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Machine Learning for Tubercolosis Classification Based on Treatment History

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Abstract. TAn important step in data Tuberculosis analysis is data exploration and representation. Tuberculosis treatment is crucial to protect the patients and it can lead to death in untreated in countries with low income. In this case, we use the machine learning technique by using Support Vector Machine for classification the tuberculosis time series to analysis and represented based on the treatment history. We use Tuberculosis dataset which employed from Province Aceh, Indonesia. The result indicated the performance of the designed system was successful and could be used in Tuberculosis treatment analysis based on the histories in Aceh Utara and Lhokseumawe.

1. Introduction

In recent years in Province of Aceh, Indonesia, healthcare has attracted much attention, which is looking for more data analytics in healthcare to relieve medical problems in medical staffage, population, people living alone, and quality of life. Data mining and forecasting play a vital role in modern social and medical fields [1]. Tuberculosis remains a major global health problem despite recent and continues progress in prevention and treatment[2].

In general, the data analysis techniques will be widely used in disease surveillance, decision-making, health management, and other fields, which focus on current intelligent medical care [3]. According to the above discussion, this paper seeks to use a machine learning technique to analysis and represented the Tuberculosis dataset in Aceh Province based on treatment history.

2. Data and Method

2.1 Data

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The Tuberculosis data were employed from DinasKesehatanKabupaten Aceh Utara, Indonesia. We use tuberculosis which recordings of Rumah Sakit Cut Meutia, Lhoksemuawe, Indonesia for two years 2016 – 2017. The raw data at this paper is the standard metadata exchange formats of Excel.
Distribution the Tuberculosis data in Province of Aceh show in Table 1. In this table, Lhoksumawe and Aceh Utara are the wide areas which distribution of tuberculosis based on histories.

Table 1. Distribution Tuberculosis Data in Province of Aceh, Indonesia

No	Regency	City
1.	Lhoksumawe	Banda Sakti, MuaraSatu, BlangMangat, MuaraDua
2.	Aceh Besar	KutaMalaka
3.	Aceh Selatan	Meukek
4.	Aceh Timur	IdieureulakTimur, SimpangUlim
5.	Aceh Utara	Baktiya, Nibong, Nisam, Baktiya Barat, Tanah Luas, Lhoksukon, Matangkuliah, Dewantara, SyamtaliraBayu, Samudera, KutaMakmur, Lapang, Banda Baro, Cot Girek, SimpangKeramat, Tanah Jambo Aye, Syamtalira Aron

2.2Method

The available tuberculosis data for two years in 2016-2017 by using Machine learning technique Classification Model [4]–[6]. We computed tuberculosis treatment at data and observatories on python. It provides read/write support the most relevant tuberculosis and formats. We use the Machine Learning by using SVM [7]–[10] to classification the Tuberculosis time series by Classification and to know the distribution of Tuberculosis in the regency of Province of Aceh, Indonesia.

3. Result and Discussions

Figure 1 shows the result of Tuberculosis data from machine learning using the Gaussian Support Vector Machine (SVM) on which respectively plotted in classification. The hierarchical tuberculosis prevalence rate dataset, applied in the simulation, the distribution of Tuberculosis treatment based on histories show that the new case (1) on green color is more than gave distribution (0) on red color.

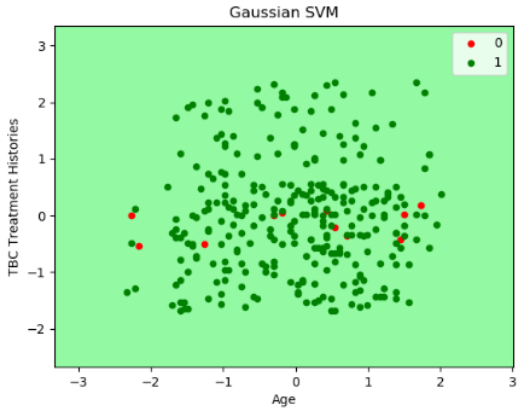
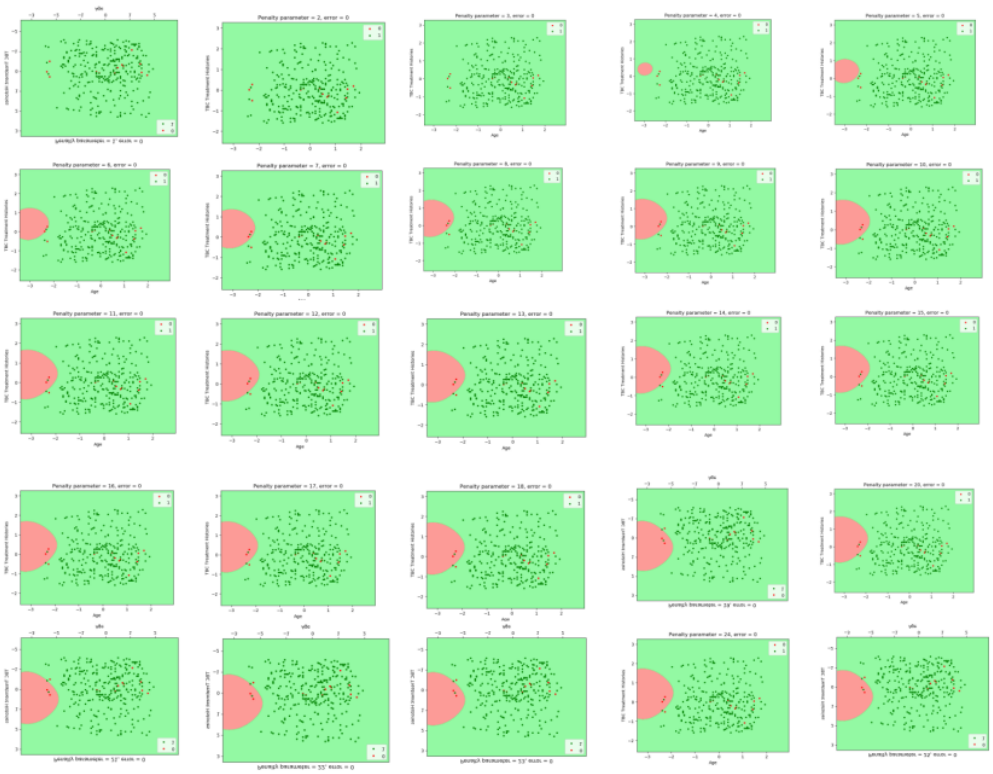


Figure 1. SVM result

In figure 1, showed the Gaussian SVM result of Tuberculosis treatment based on historical indicate the amount of news Tuberculosis is more.



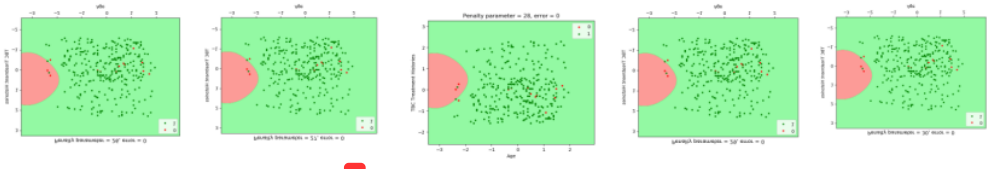


Figure 2. SVM Classification

Figure 2 show that the result of the SVM classification model [4]. The SVM classification of Tuberculosis treatment based on histories in Province of Aceh had been generated to be 30 penalty parameter model with error 0. It was how most Tuberculosis improved in the time lapse, and also able to discover a group of Tuberculosis in Province of Aceh area with a high prevalence of the disease that, far from improving their situation, are increasing the number of cases [4].

4. Conclusions

Compare with the previous studies, the classification accuracy obtained by using SVM was better to analysis and presented the Tuberculosis treatment based on time series histories in Province of Aceh, Indonesia. The result indicated the performance of the designed system was successful and could be used in Tuberculosis treatment analysis based on the histories in Aceh Utara and Lhoksuemawe has increased.

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