From the experiment, we observed that the oriented HOG variant consistently achieved the highest accuracy and F1-macro score (~56%) outperforming both magnitude and angle variants.

This is because HOG retains both direction and strength, which are essential for capturing object shapes in CIFAR-10. The magnitude-only variant performed worst, since it disregards orientation information & thus looses key structural details.

The angle-only variant performed better than magnitude, as edge direction carries more discriminative power than raw edge strength, but still lagged behind oriented HOG.