

ABSTRACT

Non-contact detection using radar of vital human parts such as breathing becomes more efficient than breathing belts which are uncomfortable yet impractical for human exercising to determine the breathing level, natural breathing processes are somewhat disrupted and measurements are likely to be affected. Because of its non-contact nature, using radar to detect vital signs such as the rate of respiration from human subjects faces many challenges due to electromagnetic interference, clutter, and random motion disturbance.

This thesis designed a non-contact human respiratory monitoring using radar Xethru X4M03 which is suitable for people who do exercise without physical contact. The proposed system can detect human's respiration that has other signal interferences due to body movements and clutter using the Bandpass Filter method, the system will pass the respiratory frequency and reduce the frequency of other than breathing.

We validated the proposed system using Xethru X4M03 that is connected to a series of computer simulations and we also categorized the target in many positions i.e., sleeping position, slightly holding breath, minor body movements, and exercise. The result shows that before filtering it has an error of 1.2 and after filtering it becomes 0.9. In the state of breathing accompanied by holding your breath, the error value generated before filtering is 45.02 and after filtering is 15.99. When breathing is accompanied by body movements, the error value obtained before filtering is 60.42 and after filtering becomes 22.29. During the hands down exercise, the RPM error value before filtering was 119.86 and after filtering it was 30.22. The biggest error value occurs in the hands up exercise with the value before filtering is 166.55 and after filtering it becomes 45.14.