PENGGUNAAN PENDEKATAN VISUALISASI CHERNOFF FACE TENTANG KEADAAN GIZI BALITA DI SURABAYA

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NUTRIONAL CONDITION

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ABSTRACT

An Approach to the Chernoff Face Visualization for Detecting the Nutritional Condition of the Under Five Children in the City of Surabaya

This research is to analyze the nutrition's condition of the under five children of Surabaya by applying an approach of Chernoff face visualization. A benefit in using this approach is that of may display data much quicker and may effectively draw its conclusion. There are 11 variables. The data of this research is a secondary data was collected from 31 sub-districts in Surabaya, and is taken from the Department of Health of Surabaya. It analyzed by using cluster analysis. The Statistica's software is utilized to display the data using the approach of Chernoff face visualization.

Employing the hierarchical method and the Ward's method for cluster analysis could be grouped into three clusters. The first cluster consists of 15 sub-districts, namely Sukomanunggal, Tandes, Lakarsantri, Genteng, Bubutan, Simokerto, Bulak, Tambaksari, Gubeng, Tenggilis, Sukolilo, Mulyorejo, Wonokromo, Dukuh Pakis, and Gayungan, where the children in these sub-districts have good nutritional condition. The second comprises nine sub-districts, there are Asemrowo, Pakal, Sambikerep, Tegalsari, Pabean Cantikan, Krembangan, Rungkut, Karang Pilang, and Jambangan, presents fair nutritional condition. The third is seven sub-districts underlines poor nutritional condition, namely Benowo, Semampir, Kenjeran, Gunung Anyar, Sawahan, Wiyung, and Wonocolo.

This research emphasizes that the nutritional condition can be displayed by Chernoff face visualization. Based on the data obtained, it has proved that the Chernoff face visualization approach can accurately present multivariate data. The nutritional condition of children in the second group is a fair condition, but they should be given more attention because there are low values from nine variables observed. Therefore, the Agency of Health should pay more attention to the under five children of the second and third groups, especially in the second group is Asemrowo, Pakal, Pabean Cantikan, and Krembangan sub-districts.

Keywords: Chernoff face, nutritional condition, cluster analyze, under five children, sub-district

SUMMARY

An Approach to the Chernoff Face Visualization for Detecting the Nutritional Condition of the Under Five Children in the City of Surabaya

The data were generally presented in the form of tables, charts, histograms, box plots, scatter plots, counter plots, arrays, parallel coordinates, matrix plots, star plots and Chernoff face visualizations. A Chernoff face visualization refers to a presentation of multivariate data in the form of human face cartoons. It is well known that human faces are easy to recognize. Some parts of the human body such as eyes, ears, mouth, and nose are taken into account for value of variables representing shapes, sizes, locations, and orientations. The main idea of using Chernoff-face visualization is due to generate human face cartoons up to eighteen different facial parameters. In addition, nutritional issues are of multivariate in nature so that it can be analyzed using a Chernoff face approach.

This research is to analyze the condition of nutritional of the under five children in the Surabaya city by employing some advantages of the Chernoff face approach. The important benefit using this approach can make a quickly conclusion of the data. The result of this research can positively be applied by government and non-government institutions such as Agency of Health or other organization to describe multivariate data in dealing with any strategically issues.

This research forms a descriptive research, which is un-obstructive using secondary data which were collected from Department of Health in the Surabaya city. The data of the under five children derives from primary health centre in 31 sub-districts in Surabaya. The number of the under five children was about 225,737 children in 2009. There were eleven variables corresponding to internal and external factors that might influence the children nutrition.

The results emphasized that infectious disease and vitamin intake resulted in a small deviation standard, suggesting that the smallest data distribution existed in such as variable, while the largest data distribution occurred in variables of early detection of growth and development, clean and healthy behavior, access to potable water, and basic sanitation. Using the hierarchical method and the Ward's method for cluster analysis, the 31th sub-districts could be grouped into three clusters. The first cluster consisted of 15 sub-districts, namely Sukomanunggal, Tandes, Lakarsantri, Genteng, Bubutan, Simokerto, Bulak, Tambaksari, Gubeng, Tenggilis, Sukolilo, Mulyorejo, Wonokromo, Dukuh Pakis, and Gayungan. The second comprised nine sub-districts consisting Asemrowo, Pakal, Sambikerep, Tegalsari, Pabean Cantikan, Krembangan, Rungkut, Karang Pilang, and Jambangan. The third are seven sub-districts, that are Benowo, Semampir, Kenjeran, Gunung Anyar, Sawahan, Wiyung, and Wonocolo.

In the first group, the Chernoff face visualization of the under five children' nutritional condition demonstrates above-average values for seven variables observed namely early detection of growth and development (nose length), vitamin intake (eyebrow angle), exclusive breastfeeding (mouth length), clean and healthy behavior (head width), healthy house (eyebrow length), access to potable water (half the length of the eyes), and basic sanitation (mouth curvature).

Furthermore, the number of under five children and infectious disease were minimal. It is therefore, the condition of nutritional of the under five children in the first group is good enough. The condition of nutritional of the under five children in the second group states low values for nine variables observed, there are early detection of growth and development (nose length), immunization (ear diameter), vitamin intake (eyebrow angle), exclusive breastfeeding (mouth length), clean and healthy behavior (head width), healthy house (eyebrow length), access to potable water (half the length of the eyes), and basic sanitation (mouth curvature), suggesting that nutritional condition of those children was fair. The nutritional condition of the under five children in the third group is the worst as indicated by sub-optimal nose width. Moreover, some variables with the above-average values were including number of the under five children (ear location), infectious disease (central eye height), immunization (ear diameter), exclusive breastfeeding (mouth length), clean and healthy behavior (head width), healthy house (eyebrow length), access to potable water (half the length of the eyes), and basic sanitation (mouth curvature). Even though they have above-average value, but this is not significantly different from the average value.

Based on the data obtained, this research has proved that Chernoff face visualization approach can accurately present multivariate data. Take into account the cluster analysis of the Chernoff face visualization approach, the condition of nutritional the under five children can be clustered into three groups. The first group consists 15 sub-districts, where the children in these sub-districts have good nutritional condition. The second with nine sub-districts presents fair nutritional condition, and the third consisting seven sub-districts underlines poor nutritional condition. However, the nutritional condition of children in the second group is a fair condition, they should be given more attention because there are low values from nine variables observed. Therefore, the Agency of Health should pay more attention to the under five children of the second and third groups, especially in Asemrowo, Pakal, Pabean Cantikan, and Krembangan sub-districts.