Diploma Thesis Evaluation Form

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Title: MLOSINT: Classifying Vehicle Losses in Ukraine

Programme/year: NP_BSBTS, 2023/2024

Author of Evaluation (supervisor/~~external assessor~~): Dr. Petr Spelda

Criteria	Definition	Maximum	Points
Major Criteria			
	Research question, definition of objectives	**10**	10
	Theoretical/conceptual framework	**30**	23
	Methodology, analysis, argument	**40**	40
Total		*80*	73
Minor Criteria			
	Sources	**10**	10
	Style	**5**	5
	Formal requirements	**5**	5
Total		*20*	20
TOTAL		*100*	93

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Evaluation

Major criteria:

The presented dissertation attempted to find evidence on usefulness of computer vision machine learning models, in this case a convolutional neural network, for frequently performed tasks in open source intelligence. The research focuses on Russian vehicle loses in Ukraine due to an existing large-scale dataset that was used as input for the machine learning experiment. The experiment comprised of classifying the losses into pre-defined categories, a task that is normally carried out by analysts with non-negligible human labor costs.

The conceptual foundation was built robustly around the fact that under ideal conditions OSINT could benefit from machine learning models used for automating repetitive tasks such as classification.

Early verification of the prototype built as part of the experiment seemed to support this, however, later testing on withheld samples showed a substantial accuracy drop and decreased usefulness of the prototype. Decreased performance was correctly attributed to several shifts in the samples' input distribution.

Conclusions correctly demonstrated basic limits and difficulties involved in using machine learning in open source intelligence. On the other hand, the encountered shifts could be anticipated even before their occurrence and the training dataset augmented accordingly. The identified limit, thus, correctly showed that usefulness of ML in OSINT does not come for free and put into perspective the initial motivation for using ML in OSINT.

Minor criteria:

All minor criteria were met.

Based on the anti-plagiarism software checks, it is formally confirmed that the submitted thesis is original and, to the best of my knowledge and belief, does not, in an ethically unacceptable manner, draw from the works of other authors.

Overall evaluation:

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This presented research combines an ML experiment with OSINT techniques and successfully generates non-trivial evidence on benefits and costs of ML in OSINT. Although the main finding is negative, it shines some light on shallow and imprecise arguments concerning ML uses in OSINT that can be found in the literature even today.

Suggested grade: A (93)

Signature