

Early Detection System for Pulmonary Tuberculosis Based on Patient Medical Records Using the C4.5 Algorithm at Andongsari Public Health Center

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ABSTRACT

Pulmonary Tuberculosis is an infectious disease that remains a public health problem. In the working area of Andongsari Public Health Center, tuberculosis ranked sixth among the ten most common diseases in 2024. In addition, the treatment success rate for Tuberculosis in 2024 was low at 22%, far below the national standard of 90%. Early detection at Andongsari Public Health Center is also still conducted manually through door-to-door activities and community screening, requiring considerable time, personnel, and resources. This condition indicates the need for a system to support more optimal early detection. This study aimed to develop SISKRIN-TB (Tuberculosis Screening System), a website-based system using the C4.5 algorithm as a classification method. The study used 141 patient medical records, consisting of 114 records classified as At Risk of Pulmonary Tuberculosis and 27 records classified as Not at Risk of Pulmonary Tuberculosis. The research stages included requirements analysis, system design, system development, and system testing. The C4.5 algorithm generated a decision tree with 5 rules, which were implemented using the Laravel framework. Evaluation using a confusion matrix showed that the 60:40 training-testing data split achieved the best accuracy of 96.49%, with 97.83% precision and 90.91% recall. Implementation testing using 57 testing data achieved an accuracy of 96.49%, while Black Box Testing showed that all system functions operated according to the specified requirements. Therefore, SISKRIN-TB can support early Pulmonary Tuberculosis screening in a faster, structured, and efficient manner.

Key Words: Pulmonary Tuberculosis, Early Detection, SISKRIN-TB, C4.5 Algorithm, Medical Records, Website.