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Investigating the social aging process using data mining techniques

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Abstract
One of the problems that today's societies face is the phenomenon of social aging. The history of social aging returned to the first world war and there are many factors contributing to it. However, aging is an inevitable and a normal routine, but, a variety of causes, including economic and cultural problems, low living standards, loneliness, and social isolation, contribute to its early occurrence and can cause serious problems for the individual and society. One of the most significant problems caused by social aging is the shortage of young people and the lack of dynamism in societies. Therefore, governments, officials and the public need to take this issue seriously and find an appropriate solution to avoid it. Due to the importance of this topic, many studies are being conducted in various research and educational centers. We present one of the activities that has been done by Princeton University. We look at the factors that cause aging and the factors such as anxiety, stress, financial need in old age, how to deal with children, the level of education of the subject. In this paper, data collected in post-preparation research by Chaid model and Clementine software are explored.

Keywords: social aging, Chaid model, social consequences, living standards, society

1. Introduction
Today, with the rapid development and change of technology, we are witnessing dramatic changes in societies, economies, and cultures. Today's societies are confronted with new and complex concepts and phenomena that have changed and shaped human life patterns. Physical skills, financial and occupational security, living standards, the gap between youth and adult prospects, and people's expectations of life and society are among the topics to be studied. Many studies have been done or are being conducted in research centers and universities around the world. The purpose of this research is to study the living conditions and the effect of different factors on the personality and psychological requirements of individuals and to find their behavioral patterns. The results of this type of research can play a significant role in improving people's life satisfaction, improving their behavior patterns, refining their standard of living and generally reducing the aging process.

1. Literature Review
The emergence of social theory of old age goes back to the early post-war years [1]. In the post-war years, social aging science emerged as an interdisciplinary discipline for responding to social, health, economic policies and predicting change [2]. The widespread disciplinary theme of social aging science by foreign forces first arose with government intervention to achieve specific outcomes in social and health policies for older people and, secondly, with a socio-political and economic environment [3]. The important point is that the theories often reflected the norms and values of their creators, the social time for the emergence of the theory, and reflected the prevailing cultural views [4]. Previous studies provide many clues for healthcare method such as fuzzy expert systems. An expert medical system is a computer program and if they are applied properly, they help in effective diagnosis of diseases and their treatment such as nephrolithiasis [5] and liver diseases [6]. Meanwhile, this computational method is understandable in other fields such as Data Envelopment Analysis (DEA) in operation research and data mining [7, 8, 9, 10].

2. Methodology
There are generally three criteria for determining age:

a. Chronological age: It measures the age of people from birth to the present and it is the same age of birth certificates.
b. Physiological age: It is based on the physiological changes and side effects caused by various diseases. There are many younger people who are physically older than their chronological age, and there are many older people who has the power of younger.
c. Mental age: It is measured based on emotional, expressive states and mental strength. In fact, it is usually consistent with physiological age.

The World Health Organization categorizes life after adolescence according to chronological age [11]

a. Middle age: From age 35 to age 59
b.* The elderly:** From age ***60 to age ***74***
c. Old: From age 75 to age 90
d. Very Old: 90 or older

If signs and symptoms of old age appear before the age of 60, it is called premature aging. Various factors such as economic pressures, life problems, famine, murder, looting, war, violence, class and racial differences, inequality in society and the lack of future supply are all contributing to the aging process. To prevent premature aging, scientists have made numerous suggestions. Some suggestions can be beneficial in old age if they are continued from childhood.

3. Problem definition

The main issue in this research is the issue of aging that today's societies are facing, and many studies are being conducted in various research and academic centers. This paper examines the social aging process, based on a project implemented by the Princeton Research Center and devoted to the study of this topic.

4. Proposed Operational Model

In this proposed model various data mining process operations including data collection, data preparation, pre-processing, and the application of various data mining algorithms are performed. Meanwhile, the proposed model is the Chiad model. At the data collection stage, the information needed to execute the project is collected through interviews with the target of community sample. For this purpose, a questionnaire was first prepared and based on the questions collected in this questionnaire, interviewees were interviewed in four different sets and the results were presented in an SPSS file.

Finally, the following four sets are discussed:

a. **Set 1:** This part is largest number of interviewees which was around 1602, including young and middle-aged people, who were interviewed by random selection of household telephone numbers.
b. **Set 2:** It included 689 individuals 65 years and older.
c. **Set 3:** It included 552 from a series of adults.
d. **Set 4:** It included 72 African Americans as well as 54 elderly from Latin America and Spain.

In the data preprocessing step, data attributes were defined and after data preparation, various data mining models were used to examine the data by using Clementine software. One of the models used is the Chaid model, which is an example of decision trees.

5. Results

In this study, the output field examines how people feel about their age. The predicted values for answering this question include three following options:

a. **Option 1**: They feel younger
b. **Option 2**: They feel older
c. **Option 1**: They feel to be the same age

Based on the aforementioned options the following results have been obtained from the evaluation:

Table 1: Results that obtained from evaluation

Options	Percent
They feel younger	*% 52/4*
They feel older	*%7*
They feel to be the same age	*% 35/7*
They did not respond or refused	*%4/7*

The first layer of this tree, which is located after the main node, was based on Field K10 and in response to the question of how old you feel. At this level, respondents were categorized by age groups below 35 years, between 35 to 45 years, between 45 to 59 years, between 59 to 80 years and over 80 years. Finally, in all age groups over 75% of respondents felt younger than their actual age.

The next level of the tree was formed based on field K8. This field asks the respondents their real age. At this level, most people between the ages of 26 and 45 declared themselves younger and those under 26 declared themselves older than the actual level. At this level, age groups between 45 and 59 years were asked to respond to the following Field 13 question:

Do you think you shouldn't work when you get older?

More than 95% of those who answered yes and more than 75% of those who answered no said they were younger than their actual age.

Meanwhile, the age group of more than 59 years was asked to answer the following question:

Do you think you will have less stress when you get older?

Most of the people did not answer to this question.

People over 80 were also asked the following question:

Do you feel older than you are?

Most people feel to be younger.

6. Conclusion

Finally, about half of the people felt younger and the other half felt the same age. Sociological and psychological studies allow governments and officials to examine the community. In doing so, they can plan for the future by studying the current situation. Obviously, in a society where people feel young and happy, productivity and efficiency, mobility and dynamics can be much higher than in other societies. Higher productivity can dramatically increase the evolution and excellence of societies. Governments should consider appropriate programs to improve living standards, increase life expectancy, and promote community workflow by examining the status of society.

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