

## Comparison of Two Classification Models for Sex Estimation Based on Bone Length of Hispanic Population

*Mohd. Faaizie Darmawan<sup>a</sup>, Fajar Agung Nugroho<sup>b</sup>, Ferda Ernawan<sup>c</sup>, Ahmad Firdaus Zainal Abidin<sup>d</sup>, Mohd Zamri Osman<sup>d</sup>*

*<sup>a</sup> Faculty of Computer & Mathematical Sciences, Universiti Teknologi Mara, Tapah Campus, Perak, Malaysia*

*<sup>b</sup> Department of Informatics Diponegoro University Semarang, Indonesia*

*<sup>c</sup> Faculty of Computing, College of Computing and Applied Sciences Universiti Malaysia Pahang Pahang, Malaysia*

*<sup>d</sup> Faculty of Computing, College of Computing and Applied Sciences Universiti Malaysia Pahang Pahang, Malaysia*

### ABSTRACT

One of the essential factors of conducting a forensic investigation is to determine sex. Although multiple studies have been conducted using hand bone, the studies using the Hispanic population are minimal. The purpose of this study is to develop the Discriminant Function Analysis (DFA) and Artificial Neural Network (ANN) model for sex estimation based on the Hispanic population using left-hand bone. The samples used are subjects ranged between age groups of infants and 18 years old which comprised of 91 females and 92 males. For the input, the length of nineteen bones from the subjects' left hand is measured in centimeters and then normalized to become input for both models. The DFA model is chosen as a benchmark in this study to be compared with the ANN model based on accuracy percentage. The chosen DFA model is due to the widely used in estimating sex based on quantitative input. For the results, the DFA model produces a 72.7% accuracy percentage while the ANN produces 83.8%. Thus, the ANN model is selected to be the most ideal model in estimating sex compared to the DFA model.

### KEYWORDS

Sex estimation; Artificial neural network; Discriminant function analysis; Forensic anthropology; Hand bone

**ACKNOWLEDGEMENTS**

Acknowledgements. The Ministry of Higher Education (MOHE) funded this work through the Fundamental Research Grant Scheme (FRGS) with grant numbers RDU190190, FRGS/1/2018/ICT02/UMP/02/13