

Seminar and Workshop on Object Recognition using Deep Learning at Sam Ratulangi University Manado

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Abstract

Purpose: This seminar and workshop aim to address the lack of understanding among students regarding object recognition with deep learning. By exploring the concepts and applications of deep learning in object detection and recognition, participants will gain insights into this crucial aspect of computer vision.

Method: The event will feature lectures, practical demonstrations, and hands-on workshops conducted by experts in the field. Participants will engage in interactive sessions to deepen their understanding of convolutional neural networks and other deep learning techniques for object recognition.

Practical Applications: The knowledge gained from this seminar and workshop will have practical implications across various industries, including autonomous vehicles, healthcare, security systems, and robotics. Participants will learn how to apply deep learning algorithms to solve real-world problems related to object detection and recognition.

Conclusion: By the end of the seminar and workshop, participants are expected to have acquired a deeper understanding of object recognition with deep learning and its practical applications. This will contribute to bridging the gap between theoretical knowledge and real-world implementation in the field of computer vision.



Introduction

Deep learning is used to create neural networks in computer vision, which then instruct the system on how to process and analyze data (Su et al., 2018). Object detection is a subfield of computer vision (Dewi, Chen, & Yu, 2020a). Both industry and research institutions are inseparable from their contributions to the development of machine learning and deep learning. Even in retrospect, the origins of machine learning and deep learning are attributed to research conducted by universities and higher education institutions.

In the world of education at universities and colleges, the application of machine learning and deep learning in everyday life is a new challenge (Aini, Lutfiani, Kusumah, & Zahran, 2021). Universities are racing against time to produce as many graduates with expertise in machine learning as possible to meet the current industry demands (Wantania, Sompie, & Kambey, 2020). Machine learning and deep learning are believed to help humans learn better according to educational goals. Computer technology related to computer vision and image processing related to object detection in certain classes is object detection (Khamdi, Susantok, & Leopard, 2017) (Dompeipen, Najooan, Elektro, Sam, & Manado, 2021). Objects referred to include humans, buildings, cars, tables, dogs, cats, and others. Object recognition is a technique for identifying objects in images and videos. This is one of the most important applications of machine learning and deep learning. The goal of this field is to teach machines to understand (recognize) image content as humans do (Utami, Andika, & Attamimi, 2021) (Dewi, Christanto, & Henoch, 2022).

Due to the rapid pace of technological advancement and the numerous benefits of deep learning applications in our daily lives, it is crucial to learn deep learning concepts early on. To address this need, we organized a seminar and workshop on "Object Detection and Recognition" at Sam Ratulangi University, Manado.

The aim of this seminar and workshop is to help students become proficient in machine learning and deep learning. Additionally, this seminar is expected to provide insights into real-world applications of object recognition to students. One fundamental topic that must be understood is the concept of "Object Detection and Recognition" itself, which is the basis of deep learning. This seminar and workshop were conducted online via Zoom on September 1, 2021. Online seminars were conducted to facilitate participants in understanding all the material presented by the speakers. Through this activity, it is hoped that talents, skills, and professionalism among lecturers and students, especially in the field of machine learning and deep learning, will be fostered. Subsequently, it is highly anticipated that lecturers will be able to develop concrete plans and steps that the education sector must take to produce quality graduates who can meet the demands of the job market.

Method

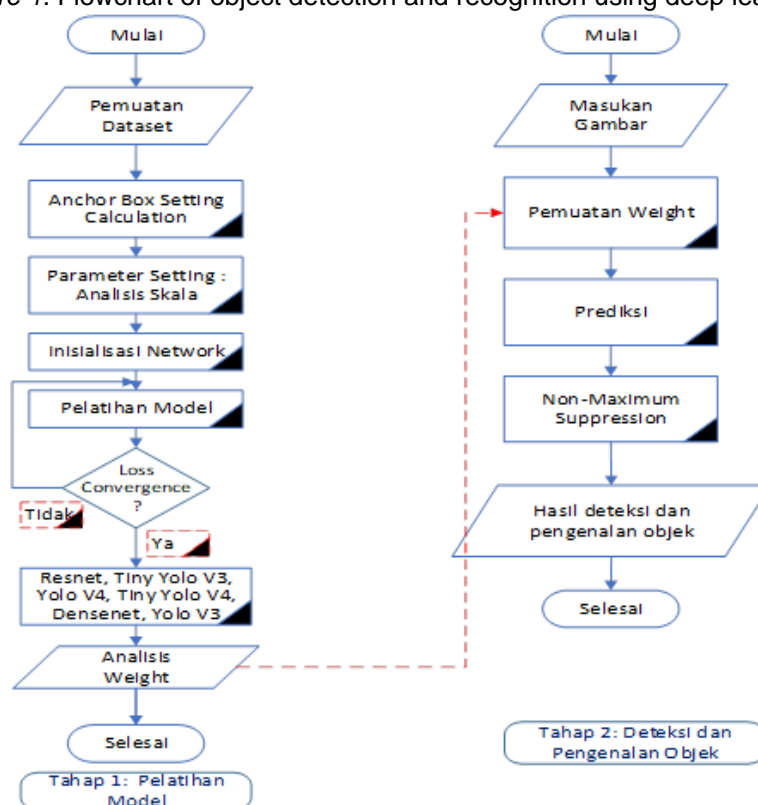
This seminar and workshop were conducted online via Zoom meeting on September 1, 2021. The seminar was attended by approximately 300 participants and could be accessed through the YouTube link of Sam Ratulangi University Manado (<https://www.youtube.com/watch?v=5f1VED816eQ&t=0s>). The seminar took place from 9:00 AM to 12:00 PM WIB and the participants were students of Sam Ratulangi University Manado. The organizers of this seminar were lecturers from the Faculty of Mathematics, FMIPA UNSRAT.

The methods used during the theoretical presentation on object detection and recognition using deep learning were as follows: (1) Lecture method, which involved oral explanation and narration by the speaker in front of the participants. The lecture method was variably chosen to convey important concepts to be understood by seminar participants, including professors and students. This method was combined with images, videos, and real-life examples of deep learning with abundant material presented succinctly, precisely, quickly, and in easily understandable language. (2) Demonstration method was chosen to show real-life examples of deep learning applications in everyday life. Demonstrations were conducted

by the speaker during the workshop by showing videos, YouTube clips, and the results of deep learning application implementations so that participants could understand the process of object recognition based on deep learning. (3) Case study method was used in active learning. This method utilized specific situations or cases that could provide participants with meaningful and beneficial learning experiences. The speaker provided a story about the concept to be learned. Subsequently, participants engaged in discussion, analysis, and evaluation based on the case or problem being studied. (4) Discussion and question-and-answer method were conducted after the presentation by the speaker. Participants were given the opportunity to ask questions, express opinions, and discuss ideas related to the presentation material.

The flowchart of object detection and recognition using deep learning is illustrated in Figure 1. It begins with the training model phase and the object detection and recognition phase. All details were explained in this seminar and workshop (Dewi, Chen, & Yu, 2020b) (Chen, Dewi, Huang, & Caraka, 2020).

Figure 1. Flowchart of object detection and recognition using deep learning



Result

The products resulting from this seminar and workshop are knowledge about object detection and recognition using deep learning. Participants gained new insights into the implementation of object recognition as the speakers provided detailed explanations. Each stage was well explained and accompanied by real-life examples. The process of presenting the seminar and workshop using Zoom meetings can be seen from Figure 2 to Figure 5. This seminar provided insights and new ideas for participants to conduct research in the field of machine learning and deep learning. This is evidenced by the active participation of participants during the question-and-answer sessions.

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Figure 2. The speaker provides material on "Object Detection and Recognition."

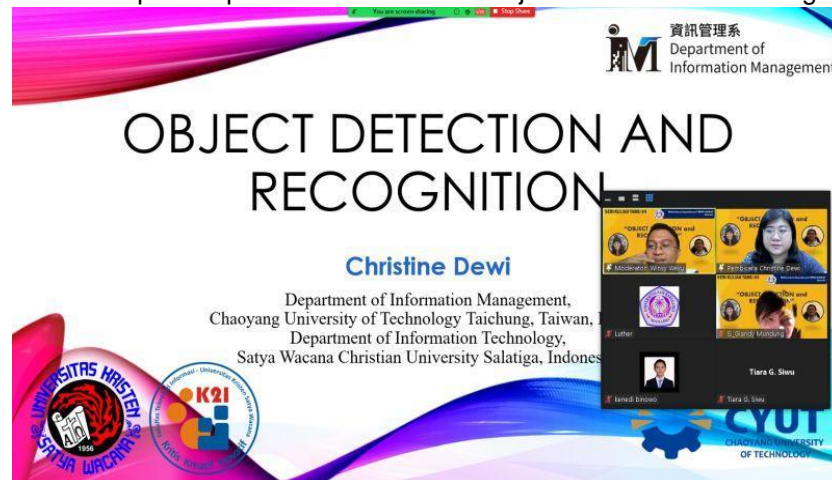


Figure 3. The speaker presents on the research topic "Drowsiness detection for safety drivers."

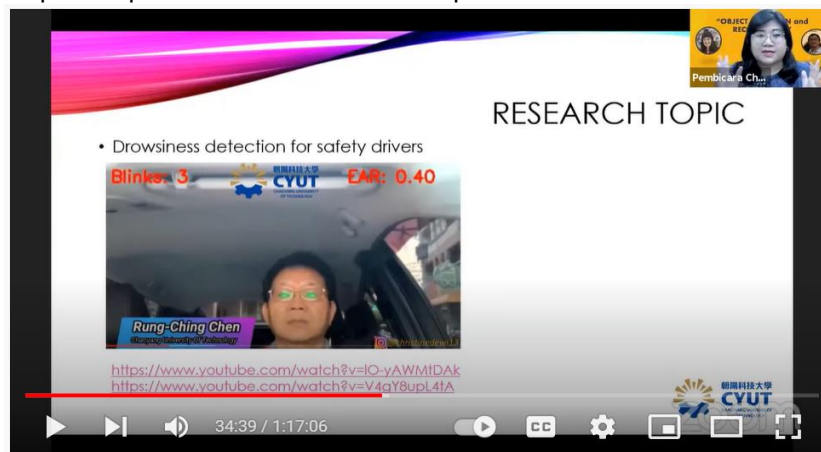


Figure 4. The speaker presents on the research topic "Traffic Sign Recognition based on Spatial Pyramid Pooling."

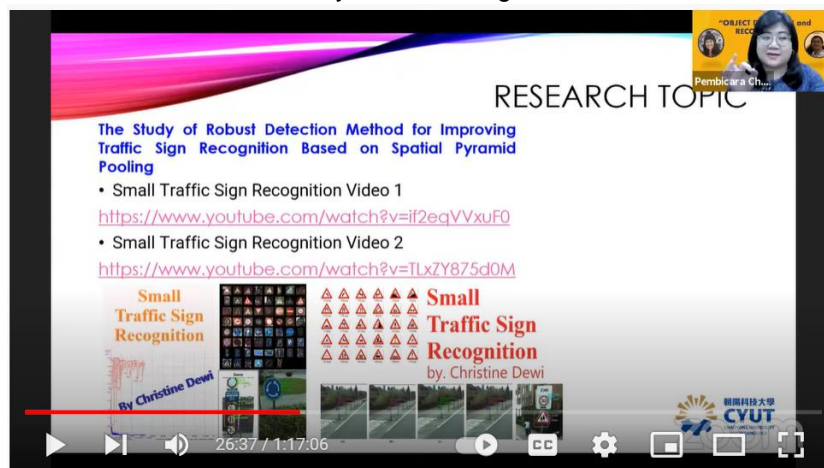
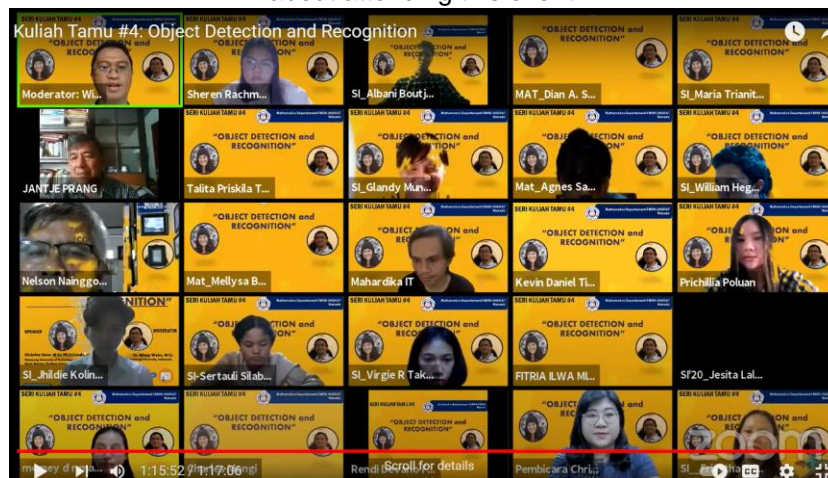


Figure 5. Group photo session after the seminar and workshop. Participants were very enthusiastic about attending this event.



Discussion

In general, the supporting factors for this seminar activity are: (1) High enthusiasm from students and lecturers, as seen from the very active discussion process. Many students and lecturers asked questions and expressed their opinions about object recognition with deep learning. The enthusiasm of seminar and workshop participants, cooperation and solidarity from all parties, good communication, and supportive facilities and infrastructure. (2) Funds provided by the faculty for the implementation of this community service activity, and the entire committee that facilitated the event to run smoothly.

Some inhibiting factors for this seminar and workshop activity are: (1) Most seminar participants do not have prior information or knowledge about machine learning and deep learning. (2) The material cannot be delivered in detail due to limited time.

Conclusion

The seminar and workshop activities have run smoothly according to the agenda set by the organizing committee. In addition, this activity has received very positive responses from the participants, both students and lecturers. This is evidenced by the active participation of the participants throughout the seminar and workshop. Participants also actively asked speakers about current research ideas that are emerging in the field of machine learning and deep learning. Participants gained new experiences, knowledge, and insights into the application of deep learning for object recognition. Another benefit is that participants gained new research ideas in the field of deep learning shared by speakers who are experts in this field.

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Thanks are extended to Sam Ratulangi University Manado, which has facilitated and coordinated this activity well. Thanks also to all parties involved directly or indirectly in the process from the beginning to the end of this community service activity. In addition, thanks are given to all the committee members who coordinated and prepared all the needs for the seminar and workshop to run smoothly. Thanks, are also conveyed to all participants who participated in this activity.

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