

Opponent's review of the Doctoral Thesis

Candidate Ing. Jan Hanuš

Title of the doctoral thesis Processing of hyperspectral data

Study Programme Geodesy and cartography

Tutor prof. Ing. Dr. Karel Pavelka

Opponent prof. Ing. Lena Halounova. Ph.D

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Topicality of the doctoral thesis theme

Commentary: Hyperspectral data and their processing is one of quickly developing part of remote sensing. The hyperspectral data provides the best spectral resolution and forms an irreplaceable data source for detailed evaluation of the Earth observation. The airborne and RPAS (remotely piloted airborne systems) are the main source of these data at all and the only sources for analyses of the scale processed by the author. It is really an actual topic providing a tool for many purposes.

excellent above average average below average poor

Fulfilment of the doctoral thesis objectives

Commentary: The thesis had two main goals. The first goal was to develop and establish chains for data preprocessing, i.e. of the data which was collected by the hyperspectral laboratory for sensors of visible and near infrared (VNIR) and short wave infrared (SWIR) wave length measurements. Applications of these chains in the FLIS (Flying Laboratory Image System) and its data was a second goal of the thesis. Both goals were met and are in detail described by above mentioned papers with a short summary in the connecting text

excellent above average average below average poor

Research methods and procedures

Commentary: Method of the preprocessing chains correctly uses the physical character of the data theory of acquisition, and theoretical and empirical tools for atmospheric and geometric corrections of acquired data during the measurement. Data fusion of VNIR, SWIR, thermal and laser scanning data is clearly explained.

excellent above average average below average poor

Results of the doctoral thesis – dissertant's concrete achievements

Commentary: Results of the research are precious since they combine the development of the system, its creation and application in the practical measurement which has been applied by his institute for other projects. The research is a collection of many steps and some of them were processed by cooperators of the author. It does not downgrade his achievements

<input checked="" type="checkbox"/> excellent	<input type="checkbox"/> above average	<input type="checkbox"/> average	<input type="checkbox"/> below average	<input type="checkbox"/> poor
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Importance for practice and for development within a branch of science

Commentary: The presented FLIS functionality is an important tool for preprocessing of hyperspectral airborne and RPAS data. Since the hyperspectral data form a precious part of remote sensing bringing unique information; the thesis is a precious tool verified in practice. There are many issues in the Earth observation which are still waiting for application of hyperspectral data and their processing. This tool can significantly enlarge these applications.

<input type="checkbox"/> excellent	<input checked="" type="checkbox"/> above average	<input type="checkbox"/> average	<input type="checkbox"/> below average	<input type="checkbox"/> poor
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Formal layout of the doctoral thesis and the level of language used

Commentary: The text has a logic structure with a brief overview of content of the papers. The layout respects necessary requirements for scientific work. There is only a limited number of typos. The language is on a good level.

<input type="checkbox"/> excellent	<input checked="" type="checkbox"/> above average	<input type="checkbox"/> average	<input type="checkbox"/> below average	<input type="checkbox"/> poor
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Statement on compliance with citation ethics

Citation and ethic rules are fully respected.

Remarks

i would appreciate if the connected text more deeply altogether evaluated results from the papers.
 Questions:
 What are key issues/limits in atmospheric corrections?
 Do you have a proposal how to detect the bark beetle infested trees earlier?

Final assessment of the doctoral thesis

The thesis brings a new tool for the first step of hyperspectral remote sensing – preprocessing of collected data. Hyperspectral data form a very important group of data for various purposes. There are still many tasks in front of users and results of this theses provide a solution for some tasks.

Following a successful defence of the doctoral thesis I recommend the granting of the Ph.D. degree

yes <input checked="" type="checkbox"/>	no <input type="checkbox"/>
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Date: 7 November 2023

Opponent's signature:.....