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KARYA ILMIAH : JURNAL ILMIAH**

Judul Jurnal Ilmiah (Artikel) : Cardiac Disease Classification Using Two-Dimensional Thickness and Few-Shot Learning Based on Magnetic Resonance Imaging Image Segmentation
 Jumlah Penulis : Tujuh (**Adi Wibowo**, Pandji Triadyaksa, Aris Sugiharto, Eko Adi Sarwoko, Fajar Agung Nugroho, Hideo Arai, Masateru Kawakubo)
 Status Pengusul : penulis ke 1 (Satu) / Korespondensi
 Identitas Jurnal Ilmiah : a. Nama Jurnal : Journal of Imaging
 b. Nomor ISSN : 2313-433X
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 d. Penerbit : MDPI
 e. DOI artikel (jika ada) : <https://doi.org/10.3390/jimaging8070194>
 f. Alamat web jurnal : <https://www.mdpi.com/journal/jimaging>
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2. Ruang lingkup dan kedalaman pembahasan:

Paper ini membahas penggunaan deep neural networks untuk analisis cardiac cine magnetic resonance imaging (MRI) dan mengatasi keterbatasan data yang tersedia untuk klasifikasi. Diusulkan pendekatan baru untuk klasifikasi penyakit jantung (kelompok pasien kardiomiopati) hanya dengan menggunakan peta output yang tersegmentasi.


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Semarang,
Reviewer 1


Prof. Dr. Kusworo Adi, S.Si., M.T.
NIP : 197203171998021001
Unit Kerja: Fakultas Sains dan Matematika

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d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,5
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Catatan Penilaian artikel oleh Reviewer :

1. Kesesuaian dan kelengkapan unsur isi jurnal:

Konten jurnal sudah lengkap sesuai dengan ketentuan yang berlaku. Artikel meliputi abstract, introduction, materials and methods, results and discussion, conclusions, acknowledgment, dan references

2. Ruang lingkup dan kedalaman pembahasan:

Paper ini membahas penggunaan deep neural networks dalam analisis cardiac cine magnetic resonance imaging (MRI) dan bagaimana mengatasi keterbatasan data yang tersedia untuk klasifikasi. Ditawarkan pendekatan baru dan cepat dalam mendiagnosis penyakit jantung khususnya pada kondisi kardiomiopati dengan menggunakan cine MRI berbasis peta output yang tersegmentasi.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Dalam studi tersebut, telah diperoleh sekumpulan informasi yang didukung oleh metodologi yang tepat dan didukung oleh referensi yang terbaru, yaitu kurang dari 5 tahun yang lalu, dengan total sebanyak 29.

4. Kelengkapan unsur dan kualitas terbitan:

Paper ini dipublikasikan di sebuah jurnal berkualitas Q2 Computer Graphics and Computer-Aided Design dengan SJR 0,73 serta H-Index 26 yang diterbitkan oleh MDPI. Paper tersebut memiliki semua unsur yang diperlukan dengan sangat baik.

Semarang,
Reviewer 2



Drs. Bayu Surarso, M.Sc. Ph.D.
NIP. 196311051988031001.
Unit Kerja: Fakultas Sains dan Matematika

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Cardiac Disease Classification Using Two-Dimensional Thickness and Few-Shot Learning Based on Magnetic Resonance Imaging Image Segmentation

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Abstract

Cardiac cine magnetic resonance imaging (MRI) is a widely used technique for the noninvasive assessment of cardiac functions. Deep neural networks have achieved considerable progress in overcoming various challenges in cine MRI analysis. However, deep learning models cannot be used for classification because limited cine MRI data are available. To overcome this problem, features from cine image settings are derived by handcrafting and addition of other clinical features to the classical machine learning approach for ensuring the model fits the MRI device settings and image parameters required in the analysis. In this study, a novel method was proposed for classifying heart disease (cardiomyopathy patient groups) using only segmented output maps. In the encoder–decoder network, the fully convolutional EfficientNetB5-UNet was modified to perform the semantic segmentation of the MRI image slice. A two-dimensional thickness algorithm was used to combine the segmentation outputs for the 2D representation of images of the end-diastole (ED) and end-systole (ES) cardiac volumes. The thickness images were subsequently used for classification by using a few-shot model with an adaptive subspace classifier. Model performance was verified by applying the model to the 2017 MICCAI Medical Image Computing and Computer-Assisted Intervention dataset. High segmentation performance was achieved as follows: the average Dice coefficients of segmentation were 96.24% (ED) and 89.92% (ES) for the left ventricle (LV); the values for the right ventricle (RV) were 92.90% (ED) and 86.92% (ES). The values for myocardium were 88.90% (ED) and 90.48% (ES). An accuracy score of 92% was achieved in the classification of various cardiomyopathy groups without clinical features. A novel rapid analysis approach was proposed for heart disease diagnosis, especially for cardiomyopathy conditions using cine MRI based on segmented output maps. © 2022 by the authors.

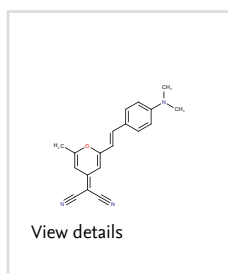
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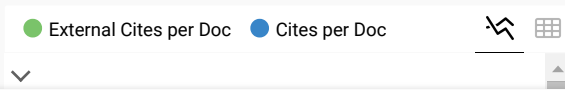
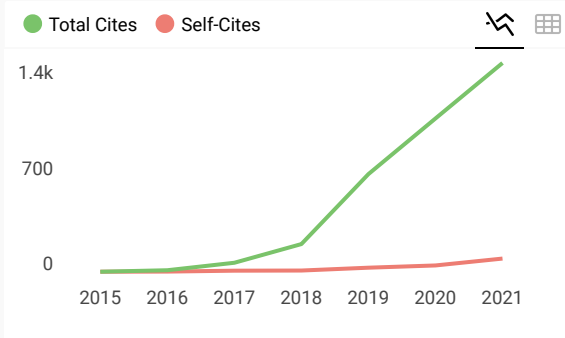
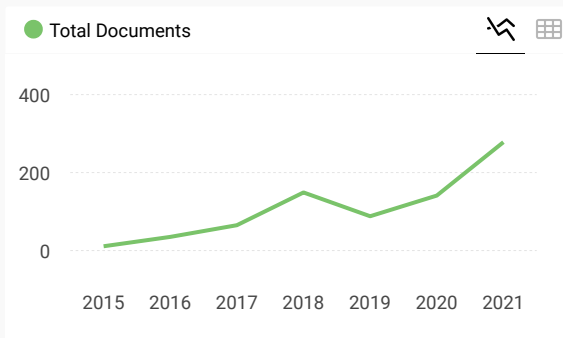
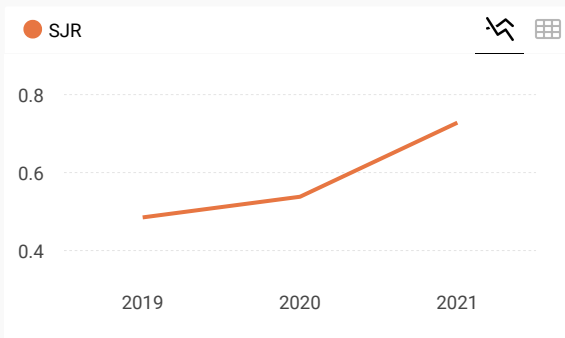
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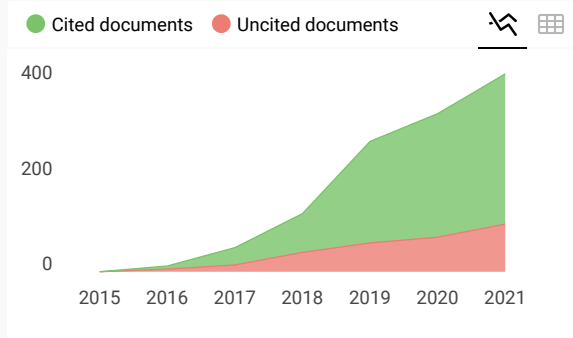
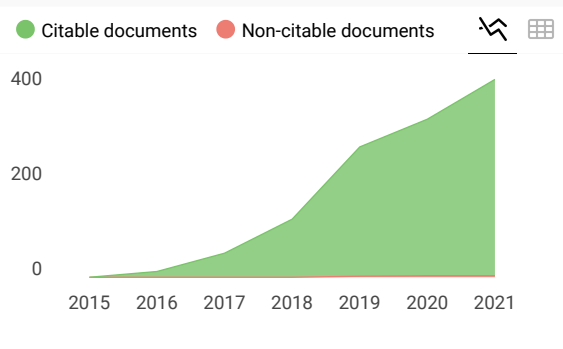
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Wed, Jul 6, 2022 at 4:51 PM

Reply-To: Samantha Li <samantha.li@mdpi.com>, "J. Imaging Editorial Office" <jimaging@mdpi.com>

To: Adi Wibowo <bowo.adi@live.undip.ac.id>

Cc: Pandji Triadyaksa <p.triadyaksa@fisika.fsm.undip.ac.id>, Aris Sugiharto <arissugiharto@lecturer.undip.ac.id>, Eko Adi Sarwoko <ekoadisarwoko@lecturer.undip.ac.id>, Fajar Agung Nugroho <fajar@lecturer.undip.ac.id>, Hideo Arai <fukuoka.hideo@gmail.com>, Masateru Kawakubo <kawakubo.masateru.968@m.kyushu-u.ac.jp>, "J. Imaging Editorial Office" <jimaging@mdpi.com>, Samantha Li <samantha.li@mdpi.com>

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Manuscript ID: jimaging-1775644

Type of manuscript: Article

Title: Classification of Cardiac Disease using 2D Thickness and Few-Shot Learning Based on MRI Image Segmentation

Authors: Adi Wibowo *, Pandji Triadyaksa, Aris Sugiharto, Eko Adi Sarwoko, Fajar Agung Nugroho, Hideo Arai, Masateru Kawakubo

Received: 1 June 2022

E-mails: bowo.adi@live.undip.ac.id, p.triadyaksa@fisika.fsm.undip.ac.id, arissugiharto@lecturer.undip.ac.id, ekoadisarwoko@lecturer.undip.ac.id, fajar@lecturer.undip.ac.id, fukuoka.hideo@gmail.com, kawakubo.masateru.968@m.kyushu-u.ac.jp

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Fri, Jun 17, 2022 at 8:08 AM

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Authors: Adi Wibowo *, Pandji Triadyaksa, Aris Sugiharto, Eko Adi Sarwoko, Fajar Agung Nugroho, Masateru Kawakubo, Hideo Arai

Received: 1 June 2022

E-mails: bowo.adi@live.undip.ac.id, p.triadyaksa@fisika.fsm.undip.ac.id, arissugiharto@lecturer.undip.ac.id, ekoadisarwoko@lecturer.undip.ac.id, fajar@lecturer.undip.ac.id, kawakubo.masateru.968@m.kyushu-u.ac.jp, fukuoka.hideo@gmail.com

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To: Adi Wibowo <bowo.adi@live.undip.ac.id>

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Type of manuscript: Article

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Authors: Adi Wibowo *, Pandji Triadyaksa, Aris Sugiharto, Eko Adi Sarwoko, Fajar Agung Nugroho, Masateru Kawakubo, Hideo Arai

Received: 1 June 2022

E-mails: bowo.adi@live.undip.ac.id, p.triadyaksa@fisika.fsm.undip.ac.id, arissugiharto@lecturer.undip.ac.id, ekoadisarwoko@lecturer.undip.ac.id, fajar@lecturer.undip.ac.id, kawakubo.masateru.968@m.kyushu-u.ac.jp, fukuoka.hideo@gmail.com

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