

## INTISARI

### **MORAN'S I TERMODIFIKASI UNTUK KONSTRUKSI FITUR PADA MODEL DIAGNOSIS *SMEAR-NEGATIVE PULMONARY TUBERCULOSIS* BERBASIS SVM DAN ATURAN**

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Indonesia, salah satu dari 22 negara dengan beban tuberkulosis (TB) tertinggi di dunia, memiliki jumlah kasus TB terbesar kedua di dunia. Menurut laporan WHO tahun 2015, Indonesia diestimasikan memiliki satu juta kasus TB baru per tahun. Namun, hanya sepertiga dari jumlah tersebut yang dapat terdeteksi. Hal ini menunjukkan adanya delay dalam diagnosis dan penanganan TB. Diagnosis TB sulit dilakukan, terutama pada kasus *Smear-Negative Pulmonary Tuberculosis* (SNPT). Menurut Pedoman Nasional Pengendalian TB di Indonesia, penemuan pasien dimulai dengan penemuan terduga TB, kemudian pemeriksaan fisik dan laboratoris, penentuan diagnosis dan penentuan tipe pasien TB. Penemuan terduga TB hanya berdasarkan gejala utama dan disertai gejala tambahan. Faktanya, beberapa gejala TB mirip dengan penyakit paru lainnya.

Penelitian ini mengusulkan model klasifikasi penemuan terduga TB paru kasus baru (model 1). Kebaruan pada model 1 adalah konstruksi fitur dengan Moran's I termodifikasi. Selain itu, kombinasi metode SVM-C4.5 serta metode voting menjadi kontribusi penelitian ini. Akurasi model 1 84,54%, spesifitas 85,24% dan sensitifitas 85,24% menunjukkan bahwa konstruksi fitur mampu menghasilkan aturan yang lebih sesuai dengan pedoman penemuan pasien TB.

Diagnosis SNPT ditegakkan oleh dokter terlatih TB berdasarkan pemeriksaan fisik dan laboratoris. Penelitian terkini masih memiliki sensitifitas yang belum optimal, yaitu 60%. Penelitian ini juga mengusulkan model klasifikasi diagnosis SNPT (model 2) menggunakan C4.5 membantu menegakkan diagnosis SNPT pada sumber daya terbatas. Aturan yang dihasilkan lebih sesuai dengan aturan diagnosis TB. Model 2 memiliki akurasi 95,63%, presisi 94,01% dan sensitifitas 93,98%. Performa ini menunjukkan bahwa model 2 memiliki kemampuan yang sangat baik dalam mendiagnosis SNPT.

*Kata kunci: Moran's I termodifikasi, data mining medis, data tuberkulosis, Terduga TB, SVM, rule-based*

## ABSTRACT

### ***MODIFIED MORAN'S I FOR FEATURE CONSTRUCTION IN SVM AND RULE BASED MODEL OF SMEAR-NEGATIVE PULMONARY TUBERCULOSIS DIAGNOSIS***

by

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Indonesia, one of the 22 high-burden countries, has the second largest numbers of tuberculosis (TB) cases in the world. According to WHO's 2015 report, Indonesia was estimated to have one million new TB cases per year. Unfortunately, only one-third of new TB cases are detected. The number shows a serious delay in TB diagnosis and treatment. Diagnosis of TB is difficult, especially in the case of smear-negative pulmonary TB (SNPT). According to National TB Control Guidelines in Indonesia, the discovery of the patient begins with the discovery of suspected TB, then laboratory and physical examination, determining the diagnosis and determining the type of TB patient. Discovery of TB suspected is only based on major symptoms and accompanied by additional symptoms. In fact, some of the symptoms of TB are similar to other lung diseases.

This study proposed a classification model of discovery the suspect of new pulmonary TB cases (the first model). The novelty in the first model is modified Moran's I in feature construction. In addition, a combination of the SVM -C4.5 methods and the voting method are also the contributions of the study. The accuracy, specificity and sensitivity of the model is 84.54%, 85.24% and 85.24% respectively. The model performance indicated that feature construction was able to produce rules more appropriate with the guidelines for TB patient discovery.

The diagnosis of SNPT is determined by the trained TB physicians based on laboratory and physical examinations. Unfortunately, the sensitivity of the latest study still has not optimal, which is 60%. The study also proposed the classification model of SNPT diagnosis using C4.5 to help determining the diagnosis of SNPT in limited resources. The resulting rule is more appropriate with the TB diagnostic rules. The model has an accuracy of 95.63%, precision of 94.01% and sensitivity of 93.98%. The model performance indicated that the model has a very good on diagnosing SNPT.

*Keywords: modified Moran's I, medical data mining, tuberculosis data, preliminary diagnosis, TB Screening, SVM, rule-based*