



INTISARI

MODEL PENALARAN BERBASIS KASUS UNTUK DIAGNOSIS PENYAKIT ABSES GIGI

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Abses gigi merupakan salah satu permasalahan kesehatan gigi dan mulut dengan prevalensi tinggi di Indonesia. Karakteristik gejala antarjenis abses yang saling tumpang tindih sering kali menyulitkan proses diagnosis awal secara tepat, terutama pada kondisi dengan keterbatasan akses terhadap pakar dan rendahnya kesadaran masyarakat untuk melakukan pemeriksaan dini. Oleh karena itu, diperlukan model penalaran komputasional yang mampu meniru pola berpikir pakar dalam mengenali kemiripan gejala antar kasus.

Penelitian ini mengembangkan model diagnosis penyakit abses gigi berbasis *Case-Based Reasoning* (CBR) dengan algoritma *Nearest Neighbor* (NN) untuk menentukan tingkat kemiripan antar kasus berdasarkan nilai similaritas antar fitur. Algoritma NN digunakan karena mampu mengukur kesamaan pola secara terukur dengan mempertimbangkan bobot fitur, sehingga proses diagnosis dapat dilakukan secara objektif, konsisten, dan adaptif terhadap penambahan kasus baru. Model dibangun menggunakan 116 data rekam medis pasien yang mencakup empat fitur utama usia, jenis kelamin, gejala klinis, dan faktor risiko dengan pembobotan ditentukan berdasarkan penilaian pakar. Proses penalaran mengikuti empat tahap utama, yaitu *retrieve*, *reuse*, *revise*, dan *retain*, sedangkan pengujian dilakukan pada tiga mode algoritma (1NN, 3NN, dan 5NN) untuk menganalisis pengaruh jumlah tetangga terdekat terhadap kinerja diagnosis sistem.

Hasil pengujian menunjukkan bahwa model mencapai akurasi 100% pada 24 data uji dari basis kasus, serta 70,96% pada mode 1NN dan 3NN, dan meningkat menjadi 80,64% pada mode 5NN terhadap 31 data baru yang disusun mandiri dan telah divalidasi pakar. Nilai rata-rata *precision* sebesar 0,76, *recall* sebesar 0,83, dan *F1-score* sebesar 0,79 menegaskan bahwa peningkatan jumlah tetangga terdekat memberikan pengaruh positif terhadap stabilitas dan keseimbangan hasil diagnosis. Dengan demikian, model CBR–NN yang dikembangkan mampu merepresentasikan pengetahuan pakar secara komputasional serta mendukung diagnosis awal penyakit abses gigi secara akurat, konsisten, dan adaptif terhadap penambahan kasus baru.

Kata Kunci: *Case-Based Reasoning*, *Nearest Neighbor*, abses gigi, sistem pakar, diagnosis.



ABSTRACT

CASE-BASED REASONING MODEL FOR DIAGNOSING ABSCESS DISEASE

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Dental abscesses are a highly prevalent oral health problem in Indonesia. The overlapping characteristics of symptoms between different types of abscesses often complicate accurate initial diagnosis, especially in settings with limited access to experts and low public awareness of early screening. Therefore, a computational reasoning model capable of mimicking expert reasoning patterns in recognizing symptom similarities between cases is needed.

This study developed a case-based reasoning (CBR) diagnostic model for dental abscesses using the Nearest Neighbor (NN) algorithm to determine the level of similarity between cases based on feature similarity values. The NN algorithm was used because it can quantify pattern similarity by considering feature weights, allowing the diagnosis process to be objective, consistent, and adaptive to the addition of new cases. The model was built using 116 patient medical records covering four key features—age, gender, clinical symptoms, and risk factors—with weighting determined based on expert assessment. The reasoning process follows four main stages: retrieve, reuse, revise, and retain. Testing was conducted on three algorithm modes (1NN, 3NN, and 5NN) to analyze the effect of the number of nearest neighbors on the system's diagnostic performance.

Test results showed that the model achieved 100% accuracy on 24 test data sets from the case base, 70.96% in the 1NN and 3NN modes, and increased to 80.64% in the 5NN mode on 31 new data sets independently compiled and validated by experts. The average precision of 0.76, recall of 0.83, and F1-score of 0.79 confirmed that increasing the number of nearest neighbors positively impacted the stability and balance of diagnostic results. Thus, the developed CBR–NN model is capable of computationally representing expert knowledge and supporting the initial diagnosis of dental abscess accurately, consistently, and adaptively to new cases.

Keywords: Case-Based Reasoning, Nearest Neighbor, dental abscess, expert system, diagnosis.