Genetic Algorithm For Convolutional Neural Network Hyperparameter Tuning

JURNAL

Oleh :

Fian Yulio Santoso

NIM : 972021002

Program Studi Magister Sistem Informasi
Fakultas Teknologi Informasi
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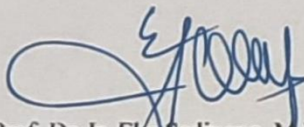**Salatiga**
April 2023

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Diajukan Kepada Program Studi Magister Sistem Informasi guna memenuhi sebagian
dari pada persyaratan untuk mencapai gelar Magister Komputer

Disetujui Oleh,

<u>Prof. Dr. Ir. Eko Sediyono, M.Kom.</u>
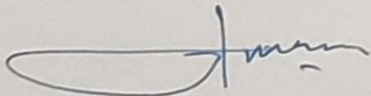Pembimbing 1
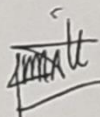
<u>Hindriyanto D. Purnomo, Ph.D.</u>
Pembimbing 2

Diketahui Oleh,

<u>Prof. Ir. Danny Manongga, M.Sc., Ph.D..</u>
Dekan FTI

<u>Yessica Nataliani, S.Si., M.Kom., Ph.D.</u>
Kepala Program Studi S2 Sistem Informasi

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2023

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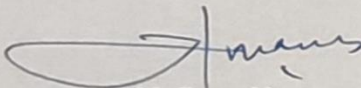|		
Judul Artikel	:	Genetic Algorithm For Convolutional Neural Network Hyperparameter Tuning
Nama	:	Fian Yulio Santoso
NIM	:	972021002
Program Studi	:	S2 Sistem Informasi
Fakultas	:	Teknologi Informasi

Menyetujui,

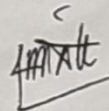Prof. Dr. Ir. Eko Sediyono, M.Kom.　　　　　Hindriyanto D. Purnomo, Ph.D.
Pembimbing 1　　　　　　　　　　　　　　　Pembimbing 2

Mengesahkan,

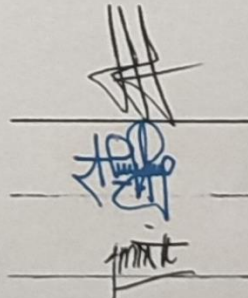Prof. Ir. Danny Manongga, M.Sc., Ph.D.　　　Yessica Nataliani, S.Si., M.Kom., Ph.D.
Dekan FTI　　　　　　　　　　　　　　Kepala Program Studi S2 Sistem Informasi

Dinyatakan Lulus Ujian Tanggal : 11 April 2023

Penguji:

1. Dr. Irwan Sembiring, ST., M.Kom.

2. Hendry, Ph.D.

3. Yessica Nataliani, S.Si., M.Kom., Ph.D.

Abstract—**Image classification has been applied in various fields, from agriculture to health. In order to perform well, an image classification method needs an appropriate hyperparameter setting. However, tuning hyperparameters in a classification method is not an easy task. Many approaches have been developed to solve the problem, such as combining metaheuristics methods with a convolutional neural network (CNN). An example of metaheuristics method is genetic algorithm. Genetic algorithms have been proven to optimize machine learning and deep learning. This research contributes to the automatic tuning of hyperparameters using genetic algorithms. The proposed method is evaluated using MNIST dataset. The experiments results show that using a genetic algorithm for tuning hyperparameters automatically, the accuracy of validation data is 97.02% and the accuracy of training data is 99.77%. The performance of Genetic Algorithm is compared with Harmony Search. The accuracy of Harmony Search for validation data is 83.96% and for training data is 88.33%. The Genetic algorithm takes 24,97 seconds for training while Harmony Search needs 56.44 seconds.**