ABSTRACT

Human health is essential for them to be able to engage in a variety of activities. Breathing is one of the vital signs that can be used to assess a person's health. However, many breathing detection devices still use gadgets that make contact with the body, which can make patients uncomfortable and enhance viral transmission. The virus is very easy to spread in the pandemic situation, especially if humans use a tool that comes into contact with the body. As a result, humans require a non-contact device capable of measuring breathing. Radar technology has been extensively researched as a foundation for building non-contact sensors, particularly for detecting human vital signs such as breathing. In addition, a radar with multi-target detection capability will support its application more efficiently. This is because, in real life, there may be multiple targets in a single room.

FMCW radar is a popular and commonly utilized form of radar due to its ease of fabrication. Also for the time term, the FMCW radar's multi-target detection capacity must be improved. The goal of the research is to improve the non-contact sensor so that it can detect breath more accurately. The FMCW radar employed detects minute motions of the human chest wall at a frequency of 60 GHz. with a bandwidth of up to 4 GHz.

In this thesis, an FMCW radar named the Batman BM201 EVM radar is used to develop a multi-target detection system. The study focuses on signal processing by measuring the respiratory rate with a 2-step FFT. The measurement results were compared to actual measurements for seated breathing target detection and oximeter measurements for sleeping target detection. average error rate achieved in the sitting position without a static target being 3.04 % and 12.36 % with a static target. The average error rate for the target in the sleeping position is 6.74 %. As a result, the proposed methodology can measure multiple targets.

Keywords: Radar Frequency Modulated Continuous Wave (FMCW), Breathing, Multi-target measurement