured or not fully visible to the camera, potentially leading to misclassification.
3. **Training Data Requirements:** The need for a substantial dataset to train the CNN effectively may pose challenges in terms of data collection and processing