**III. The Algorithm**

1. Decide on the range of ρ and θ. Often, the range of θ is [ 0, 180 ] degrees and *ρ* is [ -*d*, *d*] where *d* is the length of the edge image’s diagonal. It is important to quantize the range of ρ and θ meaning there should be a finite number of possible values.
2. Create a 2D array called the accumulator representing the Hough Space with dimension (*num\_rhos*, *num\_thetas*) and initialize all its values to zero.
3. Perform edge detection on the original image. This can be done with any edge detection algorithm of your choice.
4. For every pixel on the edge image, check whether the pixel is an edge pixel. If it is an edge pixel, loop through all possible values of θ, calculate the corresponding ρ, find the θ and ρ index in the accumulator, and increment the accumulator base on those index pairs.
5. Loop through all the values in the accumulator. If the value is larger than a certain threshold, get the ρ and θ index, get the value of ρ and θ from the index pair which can then be converted back to the form of *y = ax + b*.

Extract edges of the image How ? using Canny

1**-** initialize parameter space rs, thetas

2**-** Create an accumulator array **and** initialize it to zero

3**-** **for** each edge pixel

4**-** **for** each theta

5**-** calculate r **=** x cos(theta) **+** y sin(theta)

6**-** Increment accumulator at r, theta

7**-** Find Maximum values **in** accumulator (lines)

8-Check whether the line detected is a tangent to a curve in conic sections or not, using the following equations :-

Extract related r, theta

9-If , a the equation is satisfied return 1, else 0

Hough transform is commonly used to detect linear features in images. Lines are mapped to vertices in parameter space that match the line parameters. Arbitrary (nonparametric) curves can also be detected or analyzed using the Rein-Hough transform by analyzing the shape or location of peaks in parameter space. There is a one-to-one relationship between the curve in image space and the vertex position in parameter space, and the full curve can be reconstructed from the peak points. It is shown that the shape of the curve can be simplified by ignoring which is part of the vertex region. One such simplification is to derive the convex hull of the shape directly from the representation within the Hough transform. It is also shown that the drop parameters of ellipse can be measured directly from the Hough transform.