REPORT DUE DATE: September 18, 2016

McGILL UNIVERSITY
Graduate and Postdoctoral Studies

MASTER'S EXTERNAL REPORT

NAME OF STUDENT: Daniel Joseph HORODNICZY
DEGREE / UNIT: Master of Engineering / Department of Electrical & Computer Engr
THESIS TITLE: Characterization and application of a variable-friction foot device

Use the following scale:

EXCELLENT, VERY GOOD, GOOD, SATISFACTORY, or UNSATISFACTORY
(Choose one grade for each category)

Criteria	Excellent Top 10%	Very Good	Good	Satisfactory	Unsatisfactory
1. Evidence of originality and creativity		X			
2. Resourcefulness, alertness to significance of findings			X		
3. Diligence, care, technical skill in the research		X			
4. Usefulness of the results to other workers in the field; value as a contribution to knowledge		X			
5. Grasp of subject, powers of criticism and general adequacy in review of previous work		X			
6. Quality of presentation (coherence, lucidity, grammar, style, freedom from typographical errors)			X		

7. **OVERALL JUDGEMENT (circle one)** **PASSED** or **NOT PASSED**

8. If the overall judgement is '**PASSED**' please provide:
Comments explaining your evaluation of the thesis including recommendations for minor revisions to be included in the final thesis.

9. If the overall judgement is '**NOT PASSED**', at least one of the criteria above must be graded unsatisfactory.

Please provide:
a. Comments explaining your evaluation of the thesis, including a detailed description of the shortcomings that have informed your decision that it does not meet the requirements of a passing thesis.
b. An itemized list of the substantive issues that you expect the student to address for the written thesis to receive a passing grade upon re-examination. Please refer to appended instructions for examiners.

In order not to jeopardize the students anticipated graduation timeline (and potential associated costs), we must receive your report no later than **September 18, 2016**. Please return your report to: Thesis Office by fax 514-398-6283, email sandra.gibson@mcgill.ca or mail, Thesis Office, McGill University, James Administration Bldg, Room 400, 845 Sherbrooke St. W. Montreal, QC Canada H3A 2T5 Tel No. 514-398-3783 Ext. 00711

DATE: 12 Sept. 2016 SIGNED: _____
(Dr. H. Frissen)

External Examiner's report for

Characterization and Application of a Variable-Friction Foot Device

By: Daniel Horodniczy, Department of Electrical & Computer Engineering

McGill University

Appreciation of the thesis

This is an impressive body of work. Danny conducted not one but three empirical studies, all of which done with apparent skill and understanding. Moreover, the three studies employed very different methodologies, from the basic physics of measuring coefficients of friction to (Chapter 3), to advanced psychophysical methods (staircase methods) to determine human perceptual discrimination thresholds (Chapter 4), to human-computer interaction methods to investigate the viability of the foot as a pointing device (Chapter 5). Together they tell a larger story that is easy to understand and generally well communicated.

I have only minor comments and clarifications that, if addressed, could add to the overall quality of the thesis.

Comments

The thesis evaluation guidelines require an explicit statement of the author's contributions to the thesis work; this has not been provided.

The explanation of the dependent measure throughput (P19) is too sparse to expect a reader to understand its meaning and interpretation. It would be good to add a little bit of background information.

The definition of extrinsic devices is not explicit enough. While it's workable on page 13, it is less clear on page 21 when discussing how "colour" and "depth" are supposedly extrinsic. In addition, extrinsic is used in combination with "design", "methods", and "sensing", which adds to the confusion.

It is concluded that the range of static COFs the prototype can generate, is comparable to conventional shoe on surfaces as slippery as ice and as slip-resistant as asphalt. There is no reference to the COF for these materials. The author should include a reference where those COF values can be checked, or better yet, the values should be included in the thesis.

Figure 4.5. The label on the y-axis says the values are %, but the actual values are proportions. I suggest changing the values to percentages, to match the discussing in the text.

The results section 4.3. conflates JNDs with Weber fractions. They are, however, not the same thing. Weber fractions are JNDs scaled with respect to the reference value. While JND are expected to increase as the reference value increases, Weber fractions are typically constant (which is apparently not true for the current results) (see Gescheider, 1997, Psychophysics: The Fundamentals). At the very least the writing needs to be checked so that the conflation is eliminated; an easy solution is to report both the JNDs and the Weber fractions.

The hypothesis for the foot pointing experiment (P40) is not explicit enough (e.g., "will […] elicit the same effects as it sees in hand-operated context". What effects?

Reference is made to "relatively gradual slopes" (P44) but they are not shown.

Missing citations in text
P12, 2.2.2: "Levesque et al."; add: [13].
P16, 2.3.2: "Cohen and Cohen"; add: [41].

Writing
At times, word choice is imprecise, the author editorializes, or writing is colloquial (spoken English rather than written English). (below is a subset of examples). I don't expect the student to rewrite the thesis, but strongly encourage him to be aware of these kind of writing choices in future efforts.

P12, 2.2.2 [imprecise] "co[illegible]med these postulates". There are no (apparent) postulates in the preceding.
P12, 2.2.2 [editorializing] "Bau introduced some intriguing ideas
P12: 2.2.3 [fluffy] "see commercial exposure". What does that mean? Does it mean that there are products on the market that feature controlled friction?
P13, 2.2.3 [imprecise] "the concern", what concern exactly? And "a solution of this nature", did you mean an intrinsic solution?
P14, 2.3.1 [imprecise] "used as alternatives…" to what?
P16, 2.3.2 [colloquial] "Subjects would indicate…" → subjects indicated
P16, 2.3.2 [imprecise, teasing] "results […] did not consistently agree with measured COFs". How were to agree anyway? This is an apparently important finding, but the reader is not provided with any real information about what the actual finding is, and how it affects our understanding of the perception of slipperiness.
P20: 2.4.2 [fluffy] "in terms of simplified tasks". "In terms of" could simply be replaced with "for"

P20, 2.4.2 [imprecise] “While effective, this approach” What approach exactly? Suggestion: “While task simplification is effective, it oversimplifies the capabilities of the foot.”

P49, 5.6: period missing at the end of the 3rd sentence (“…periods of time”)

P51, [colloquial] “greatest performance”; suggest to change to “best performance”