THESIS SUPERVISOR'S REPORT

I. IDENTIFICATION DATA

Thesis title:	Classification of Veterinary X-Ray Images
Author's name:	Anna Motlová
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	doc. Ing. Daniel Novák, Ph.D.
Reviewer's department:	Analysis and Interpretation of Biomedical Data

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

How demanding was the assigned project?

The assigned project was demanding, requiring interdisciplinary knowledge in artificial intelligence, medical imaging, and veterinary diagnostics. The complexity of working with non-standardized veterinary data added to the challenge, making the assignment highly relevant and technically complex.

Fulfilment of assignment **fulfilled**

How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.

The thesis fully meets the assigned tasks. The student successfully designed and implemented a machine learning-based system for classifying veterinary X-ray images, specifically focusing on canine cardiomegaly detection. Despite the limited size and variability of the dataset, the student achieved significant results, including a test set accuracy of 77.8% and a sensitivity of 85.7% for cardiomegaly detection. The project effectively demonstrates the feasibility of using deep learning methods in veterinary diagnostics.

Activity and independence when creating final thesis **E - sufficient.**

Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted and whether the student was well prepared for the consultations. Assess the student's ability to work independently.

The student did not maintain regular communication throughout the thesis development. She did not attend scheduled meetings and failed to respond to emails and Slack messages. This lack of engagement made it unclear whether she was actively working on the thesis. Unfortunately, the student submitted the thesis only a few days before the deadline, leaving insufficient time for proper revision and feedback. This approach reflects poor time management, an inability to work effectively in a team environment, and a lack of basic communication skills. Rather than demonstrating independence, it highlighted challenges in adhering to collaborative work practices.

Technical level **B - very good.**

Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?

The technical quality of the thesis is resonable. The student employed advanced machine learning techniques, including U-Net architectures with ResNeXt encoders and custom keypoint detection heads, to achieve reliable segmentation and classification results.

Formal level and language level, scope of thesis **C - good.**

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

The thesis is generally well-structured and logically organized, with clear and concise language. The formal presentation adheres to academic standards, and the use of diagrams, tables, and figures effectively supports the textual content. However, the overall length of the thesis is relatively short, which limits the depth of explanation for some complex aspects of the methodology. This brevity restricts a comprehensive understanding of the underlying approaches, particularly concerning model architecture and

evaluation strategies. A more detailed exposition of the methods and results would have strengthened the thesis and provided clearer insights into the technical decisions made.

Selection of sources, citation correctness **D - satisfactory.**

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

While the thesis references a range of relevant studies and includes citations from both veterinary medicine and machine learning fields, the list of sources is incomplete. Some key references lack sufficient detail, which requires additional effort from readers to locate the original materials. This oversight affects the overall readability and accessibility of the thesis and detracts from the academic rigor of the work. A more thorough and complete bibliography would have significantly improved this aspect of the thesis.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

This thesis presents a sound contribution to the field of veterinary diagnostics by demonstrating how AI models can be adapted to analyze non-human radiographic data. The student's approach to addressing the lack of standardized veterinary datasets, combined with her thoughtful evaluation of model performance, highlights the practical potential of the developed system. The work is original, methodologically sound, and offers valuable insights for future research. However, the thesis is hindered by incomplete references, limited methodological explanations, and poor communication throughout the process.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

The thesis achieves its primary objectives and demonstrates strong technical competence. However, it is impacted by incomplete references, a brief exposition of methodologies, and insufficient collaboration with the supervisor.

Suggested questions for defense:
1. What were the main challenges in handling the limited and non-standardized dataset?
2. How could the current model be adapted to work with other veterinary conditions or species?
3. What ethical considerations should be taken into account when deploying AI-based diagnostic tools in veterinary medicine?
4. How would you improve the referencing and documentation to make the thesis more accessible to readers?

The grade that I award for the thesis is **D - satisfactory.**

Date: **20.2.2025** Signature: