Skoltech
Skolkovo Institute of Science and Technology

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Daniil Kononenko

PhD Program: Computational and Data Science and Engineering

Title of Thesis: Gaze redirection in Images Using Maching Learning.

Supervisor: Professor Victor Lempitsky

Chair of PhD defense Jury: Professor Maxim Fedorov ***Email:*** ***m.fedorov@skoltech.ru***

Date of Thesis Defense: October , 2017

Name of Reviewer: Stamatios Lefkimmiatis

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	**Signature:** **Date: dd-mm-yyyy**

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to forward a completed copy of this report to the Chair of the Jury at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.
If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

The main research focus of this dissertation revolves around the problem of image re-synthesis with a particular interest on gaze redirection. In the first two chapters the author describes the problem in detail, gives clear motivations for the necessity of developing techniques that can lead to efficient solutions, provides a thorough overview of the current literature, and explains adequately the existing challenges.

Then, in chapters 3-6 the author proposes four different machine-learning systems for gaze redirection, with each one being more suitable than the rest under different scenarios, such as computational speed, memory footprint of the system, availability of training data for fully supervised or semi-supervised learning, teaching-student learning architectures. The candidate's work is extensive and spans a wide spectrum of Machine Learning techniques, such as Random Forest Trees and Deep Convolutional Neural Networks. Also the underlying idea that defines all the developed systems, that is the processing is completely localized and takes place only around a constrained region of the eye without affecting the rest of the scene, is very clever and effective since it avoids the introduction of unwanted artefacts in the rest of the scene and leads to faster computations.

One main consideration during the first review of the thesis has been about the validation of the

reported results, since the question whether the desired angle of gaze redirection has been successfully performed by the developed systems and in what extent was not clearly addressed. In the revised version of the thesis, the author has addressed this issue in a convincing way by performing a thorough study and devising an assessment technique which leads to more accurate evaluation.

Overall the research work that has been conducted by the candidate is solid and of high quality. This is also supported by the fact that this thesis has resulted in several publications in the top peer-reviewed international conferences and journal articles in the field of computer vision.

Other comments: Throughout the dissertation there are several typos and syntactical errors, such as the use of wrong tenses in verbs, missing articles and use of expressions that do not have a correct meaning, such as “The problem of gaze in videoconferencing has been attracting researchers and engineers for a long time”. Furthermore, a common practice in scientific papers is to avoid using expressions such as “I did”, “my work”, “my model”, etc., which are repeated almost everywhere in this dissertation. Especially for the case of a dissertation, where by definition it is expected that the author describes and analyzes the research work that **he** performed during his PhD studies, this is a clear redundancy and does not read well. In this case it would be preferred a passive voice to be used instead of an active voice. Therefore, a careful final proofreading of the thesis is necessary so that these types of problems are corrected.

Provisional Recommendation

☒ *I recommend that the candidate should defend the thesis by means of a formal thesis defense*

☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

☐ *The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*