This paper presents a method to detect air leakage of an air conditioning compressor using image processing techniques. Air leakage should be prevented to ensure the performance of an air conditioning compressor. To detect an air conditioning compressor leak, the compressor is pumped with air and then submerged into a water tank. If air bubbles are observed from the surface of the compressor, then that compressor must be returned for repair. In this work, a new method to detect air leakage and search for the leakage point with high accuracy, speed, and precision is proposed. In the preprocessing stage to detect air bubbles, threshold and median filter techniques are used. The connected-component labeling technique is used to detect air bubbles while blob analysis is employed as the technique to analyze a group of air bubbles in sequential images. The proposed algorithm was tested in experiments conducted to determine the leakage point of an air conditioning compressor. The location of the leakage point was represented as a coordinate point. The results demonstrated that the proposed method could accurately detect the estimated leakage point. The error in the estimated leakage point compared to the actual leakage point was less than 5%.