KLASIFIKASI TINGKAT KEPARAHAN OSTEOARTRITIS LUTUT MENGGUNAKAN *NASNET MOBILE* PADA CITRA *X-RAY*

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ABSTRAK

KLASIFIKASI TINGKAT KEPARAHAN OSTEOARTRITIS LUTUT MENGGUNAKAN *NASNET MOBILE* PADA CITRA *X-RAY*

Osteoartritis (OA) lutut adalah penyakit yang paling banyak menyebabkan disabilitas pada populasi lanjut usia dan terjadi karena rusaknya tulang rawan artikular dan tepi sendi. OA lutut dapat diklasifikasi sesuai tingkat keparahannya berdasarkan ciri-ciri patologis pada citra *X-ray*. Pada umumnya, tingkat keparahan tersebut diklasifikasi menggunakan sistem penilaian *Kellgren-Lawrence* (KL) yang dibagi menjadi lima tingkatan, yaitu *grade* 0 sampai *grade* 4. Penelitian ini bertujuan untuk mengklasifikasi OA lutut berdasarkan tingkat keparahannya dengan mengimplementasikan salah satu algoritma *Convolutional Neural Network*, yaitu *NASNet Mobile*. Penelitian ini menggunakan tiga kelas citra *X-ray* lutut berdasarkan sistem penilaian *Kellgren-Lawrence* (KL), yaitu *grade* 0 (normal), *grade* 3 (sedang), dan *grade* 4 (parah) yang diperoleh dari website Kaggle. Jumlah data yang digunakan sebanyak 1500 data dengan rincian 500 data pada setiap kelas. Proses pelatihan model menggunakan uji coba pembagian data secara acak dan *k-fold cross validation* serta uji coba *learning rate*, dan *batch size*. Akurasi terbaik diperoleh pada pembagian data *k-fold cross validation* ketika *learning rate* 0.001 dengan *batch size* 32, yaitu 92.53%, sensitivitas 92.72%, dan spesifisitas 96.32%.

Kata kunci: *Convolutional Neural Netwok* (CNN), *K-fold Cross Validation*, *NASNet Mobile*, Osteoartritis Lutut, *X-ray*

ABSTRACT

KNEE OSTEOARTHRITIS SEVERITY CLASSIFICATION USING MOBILE NASNET ON X-RAY IMAGES

Knee osteoarthritis (OA) is the most common disease-causing disability in the elderly population, which occurs due to the destruction of articular cartilage and joint edges. Pathological features on X-ray images aid in classifying knee osteoarthritis (OA) according to its severity. The Kellgren-Lawrence (KL) scoring system, which includes five grades ranging from grade 0 to grade 4, commonly evaluates OA severity. This study aims to classify knee osteoarthritis using the NasNet Mobile algorithm, a type of Convolutional Neural Network. The study utilizes three categories of knee X-ray images, determined by the Kellgren-Lawrence grading system: grade 0 (normal), grade 3 (moderate), and grade 4 (severe). The total data used is 1500, with 500 details in each class. The model training process uses random data division, k-fold cross-validation, learning rate, and batch-size trials. The best accuracy was obtained in the k-fold cross validation when the learning rate was 0.001 with a batch size of 32, which was 92.53% with a sensitivity of 92.72%, and specificity of 96.32%.

Keywords: Convolutional Neural Netwok (CNN), K-fold Cross Validation, Knee osteoarthritis, NASNet Mobile, X-ray

DAFTAR ISI

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