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Preliminary Machine Learning report

[name, student number]

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# Introduction

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| --- | --- |
| Assignment | Introduce your Machine Learning (ML) portfolio and position it within the context of the minor program. What is the relevance of ML to practical domains you are interested in? What is the relation between ML and your main project in the minor? What are your learning objectives? |
| Acceptance criteria | ML relation to the minor is discussed.  ML portfolio relation to main project in the minor is discussed. |
| Size | Max 1 A4 |

# Problem statement

|  |  |
| --- | --- |
| Assignment | 1. Define your objective, e.g. hand gesture classification, recognizing at least 3 gestures, or obstacle classification, recognizing at least 3 different obstacles in front of a mobile robot. Alternatively, combine an ML objective within your EVML project, by replacing the classifier in step 5 of the conventional vision train. Note that the subjects for building an ML project should be covered, i.e. data acquisition, exploration, and preparation, ML model selection, training, and finetuning, and model deployment and testing. 2. List and prioritize requirements. Think about measurable parameters, e.g. what performance criterium will you use, what performance levels are you hoping to achieve, what framerate, etc? List and prioritize your functional requirements, think about technical requirements too, e.g. camera angles, distances, etc. |
| Acceptance criteria | Problem definition is specific and measurable (SMART criteria, 2020).  Functional and technical requirements are listed and prioritized. |
| Size | Max 1 A4 |

# Data acquisition and exploration

|  |  |
| --- | --- |
| Assignment | 1. Collect and label an image set using a controlled test set-up. 2. Propose and argue image features and design a preparation algorithm to compute the features. 3. Explore the resulting feature data, and discuss data quality. Is your data set representative, sufficient, balanced, unbiased, etc.? Are your features informative, discriminating, independent, explainable? Look for correlations or combinations. 4. Prepare your data to better expose the underlying data patterns to ML algorithms. Does your data need cleaning? Do outliers need to be detected and removed? Do your features need to be transformed or scaled? |
| Acceptance criteria | Data collected, features engineered and argued.  Feature data is visualized and explored, quality is checked.  Preprocessing pipeline discussed and implemented. |
| Size | Max 5 A4 |

# References

Géron, A. (2019). *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow.* Sebastopol, Canada.: O’Reilly Media.

*SMART criteria*. (2020, 05 14). Opgehaald van wikipedia: https://en.wikipedia.org/wiki/SMART\_criteria