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ABSTRACTS

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Title : Intelligence Classification and Fuzzy Optimisation Model of People With Epilepsy

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Epilepsy refers to disturbances in the nerves caused by excessive electrical activities taking place in the brain. One of the most challenging problems faced by people with epilepsy (PWE) is finding employment. The objective of this thesis is to identify intelligence profiles of epilepsy patients and to classify their intelligence patterns and characteristics based on a developed intelligence scale, Ability Test in Epilepsy (ATIE©). Three clustering approaches were applied: Principal Component

Analysis (PCA), Hierarchical Clustering Analysis (HCA) and Two-Step Cluster Analysis. This study also explores the attitudes and perceptions of human resource personnel towards the epilepsy and unemployment of PWE. A fuzzy algorithm, Fuzzy Inverse ATIE (FIA) was created to estimate a fuzzy model that could indicate the best parameters of the eight intelligence skills based on the Howard Gardner's Multiple Intelligence. With that information, it could now be possible to improve the chance of employment for PWE. The eight intelligences or skills are musical, bodily/kinaesthetic, logical/mathematical, spatial, linguistic, interpersonal, intrapersonal and naturalist. ATIE was administered on 166 epilepsy patients who were out-patients at the Neurological Department's clinic, Hospital Kuala Lumpur. The respondents, consisted of both employed and unemployed were classified as either partial or generalized epileptic. The FIA algorithm, which was coded

in C Sharp (C#) programming language, was incorporated into a logistic regression model, which was then estimated. The findings showed that the majority of the patients were strong in interpersonal and intrapersonal intelligences. Verbal and interpersonal skills were found to be the most correlated with the other intelligences, and musical skill was the least. Hierarchical Clustering

Analysis gave the most appropriate classifications with three clusters: *Foundation Cognitive*, *Agility*, and *Logical Thought* skills. The fuzzy model reveals that the probability of employment, $P(Y=1)$, is close to 1. The study contributes significantly to statistical applications in neurosciences, social sciences and epilepsy study in Malaysia.