



Notice for the PhD Viva Voce Examination

Mr Yong Woon Kim (Registration Number:1870076), PhD scholar at the School of Engineering and Technology, CHRIST (Deemed to be University), Bangalore will defend his PhD thesis at the public viva-voce examination on Wednesday, 03 May 2023 at 10.30 am in the CDI Conference Room, III Floor, Block V, Bangalore Kengeri Campus, Bengaluru 560074.

- Title of the Thesis** : **A Study on High-Performance Portrait Segmentation Using the Ensemble of Deep-Learning Models and Hybrid Model: Accuracy and Speed Perspective**
- Discipline** : **Computer Science and Engineering**
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The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Place: Bengaluru
Date: 20 April 2023

Registrar

ABSTRACT

Portrait Segmentation (PS) can be referred to as a process of segmenting a person in an image from its background. There are many real applications using PS technology. For example, camera apps of mobile phones and online services support instant PS for selfie photos; online video conferencing solutions provide virtual background function for entertainment, aesthetic, privacy, and security reasons, robot vision requires the PS for human-robot interaction, and the PS can be used for content-based image/video retrieval in a database application. A good number of studies show that the Deep-Learning based Segmentation Model (DSM) is a reasonable choice for the PS. However, the study on the PS using the ensemble of multiple DSMs is a new domain. Unlike the PS using a single DSM, the ensemble method combines the segmentation results of multiple DSMs to generate an optimal result. This work proposes three ensemble approaches for the PS to achieve a high-accuracy and high-speed segmentation for various applications. The first is the PS using the ensemble of DSMs for portrait images. The second is the PS using the ensemble of DSMs for portrait videos. The last is the PS using the ensemble of DSMs and hybrid method for portrait videos. The effect of image downscaling for PS was also evaluated and analyzed. This work evaluated the proposed approaches using publicly available datasets named EG1800 for portrait image segmentation and self-constructed portrait video datasets having a single-person view collected from publicly available websites. The proposed approaches were evaluated by measuring accuracy, variance error, bias error, and efficiency.

Keywords: Portrait Segmentation, Computer Vision, Portrait Video Segmentation, Deep-Learning, Convolution Neural Network, Artificial Intelligence, Ensemble, Soft Voting, Hybrid.

Publications:

1. **Y.-W. Kim**, Y.-C. Byun, A. V. N. Krishna and B. Krishnan, "Selfie Segmentation in Video Using N-Frames Ensemble," in *IEEE Access*, vol. 9, pp. 163348-163362, 2021.
2. **Y.-W. Kim**, Y.-C. Byun, and A. V. N. Krishna, "Portrait segmentation using ensemble of heterogeneous deep-learning models," *Entropy (Basel)*, vol. 23, no. 2, p. 197, 2021.
3. **Y. W. Kim**, I. Rose, and A. V. N. Krishna, "A study on the effect of canny edge detection on downscaled images," *Pattern Recognit. Image Anal.*, vol. 30, no. 3, pp. 372–381, 2020.