Classification of Labor Using Support Vector Machine in North Sumatera

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ABSTRACT

Labor markets in Indonesia are key challenges and policy issues. Balai Besar Pengembangan Latihan Kerja (BBPLK) Medan is a services unit to develop and implementation of labor to increase skill and knowledge. The classification of labor in North Sumatera is very interesting to evaluate the performance of the labor in North Sumatera. In this case, we compute the labor data to classify and evaluate the model and performance of the dataset. The computation of the dataset using the support vector machine (SVM) as a model in machine learning or probabilistic approach by training and test data. The data was collected from Badan Pusat Statistik (BPS) Sumatera Utara for 2018 samples. Labor force dataset in North Sumatera had been computed and shown the result, indicates the support vector machine classifier is the good algorithm for this classification problem, offering good values in terms of accuracy, for describe the labor force in North Sumatera and can be recommended to BBPLK to add more development and implementation.

Keywords: Classification, labor force, SVM

INTRODUCTION

In general, Indonesia has a big population in the world that needs to ensure that new entrants to the labor force are equipped to support economic development. Labor market institutions need to provide an enabling environment for supporting economic growth and job creation [1]. Social protection and social security systems need to support the productivity of the labor force and help to resolve issues related to poverty and inequality [2]. The concept or technical explanation of labor, in this case, using the population. The population included in the labor force is the working-age population (15 years and over) who work, or have work but are temporarily unemployed and unemployed. Residents who are not in the workforce are working-age population (15 years and over) who are still in school, taking care of the household or carrying out other activities other than personal activities. Balai Besar Pengembangan Latihan Kerja (BBPLK) Medan, North Sumatera is a technical program unit of a government agency to development and implementation by a train of worker or labor to increase the skill and knowledge. In this study, we focused to evaluate the labor force in 2018 and compute the model of the labor force for to investigate and got of decision making for labor by using the SVM by training and test the data as visual the growth of the labor force in North Sumatera and related to activity in the BBLK as development and implementation of labor. The paper will conclude with brief suggestions and discussion of human resources of BBPLK Medan policies and programs.

RELATED WORK

This study shows a relationship between a labor force in the population in North Sumatera, Indonesia. The analysis of trends and challenges in the Indonesian labor market had been evaluated by [1]. The Indonesian labor market is needed to ensure that the ongoing structural transformation process and sustainable solutions are needed for wage policies. The result of this study shows the strengthening labor market governance will be important to ensure that the larger majority of Indonesian workers benefit from the standards outlined in regulations. Other research said the labor markets in Indonesia are policy issues and key challenges [3]. During the past two decades, Indonesia's labor market has been characterized by a considerable degree of structural change. [4] provides an overview of key labor market development strategies, particularly in conjunction with the development of the training system and employment creation. Classification in machine learning is distress by building a model that separates data into distinct classes, as shown in [5], [6]. They try to use some model in machine learning approach to pre-labeled for the algorithm.

DATA AND METHODS

The sample data of laborers' force were collected from BPS. To be comprised of this sample, the labor force data set must have passed the test during the application process and must have completed the ability test.

Table 1. The labor force report 2018

Labor Force	Male	Female
15 – 19	28000	27113
20 – 24	91770	79338
25 – 29	96258	65366
30 – 34	85498	56160
35 – 39	78330	55791
40 – 44	71832	53370
45 – 49	63050	48222
50 – 54	54808	32868
55 – 59	36859	24453
60 +	40366	22582
Total	646771	465263

The methods of this study using a support vector machine (SVM) [7]. This study focused to classify and evaluate the data of the labor force. A Support Vector Machine (SVM) is a discriminative classifier formally defined by a separating hyperplane. In other words, given labeled training data (*supervised learning*), the algorithm outputs an optimal hyperplane which categorizes

new examples [8], [9]. In two dimensional spaces, this hyperplane is a line dividing a plane into two parts wherein each class lay in either side.

RESULT AND DISCUSSION

The result in this study, compute and produced from preparing the labor force data by feature extraction to be overall grade, obedient, research score, project score and recommend.
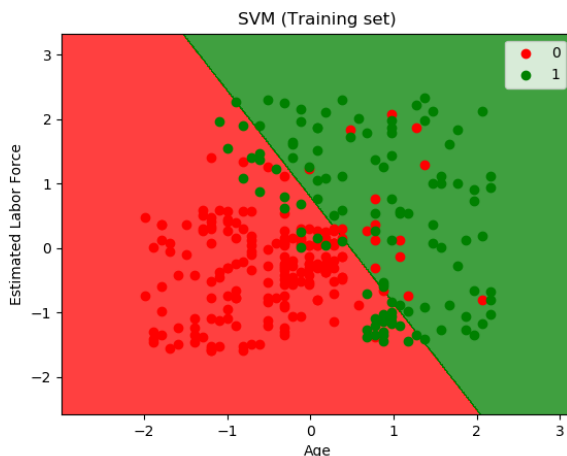

Figure 1. Numerical feature training set

The classify the data by simple making in labels. The numerical training data in this result shown in Fig. 1. SVM modeling can show in Fig. 2. The modeling in this study has a model parameters for the recommended variable.
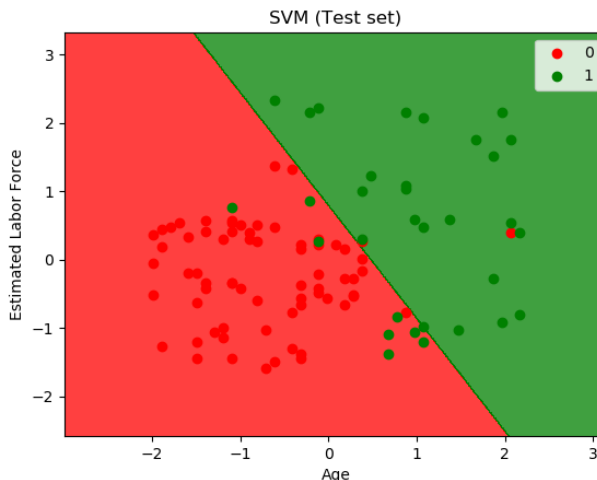

Figure 2. The model parameter based on labor force test set using SVM

The result of this study, based on the dataset indicates the dominant of the labor force for males in 25-29 ages, and the dominant labor force in the female is 20-24 ages. We can suggest to BBLK

for development and suggestions and discussion of human resources of BBPLK Medan policies and improve the program started from 20-24 ages.

CONCLUSSION

This paper describes a study in classifying and evaluates the labor force performance by using only report data in the 2018 year, from BPS Sumatera Utara, Indonesia. The experimental result shows that the labor/worker force can be identified in dominated the male or female in labeled from performance data. The result showed that SVM is a good algorithm for this classification problem, offering good values in terms of accuracy.

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