AI 201 MINI-PROJECT PROPOSAL

Enhancing Poverty Assessment using Naïve Bayes Classifier

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Problem and significance

Poverty, often narrowly defined by income levels, is a multidimensional issue with various contributing factors such as poor health, malnutrition, lack of resources, and the quality of work. Traditional methods of poverty assessment may overlook these crucial dimensions. This research aims to employ a Naïve Bayes classifier to provide a more comprehensive understanding of poverty by considering multiple attributes.

The recent evaluation of the 4P's program, a national poverty alleviation initiative, revealed that a significant proportion of beneficiaries did not match the criteria outlined in the national targeting system for the poorest families. This discrepancy raises concerns about the allocation of government resources, suggesting that cash assistance might not be reaching those in genuine need [1]. By utilizing a Naïve Bayes classifier and exploring various attributes influencing poverty, this research seeks to inform policy decisions and optimize resource allocation for poverty alleviation programs.

Furthermore, there is a noticeable gap in the application of artificial intelligence (AI) projects specifically targeting the United Nations' Sustainable Development Goal number 1 - No Poverty. Goal 1 aims to "ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources" because "eradicating poverty is not a task of charity, it is an act of justice." It is alarming that, during the second quarter of 2023, approximately 50% of Filipino households self-identified as experiencing poverty, as indicated by a survey conducted by OCTA Research [2]. This study aims to contribute to filling this void by proposing an innovative approach to poverty assessment using machine learning techniques.

Methodology

The project will adopt the following methodology:

a. **Data Collection:** Gather relevant data, including socio-economic indicators, health information, nutritional status, and other attributes, from a household/individual.

b. **Naïve Bayes Implementation:** Develop and implement a Naïve Bayes classifier for poverty assessment based on the collected data.

c. **Attribute Selection Experimentation:** Explore attribute selection techniques to identify the most significant factors influencing poverty.

d. **Classifier Comparison:** Experiment with alternative classifiers, such as k-nearest neighbors (KNN), and compare their performance against the Naïve Bayes classifier.

e. **Evaluation and Validation:** Assess the accuracy, precision, and recall of the classifiers to validate the proposed methodology's effectiveness in identifying individuals in genuine need of poverty alleviation.

Dataset

One of the dataset that can be used comprises the Poverty Probability Index (PPI), a measure that gauges an individual's poverty status through 10 questions about a household's features and ownership of assets. Additionally, it includes various socioeconomic indicators sourced from the household surveys on Financial Inclusion Insights conducted by InterMedia. The dataset can be found in this link.

An alternative data source is the Department of Social Welfare and Development's Listahanan database, for which a research request letter is necessary. Also referred to as the National Household Targeting System for Poverty Reduction (NHTS-PR), Listahanan serves as an information management system designed to identify who and where the poor are nationwide. This system provides National Government Agencies (NGAs) and other stakeholders in social protection with a database of households in poverty, serving as a foundation for identifying potential recipients of their social protection programs and services.

Reference:

[1] COA Report: 6 of 10 4Ps beneficiaries not in DSWD database – COA, https://www.rappler.com/nation/luzon/most-4ps-beneficiaries-not-in-national-targeting-system-coa-dswd-2022/

[2] 13.2 million Filipino families consider themselves poor — OCTA, https://www.philstar.com/headlines/2023/09/19/2297494/132-million-filipino-families-consider-themselves-poor-octa#:~:text=MANILA%2C%20Philippines%20%E2%80%94%20Around%20half%20of,households%2C%20rated%20themselves%20as%20poor.