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EASDEC 2019 MEETING
RETMARKER SCREENING NEW IMAGE QUALITY ALGORITHM IMMEDIATELY EVALUATES GRADEABILITY OF IMAGES

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TAKEAWAY

Deep Learning algorithm shows good and immediate performance evaluating if colour fundus photographs are good enough to be graded

Retmarker

Abstract EASDEC 2019 – Gradeability Evaluation

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Title of Abstract: Retmarker Screening new image quality algorithm immediately evaluates gradeability of images

Design of Study: Retrospective study to evaluate performance of new Deep Learning-based methods for automated classification of Colour Fundus Photographs (CFP) as gradable/ungradable in Diabetic Retinopathy (DR) screening (integrated in Retmarker Screening, *Retmarker SA*, Coimbra, Portugal) with resource to anonymized data from our screening programs.

Purpose: A great number of DR screening exams are often marked as not-gradable due to visual impairments, noisy images or even non-retinal images (eye lashes, etc.). The objective of the study is to evaluate the performance of the new method in assessing whether an image is gradable in the context of DR screening. That ability is desirable for more efficient setup, reducing the quantity of defective exams thus reducing the number or patients that would need to repeat an exam, clogging the screening workflow.

Methods: Retmarker technology has been employed in DR Screening Programs since 2011 with more than 250.000 screening exams performed. Retmarker technology includes another image quality algorithm that is used to evaluate images sent to us. Such algorithm evaluates parameters such as colour, contrast, illumination and focus.

The new method employs a Convolutional Neural Network(CNN) model trained with a dataset of 8.114 Gradable and 7.958 Ungradable CFPs to each several data augmentation strategies were applied. The model was tested in 19.722 anonymized exams (78.889 images, no overlap with training images) of which 1.132 (7,01%) were marked as “Not-Gradable” and 11.125 (56.41%) had at least one eye marked as “Not-Gradable” in our ground truth.

Results: The new method applied to the test dataset (19.722 exams) presented a Sensitivity of 94.22% and a Specificity of 87.27%.

Conclusions: The new method shows good performance, complements the existing algorithm, and can be used to indicate immediately to the photographer whether better CFPs may be needed.