

ABSTRAK

Tingkat pernapasan merupakan tanda vital mendasar yang sensitive terhadap kondisi patologis yang berbeda diantaranya kelainan jantung, paru – paru, stress emosional, pengaruh suhu tubuh dan kelelahan aktivitas. Tingkat pernapasan pada manusia diukur dengan menghitung jumlah napas selama satu menit dengan memantau dan menghitung berapa kali dada naik dan turun pada saat terjadi proses inhale dan exhale. Berbagai metode untuk mengukur laju pernapasan yang umum digunakan termasuk pneumografi, impedansi dan kapnografi diterapkan dalam pemantauan pasien. Penelitian ini bertujuan untuk meneliti dan menganalisa penerapan filter kalman pada output sensor gyro accelerometer pada peningkatan hasil deteksi tingkat pernapasan menggunakan sensor gyro accelerometer. Penelitian ini menggunakan mikrokontroler Arduino untuk memfilter output dari sensor gyro accelerometer lalu hasilnya akan dibandingkan sebelum dan sesudah filter. Variabel bebas pada penelitian ini adalah nilai respirasi sedangkan, variabel terikatnya adalah hasil output sensor sebelum di filter. Pada kondisi responden rileks didapatkan nilai respirasi 56 pre filter dan 19 filter dan kondisi responden bergerak didapatkan nilai respirasi 58 pre filter dan 20 filter. Pada penelitian ini didapatkan nilai rata – rata respirasi pre filter 50.5, filter 19.3 dan nilai akurasi pre filter 49.50% dan filter 81.17%. Pada penelitian ini menunjukkan adanya pengaruh perbedaan nilai respirasi sebelum dan sesudah penggunaan filter kalman. Penelitian ini memiliki keterbatasan selisih nilai yang jauh antara pre filter dan setelah di filter pada beberapa pengambilan data.

Kata Kunci : Respirasi, Filter Kalman, Gyro Accelerometer

ABSTRACT

Respiratory rate is a fundamental vital sign that is sensitive to different pathological conditions including heart, lung, emotional stress, the influence of body temperature and activity fatigue. The respiratory rate in humans is measured by counting the number of breaths for one minute by monitoring and counting the number of times the chest rises and falls during the inhale and exhale process. Various methods for measuring respiratory rate that are commonly used including pneumograph, impedance and capnography are applied in patient monitoring. This study aims to examine and analyze the application of the kalman filter on the output of the gyro accelerometer sensor to increase the results of the detection of respiratory rates using the gyro accelerometer sensor. This study uses an Arduino microcontroller to filter the output of the gyro accelerometer sensor and the results will be compared before and after the filter. The independent variable in this study is the respiration value, while the dependent variable is the sensor output before being filtered. In the relaxed condition of the respondent, the respiration value was 56 pre filtered and 19 filtered, and in the mobile respondent's condition, the respiration value was 58 pre filtered and 20 filtered. In this study, the average value of pre-filter respiration was 50.5, filtered was 19.4 and the pre-filter accuracy value was 49.50% and filtered was 81.17%. This study shows the effect of differences in respiration values before and after using a kalman filter. This study has limited differences in values that are far between the pre filter and after being filtered in several data collections.

Keywords: *Respiration, Kalman Filter, Gyro Accelerometer*