Opponent review of the diploma thesis

"Sound module for interactive transport simulators"

Student: Bc. Matúš Lorinc

Proposed master thesis has an extent of 76 pages and it is divided into 10 chapters including the preface and the conclusion. The text is annexed with two appendices.

Three introductory chapters conclude physical principle of sound, propagation of sound waves in the space, its perception etc. This part is written clearly, with minimal mathematical apparatus. Some parts are explained by down-to-earth manner - sentences like "Second [s] - a unit of a time" at page 12 are dispensable at the level of the master thesis, in my opinion. The student then describes simulators generally and a car simulator at the Faculty of Transportation Sciences in the fourth and the fifth chapter, the 6th chapter analyses sounds inside and outside of the car cabin in some modes of ride and under several conditions. The section is clear and it gives the author good starting point to decide where and what frequencies to record to achieve high fidelity of the simulated sound surroundings. The result of own work of the student is mentioned firstly in the 7th chapter. Student recorded 12 typical sounds which are in the appendix B. I think the scope of the master thesis deserves more samples. Further, he does not specified which measurement chain was used and how it had been configured (sample frequency etc.). I don't understand the caption of the Fig. 32 "Waveshape comparison of noise recorded inside and outside of the car cabin". There is evidently only one record.

In the last section the student describes synthetic sound module which he created. The module is written as data-flow program for Pure Data freeware. Student considers significant data from simulator as its input (gas pedal) and the module contains special "noise" sounds like explosion. What a shade the author did not place some outputs from the sound module to the .zip attachment. I can't review the quality of synthetic sound module output.

Formal, language and graphical sides are good. Bibliography contains 12 relevant references to digital materials. A mistake is in the case of the work [6]. Author which is named in the text is different from the one in the reference list. Outline of the assignment was met although the scope of student's own could be higher (the ration between general, descriptive part and part which contains authors own contribution is approx. 50:20 pages).

I recommend the thesis for the defence. Summary classification is **D (satisfactory)** – 2.5.

Questions:
1. Who made the measurement their spectrograms are in Figures 28 and 29 in the section 6?
2. Which car was used when you had made your measurement? And which apparatus was used and what parameters were set (sampling frequency for instance)?
3. Describe differences in measurement in GoldWave and music studio. Why did you select these software instruments?
4. Why did you select Pure Data software?

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