Vilnius university Systems Biology study program

Research Progress

REVIEWER’S REPORT

1. Student (name and surname): Marius Latinis

2. Title of Master’s Thesis: Collagen Fiber Extraction and Analysis in the Hematoxylin and Eosin Stained Cancer Tissue Images

3. Assessment of the research novelty of the Research progress:

Novelty is an essential aspect of research. This research is related to the visual examination of tissue by analyzing digital images, which plays an important role in cancer diagnosis. The research aims to provide a solution that automatically analyses a digital H&E image and generates a prediction about the patient’s fate. The data provided by the National Centre of Pathology are used in the experiments. Deep learning model based on convolutional neural network is used as a possible solution to the problem. The topic of the research is interesting and may provide novel, useful information for the scientific community. The results are not yet obvious but are likely to be rather significant.

Since the scientific literature mentions different ways of solving the described problem, more emphasis should be placed on the novelty of this research and its impact on the field (what new advance or contribution the research represents). The contribution of the research can be enhanced if it would discuss the advantages of using the proposed method. In order to highlight the novelty in this field of research, a thorough literature analysis is needed to find out what is known and what gaps need to be clarified.

4. Assessment of the literature review of the Research progress:

The introduction section, as well as literature review section, leads the reader from a general subject area to a particular topic of inquiry. The introduction gives an overall review of the paper, and it establishes the scope, context, and significance of the research being conducted by summarizing current understanding and background information about the topic. The literature review of this research is not complete and does not provide a general overview of the problem being solved. Only 4 references are used in this section. The reference [15] does not correspond to the content of the referenced text. This part of the research needs to be extended. A literature review should discuss published information in a particular subject area in more details, and provide information in a particular subject area over a period of time. The literature review should focus on generalizing the arguments and ideas of others without adding new contributions.

As mentioned in the research (see Aims and tasks), the main aim is to present a method that automatically analyses a digital H&E image. The review of the literature should correlate with the tasks discussed in the research and provide possible alternatives for solving the problem. Deep learning model based on the convolutional neural network was chosen as a possible solution to the problem. A review of relevant studies and articles with similar solutions should also be made.

5. Assessment of the methods of the Research progress:

Deep learning model based on convolutional neural network was chosen as a possible solution to the problem. The choice of a solution is not well reasoned. It would be a good idea to argue and justify the solution. The description of the method is quite brief and not complete. A more detailed and reasoned description of the method is necessary.

“A skeletonization function [18] is applied on the mask”, “A breath first search algorithm [1] is then applied to find for each collagen pixel” – there is a lack of explanation of methods and reasons for their use.

6. Other comments:

Obviously, a lot of attention has been paid to experiments with data. The results are promising and interesting. However, a more detailed description of the method, as well as the structure and topology of the convolutional neural network, solutions used, would enhance the value of this study. The contribution of the research can be enhanced if it would discuss the advantages of using the proposed method.

For now, it can be stated that the author does not pay enough attention to the main parts of the work: research novelty, literature review, description of the method. The work done is not complete enough, and requires further improvement.

Despite all the comments, there is a possibility that the description and the work itself can be improved, and I suggest that an improved and extended version of this research be allowed for defense.

Supervisor (name, surname) (signature)

(date)