

# A study on the application of data mining to disadvantaged social classes in Taiwan's population census

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## Abstract

Data mining has been widely applied to different areas. For a country with a huge population and household census data, data mining is an ideal approach for analyzing this information. In Taiwan single-parent families, aborigines and the elderly have long been considered disadvantaged social classes, and their widening problems will have a tremendous impact and influence on society. This study aims to apply data mining techniques to investigate the demographic features of socially disadvantaged groups in Taiwan by using population and household data collected in the 2000 census to provide reference for social welfare decision makers in understanding these groups and forming policy. The demographic features, marital features and educational attainment of the heads of household in single-parent families were investigated. The demographic features, educational attainment and marital status of aborigines were analyzed. The marital features, educational attainment, care and life patterns of the elderly were studied.

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*Keywords:* Data mining; Population and household census

## 1. Motivation

Single-parent families, aborigines and the elderly have long been considered as socially disadvantaged groups in Taiwan. As they influence the general operation of the nation, it is necessary to study these groups and provide them appropriate national and social resources and social benefits in order to aid in Taiwan's transformation into a developed county. Because only statistical analysis was conducted on data collected from population and household censuses in the past, this study therefore applied data mining to investigate the features of socially disadvantaged groups in Taiwan and help the government evenly allocate social resources and promote respect for the rights and benefits of socially disadvantaged groups. The motivation for research is detailed below in terms of the three socially disadvantaged groups investigated in this study.

### 1.1. Single-parent families

The term feminization of poverty was first introduced in the 1970s in the USA following the rise of the divorce rate, the declining death rate and the increase of out-of-wedlock births. Poverty has become a problem for women for the following reasons. In 1976, by Pearce (1979), in the USA, two out of three poor people over 16 were women, and 70% of the heads of households in aging low-income families were women. Most importantly, the heads of households of nearly half of the total low-income families were women (Winkler, 1993).

In fact, the USA was not alone in the feminization of poverty. The growth of single-parent families led by women seems to have become a global phenomenon following the increase of such families. According to the "Trend Analysis of Womens' Social Life in Taiwan" by the Directorate-General of Budget, Accounting and Statistics (DGBAS), the number of single-parent families has increased as a result of the rising divorce rate while society

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is becoming more open and people are more independent financially. In 1999 in Taiwan, there were 156,000 single-parent families with minors, accounting for 2.4% of total households; 69.7% of the heads of households in single-parent families were either divorced or separated, which was 14% higher than in 1989. In the same year, 67.4% of single-parent families were led by women, which was significantly different from ordinary families which were supported by men (81.3%). In terms of educational attainment, 13.5% of women heads of households in single-parent families had at least one degree, which was 11.5 percentage points lower than those in ordinary families. Women heads of households in single-parent families who were executives or professionals were 7 percentage points lower than those in ordinary families. Moreover, as minors in single-parent families were students, they needed to spend more on education (19.2%). In addition to the unfavorable labor and salary conditions, the heads of households in single-parent families need to do housework and take care of their children, thus making single-parent families a socially disadvantaged group that needs special care.

### 1.2. Aborigines

Though the efforts of the ROC government in Taiwan to promote modernization have brought Taiwan on a par with the rest of the world and made it a place where the living standard has been largely improved, it is “absolute progress” but a “relative decline” according to scholars. This suggests that though educational and cultural standards and the social and economic status of aborigines have advanced, there is a significant difference compared with the progress of the Han Chinese in Taiwan. For example, the average income of aborigines in Taiwan was only a third of the average income in Taiwan, but their unemployment rate is three times higher. In terms of educational attainment, only 9% of aborigines hold a diploma or a degree, compared with 22% in the general public; and only 17 of about 400,000 aborigines in Taiwan hold a doctorate degree. Also, though accidents and disasters are common in places where aborigines live, medical resources are lacking in these areas. The average life expectancy of aborigines is thus 10 years shorter than other ethnic groups in Taiwan and the conditions for aborigines to develop their lives are more unfavorable. According to the Taiwan Aborigine Employment Survey in 1999 by the Council of Indigenous People (CIP), 7.55% of aborigines over 15 were unemployed, a rate much higher than the general unemployment rate of 2.84% in Taiwan in the same period. The relatively weaker situation of aborigines is not unique to Taiwan; there are many alarming similarities regarding the survival of aborigines worldwide. These include: relatively small populations, decreasing living space, the decline of native languages, the collapse of the original social system and customs and interruption of generational continuation. Together with continual pressure from social isolation

and discrimination, the survival and continuation of most indigenous ethnic groups is endangered. To help the authorities to draw up suitable social welfare policies for socially disadvantaged groups, the DGBAS thus extracted survey results on aborigines from the 2000 census. The legislature even in January 2001 passed the Indigenous Peoples’ Identity Determination Act to extensively enlarge the scope of determination to aid in the survival and continuation of indigenous ethnic groups in Taiwan.

### 1.3. The elderly

At the seminar *Recommendations for Policies on Problems Regarding the Elderly*, the former Department of Health Minister Chi-Shean Chan pointed out (Chan, 1999), “The elderly have become a global issue and one of the big challenges for mankind in the 21st century”. Compared with the benefits and systems established for aging people in European and American nations (U.S. Bureau of the Census, 2000) as a result of long and progressive changes in population over the past hundred years or so, problems of the elderly have rapidly soared in Taiwan. According to national statistics from DGBAS in 1993 in Taiwan more than 7% of the population, or nearly 1.5 million people, were elderly (over 65) as birth rates dropped and people had longer life expectancy; thus Taiwan became one of the aging nations. By the end of 2001, the elderly increased to 8.8% of the population, or over 1.97 million people, and over 0.32 million people were over 80, growing 37.7% from five years earlier. The characteristics of an aging society have thus become evident. According to population projections by the Council for Economic Planning and Development (CEPD), the elderly in Taiwan will rapidly double in size by 2021, accounting for 3.6 million or over 14% of the total population. The support ratio of the young population for the elderly will drop from 8:1 at present to 4.7:1 in 20 years. Such a rapid expansion of the elderly population within two-three decades will have a tremendous impact and influence on the social structure, family relations, health care, social welfare, politics and the economy in Taiwan. Therefore, it is necessary for the government to prepare by drawing up appropriate solutions.

Single-parent families, aborigines and the elderly are considered socially disadvantaged groups because they will have a tremendous impact and influence on Taiwan’s society in the future. This study thus investigated the demographic features of these socially disadvantaged groups based on population and household census data from 2000 in order to help social welfare decision makers draw up solutions appropriate to the potential problems induced by these socially disadvantaged groups according to their features.

## 2. Methods

To find the association rules for large volumes of data is the basic approach of data mining, and methods can be

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