Bachelor's Thesis

Survey on Continual Learning

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Submitted in partial fulfillment of the requirements for the degree of B. Sc.
Supervised by Dr. Julian Rodemann

Abstract

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Contents

1 Introduction

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2 Framework

Consider a general continual learning (GCL) problem. T individual tasks $t \in \{1, ..., T\}$ arrive in sequence. Each task has a sample set D_t where every D_t may be drawn from its own population. Hence they are assumed to be independent but not identically distributed. A single sample has the form $D_t = (x_i^{(t)}, y_i^{(t)})$ with $x_i^{(t)}$ being the i-th feature vector and $y_i^{(t)}$ the corresponding target.
In regard to the distribution of $Y = \{Y^{(1)}, ..., Y^{(T)}\}$ one can differentiate between three different types of CL:
Domain-incremental learning considers only one big task where its data from one population arrives in multiple batches. Thus $\{Y^{(t)}\} = \{Y^{(t+1)}\}$ and $D_t \sim P(Y^{(t)})$ iid.
Class-incremental learning describes the challenge of adding more and more classes to a classification problem.
Task-incremental learning

3 Conclusion

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A Appendix

See all the extra material here.

B Electronic appendix

Data, code and figures are provided in electronic form.

References

Bach, S. H. and Maloof, M. A. (n.d.). *A Bayesian Approach to Concept Drift*, pp. 127–135.

Declaration of authorship

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