SISTEM DIAGNOSIS PENYAKIT GINJAL BERDASARKAN CITRA *CT-RADIOGRAPHY* MENGGUNAKAN *CONVOLUTIONAL NEURAL NETWORK* (CNN) MODEL *RESNET-50*

SKRIPSI

Disusun Oleh

ICHA DWI SAFIRA

09020220033

PROGRAM STUDI MATEMATIKA

FAKULTAS SAINS DAN TEKNOLOGI

UNIVERSITAS ISLAM NEGERI SUNAN AMPEL

SURABAYA

2024

PERNYATAAN KEASLIAN

Saya yang bertanda tangan di bawah ini,

Nama	:	ICHA DWI SAFIRA
NIM	:	09020220033
Program Studi	:	Matematika
Angkatan	:	2020

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Yang menyatakan,

ICHA DWI SAFIRA

NIM. 09020220033

LEMBAR PERSETUJUAN PEMBIMBING

Skripsi oleh

Nama	:	ICHA DWI SAFIRA
NIM	:	09020220033
Judul proposal skripsi	:	SISTEM DIAGNOSIS PENYAKIT GINJAL BERDASARKAN CITRA *CT-RADIOGRAPHY* MENGGUNAKAN *CONVOLUTIONAL NEURAL NETWORK* (CNN) MODEL *RESNET-50*

telah diperiksa dan disetujui untuk diujikan.

Pembimbing I

Dr. Dian Candra Rini Novitasari, M.Kom
NIP. 198511242014032001

Pembimbing II

Dr. Lutfi Hakim, M.Ag
NIP. 197312252006041001

Mengetahui,
Ketua Program Studi Matematika
UIN Sunan Ampel Surabaya

Yuniar Farida, M.T
NIP. 197905272014032002

PENGESAHAN TIM PENGUJI SKRIPSI

Skripsi oleh

Nama	:	ICHA DWI SAFIRA
NIM	:	09020220033
Judul Skripsi	:	SISTEM DIAGNOSIS PENYAKIT GINJAL BERDASARKAN CITRA *CT-RADIOGRAPHY* MENGGUNAKAN *CONVOLUTIONAL NEURAL NETWORK* (CNN) MODEL *RESNET-50*

Telah dipertahankan di depan Tim Penguji
pada tanggal 2 Januari 2024

Mengesahkan,
Tim Penguji

Penguji I

Putroue Keumala Intan, M.Si
NIP. 198805282018012001

Penguji II

Nurissaidah Ulinnuha, M.Kom
NIP. 199011022014032004

Penguji III

Dr. Dian Candra Rini Novitasari, M.Kom
NIP. 198511242014032001

Penguji IV

Dr. Lutfi Hakim, M.Ag
NIP. 197312252006041001

Mengetahui,
Dekan Fakultas Sains dan Teknologi
UIN Sunan Ampel Surabaya

A. Saepul Hamdani, M.Pd.
NIP. 196507312000031002

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KEMENTERIAN AGAMA
UNIVERSITAS ISLAM NEGERI SUNAN AMPEL SURABAYA
PERPUSTAKAAN
Jl. Jend. A. Yani 117 Surabaya 60237 Telp. 031-8431972 Fax.031-8413300
E-Mail: perpus@uinsby.ac.id

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Nama : ICHA DWI SAFIRA
NIM : 090202200 33
Fakultas/Jurusan : SAINS DAN TEKNOLOGI / MATEMATIKA
E-mail address : dwiicha 04 @ gmail. com

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ABSTRAK

SISTEM DIAGNOSIS PENYAKIT GINJAL BERDASARKAN CITRA *CT-RADIOGRAPHY* MENGGUNAKAN *CONVOLUTIONAL NEURAL NETWORK* (CNN) MODEL *RESNET-50*

Penyakit ginjal dialami oleh lebih dari 10% populasi global yang berjumlah lebih dari 800 juta individu pada tahun 2022. Pada tahun 2040, penyakit ginjal diperkirakan menjadi urutan ke-5 sebagai penyebab kematian utama. Penyakit ginjal paling umum yang dapat mengganggu fungsi ginjal diantaranya Renal Cell Carcinoma (tumor ginjal), kista ginjal, dan nefrolitiasis (batu ginjal). Sebelum dilakukan pengobatan, diagnosis penyakit ginjal penting dilakukan untuk menentukan jenis dan tingkat keparahan penyakit ginjal yang dialami oleh seorang pasien, salah satunya menggunakan citra Computer Tomography (CT) Radiography. Berdasarkan data citra yang diperoleh, terdapat data normal dan 3 jenis penyakit ginjal, yaitu kista, tumor, dan batu ginjal. Tujuan dari penelitian ini yaitu mengetahui performa Convolutional Neural Network (CNN) model ResNet-50 dalam mendiagnosis penyakit ginjal berdasarkan hasil klasifikasi penyakit ginjal. Hasil yang optimal pada penelitian ini diperoleh pada uji coba learning rate 0,001 dengan probabilitas dropout 0,1 dan jumlah mini batch size 32. Uji coba tersebut menghasilkan akurasi, sensitivitas, dan spesifisitas masing-masing 100%, 100%, dan 100% dengan waktu komputasi 15 jam 53 menit 34 detik. Hasil tersebut menunjukkan bahwa metode CNN model ResNet-50 mampu mendiagnosis penyakit ginjal dengan baik.

Kata kunci: CNN, Penyakit ginjal, ResNet-50

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ABSTRACT

DIAGNOSIS SYSTEM OF KIDNEY DISEASES BASED ON CT-RADIOGRAPHY IMAGES USING CONVOLUTIONAL NEURAL NETWORK (CNN) RESNET-50 MODEL

Kidney disease affects more than 10% of the global population of more than 800 million individuals in 2022. In 2040, kidney disease is predicted to be the 5th leading cause of major death. The most common kidney diseases that can impair kidney function include Renal Cell Carcinoma (kidney tumor), kidney cysts, and nephrolithiasis (kidney stones). Before treatment can be administered, the diagnosis of kidney disease is essential to determine the type and severity of kidney disease experienced by a patient, one of which can be done using Computer Tomography (CT) Radiography images. Based on the obtained image data, there are normal data and three types of kidney diseases, namely cysts, tumors, and kidney stones. The aim of this research is to determine the performance of the Convolutional Neural Network (CNN) ResNet-50 model in diagnosing kidney disease based on the results of kidney disease classification. Optimal results in this research were obtained in a learning rate of 0.001 with a dropout probability of 0.1 and a mini batch size of 32. The trial produced accuracy, sensitivity and specificity of 100%, 100% and 100% respectively with a computing time of 15 hours 53 minutes 34 seconds. These results show that the CNN ResNet-50 model method is able to diagnose kidney disease good.

Keywords: Kidney disease, CNN, ResNet-50

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