

LITHUANIAN COMPUTER SOCIETY
VILNIUS UNIVERSITY
INSTITUTE OF DATA SCIENCE AND DIGITAL TECHNOLOGIES
LITHUANIAN ACADEMY OF SCIENCES



12th Conference on
**DATA ANALYSIS
METHODS FOR
SOFTWARE
SYSTEMS**

Druskininkai, Lithuania, Hotel "Europa Royale"
<http://www.mii.lt/DAMSS>

December 2–4, 2021

VILNIUS UNIVERSITY PRESS
Vilnius, 2021

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<https://doi.org/10.15388/DAMSS.12.2021>

ISBN 978-609-07-0673-2 (print)

ISBN 978-609-07-0674-9 (digital PDF)

Impact of Images Quality Variety and Resizing Level on Eye Fundus Optic Disc Segmentation

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Various eye diseases such as glaucoma, diabetic retinopathy and hypertension can be diagnosed using eye fundus images. Therefore, image analysis is necessary. Here, the different parts of an eye such as blood vessels, macula, optic disc, and optic cup may be the objects of interest depending on the disease. In eye fundus images analysis, image segmentation is one of the main steps. At this stage, different objects in the image are distinguished and defined, and thus assigned to different object classes. With the rapid development of convolutional neural networks in image processing, deep learning methods have achieved great results in automated image segmentation. Applying various deep learning algorithms, the image quality plays an important role. In this research we analyzed a few different publicly available datasets. Each dataset consists of different quality images as these have been captured by different non-stationary digital eye fundus cameras. The images vary in resolution, brightness, and visualization. Several images pre-processing scenarios have been applied to evaluate an impact of these images' quality on image segmentation. An impact of images resizing level has been evaluated as well. For these evaluations we applied the most popular medical images segmentation autoencoder named U-Net. Optic disc has been chosen as an object of interest.