ABSTRACT

Name	:	IRSYAD MIZAN
Studies Program	:	Physics
Title	:	*Speech Impaired Sign Language Translator using Raspberry Pi 4 With Machine Learning Artificial Neural Network (ANN) Method*

This research builds Speech Impaired Sign Language Translator using Raspberry Pi 4 With Machine Learning Artificial Neural Network (ANN) Methodto help the speech impaired communicate with the surrounding community, the main components in this research are the flex sensor and the ADXL345 GY-291 Accelerometer sensor, using micro processor Raspberry pi 4, the programming language used is software Python 3.9.5 and the micro controller used is Arduino DUE. The research was conducted at BOLABOT Techno Robotic Institute, carried out during September 2021 until March 2022. The first test is to test the performance of the flex sensor and accelerometer sensor, the accuracy obtained on the five flex sensors and accelerometer sensors is more than 90%. Classification of ADC values using machine learning ANN method and the parameters used are: Activation function = RelU, hidden layer = (200,200), solver = adam, alpha = 0.00001, and random state = 43. The application of the tool was tested by repeating 26 letters carried out by researchers and by respondents with speech impairments, on repetition of letters an average value of accuracy was 96.92% tested by researchers and 87.17% tested by respondents with speech impairments.

Keyword:Machine learning, Artificial Neural Network, Sign Language, Speech Impaired, Flex Sensor, ADXL345 GY-291 Accelerometer sensor, Raspberry pi 4, Python 3.9.5, Arduino DUE, ADC value (Analog to Digital Converter)

ABSTRAK

Nama   :   IRSYAD MIZAN

Program Studi   :   Fisika

Judul   :   Penerjemah Bahasa Isyarat Tuna Wicara Berbasis Raspberry Pi 4 Dengan Metode *Machine Learning Artificial Neural Network* (ANN)

Penelitian ini membangun Penerjemah Bahasa Isyarat Tuna Wicara Berbasis Raspberry Pi 4 Dengan Metode *Machine Learning Artificial Neural Network* (ANN) guna membatu para kaum tuna wicara berkomunikasi dengan masyarakat sekitar, komponen utama pada penelitian ini adalah sensor flex dan sensor akselerometer ADXL345 GY-291, menggunakan *micro processor* Raspberry pi 4, bahasa pemrograman yang dipakai adalah *software* Python 3.9.5 dan *micro controller* yang digunakan adalah Arduino DUE. Penelitian dilakukan di BOLABOT *Techno Robotic Institute*, dilakukan selama bulan September 2021 hingga Maret 2022. Pengujian pertama yaitu menguji performa sensor flex dan sensor akselerometer, ketelitian yang didapat pada kelima sensor flex dan sensor akselerometer lebih dari 90%. Pengklasifikasian nilai ADC menggunakan *machine learning* metode ANN dan parameter yang dipakai yaitu fungsi aktivasi = RelU, *hidden layer* = (200,200), *solver* = adam, alpha = 0,00001, dan *random state* = 43. Penerapan alat diuji dengan melakukan pengulangan terhadap 26 huruf yang dilakukan oleh peneliti dan oleh responden disabilitas tunawicara, pada pengulangan huruf mendapatkan nilai ratarata ketelitian sebesar 96,92% diuji oleh peneliti dan 87,17% diuji oleh responden disabilitas tunawicara.

Kata Kunci: Machine learning, Artificial Neural Network, Bahasa Isyarat, Tunawicara, Sensor Flex, Sensor Akselerometer ADXL345 GY-291, Raspberry pi 4, Python 3.9.5, Arduino DUE, Nilai ADC(Analog to Digital Converter)