1. Assume a circle around the current mouse position. Will any straight-line movement that moves the mouse from its current position at the center of the circle to arbitrary points on the circle have the same effect on the "motionMetric"? Why?

Yes, because we use Euclidean metric when calculating the combinedMotion which is in the formula of motionMetric. Therefore, only the distance of two points affects the result. If the mouse moved from the center to arbitrary points on the circle, the distance will be the radius of the circle which causes the same effect on the motionMetric.

2. Name an alternative for the Euclidean metric that we used (i.e. $\sqrt{h^2 + v^2}$). Briefly explain how it works.

We can use Manhattan distance as the alternative for the Euclidean metric. To do this, we just have to perform the addition of the absolute value of horizontalMotion and verticalMotion. ($|horizontalMotion| + |horizontalMotion|$)

3. What are advantages and disadvantages of Euclidean metric?

The advantage of Euclidean is that we can get the distance between this two points directly. Furthermore, we can always get the positive value from the Euclidean metric which helps us to do some operations. However, points may be in opposite directions but they may fall into the same cluster if the distance of both points from the centroid is the same**.**

4. Modify the code, compile, and run it for alpha equal to 0.01, 0.5, and 0.99. Move the mouse around with minor and major movements and analyze the system behavior. You may find it helpful to uncomment some of the lines in "main.c" to print out more details. Name a difference that each one of these alpha values causes in the system behavior. Choose an alpha value that you think is useful.

For alpha value equals to 0.01, even if the minor movements can result in "Large motion detected" so. As the alpha value increased, the combinedMotion part in motionMetric becomes more dominant which makes the motionMetric lower and less likely to occur "Large motion detected".

5. (Optional): Name an alternative for the moving average filtering mechanism that we have used (i.e., $y_n = a \times x_n + (1 - \alpha) \times y_{n-1}$). Briefly explain how it works.