IMPLEMENTASI *VIDEO CAPTIONING* MENGGUNAKAN *OBJECT RELATIONAL GRAPH* DENGAN PENDEKATAN *NON-AUTOREGRESSIVE*

SKRIPSI

Diajukan untuk Memenuhi Sebagian dari
Syarat Memperoleh Gelar Sarjana Komputer
Program Studi Ilmu Komputer

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UNIVERSITAS PENDIDIKAN INDONESIA
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Agustus 2023

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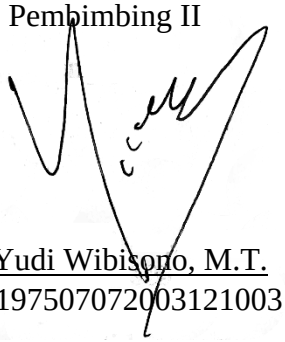

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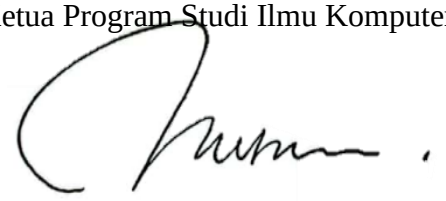

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SURAT PERNYATAAN

Dengan ini saya menyatakan bahwa skripsi/tesis/disertasi dengan judul "Implementasi *Video Captioning* Menggunakan *Object Relational Graph* dengan Pendekatan *Non-Autoregressive*" ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung risiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

Bandung, Juli 2023

Yang membuat pernyataan

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KATA PENGANTAR

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Penulis menyadari bahwa selama penyusunan skripsi ini tidak terlepas dari peran, dukungan, dan bantuan dari berbagai pihak baik secara langsung atau tidak langsung. Oleh karena itu, penulis sampaikan terima kasih yang sebesar-besarnya kepada:

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Bandung, Juli 2023

Penulis

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ABSTRAK

Kemampuan video captioning dalam menghasilkan deskripsi singkat yang menjelaskan isi dari video secara detail dengan waktu inference yang rendah merupakan hal yang penting. Namun, metode-metode yang ada saat ini memiliki kekurangan pada kedua aspek tersebut. Pada penelitian ini, kami mengajukan sebuah model video captioning yang bernama *Object Relational Graph* dengan pendekatan *Non-autoregressive Coarse-to-Fine* (ORG-NACF) untuk mengatasi masalah video captioning pada kedua aspek tersebut. Modul ORG digunakan untuk memperoleh informasi objek secara detail dan mempelajari hubungan antar objek. Modul NACF bersama sequential cross attention digunakan untuk menyelesaikan masalah waktu *inference* yang tinggi dan menjaga kualitas caption ketika pembangkitan *caption*. Evaluasi dengan Dataset MSR-VTT menunjukan hasil unjuk kerja Model ORG-NACF yang setara bahkan melebihi dari model *state-of-the-ar*t pada beberapa metrik serta memiliki kelebihan lain yaitu waktu *inference* pembangkitan *caption* yang lebih rendah. Hasil ini menunjukan bahwa Model ORG-NACF mampu membangkitkan *caption* yang deskriptif dengan waktu *inference* yang lebih rendah dibandingkan dengan metode yang ada saat ini.

Kata Kunci: *Video Captioning, Transformer, Object Detection, Graph Convolutional Network, Convolutional Neural Network.*

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ABSTRACT

The ability of video captioning to generate a detailed caption that explains the content of the video with low inference is important. However, existing methods have limitations in both aspects. In this paper, we propose a video captioning model Object Relational Graph with Non-autoregressive Coarse to Fine (ORG-NACF) approach to tackle the video captioning problem in both aspects. The ORG module is used to obtain detailed object information and learn the relationship between the objects. The NACF module along with sequential cross attention is used to solve the problem of high inference time and maintain caption quality during caption generation. Experimental evaluation on benchmark MSR-VTT dataset shows that the performance of the ORG-NACF model is competitive and even exceeds the state-of-the-art model on several metrics and has the advantage of faster inference time. This model achieved 7 times more faster inference time than the baseline model. These results show that the ORG-NACF Model is able to generate descriptive and detailed captions with lower inference time compared to existing methods.

Kata Kunci: *Video Captioning, Transformer, Object Detection, Graph Convolutional Network, Convolutional Neural Network.*

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