

AN EXPERT SYSTEM APPLICATION FOR EARLY DIAGNOSIS OF LIVESTOCK DISEASES USING MAMDANI FUZZY LOGIC BASED ON A WEBSITE

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ABSTRACT

Pig diseases are a significant cause of economic losses for farmers, particularly when treatment is delayed, leading to disease spread and increased mortality. Additionally, high consultation costs and limited access to animal health centers (Puskesmas) often compel farmers to perform manual diagnoses, which are inaccurate and may exacerbate livestock conditions. This research developed a web-based expert system for diagnosing pig diseases using the Mamdani fuzzy logic method to assist farmers in independently diagnosing diseases based on emerging symptoms. The system was implemented in Python using the Flask framework, with Bootstrap for the user interface and Supabase as the cloud-based database. The diagnostic process involves three main stages: symptom fuzzification, fuzzy rule-based inference, and defuzzification using the centroid method. Testing was conducted on 8 disease types and 45 symptoms using validated test data; the system achieved 100% accuracy and consistently provided reliable diagnostic results based on the input symptoms. Additionally, the system features online consultation with experts, enhancing the ease and effectiveness of pig disease identification.

Keywords: Expert System, Mamdani Fuzzy Logic, Pig Disease, Flask, Supabase