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M.Sc. Research

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Abstract Title: Multi-task Learning with a Shared Annotator

ABSTRACT:

We introduce a new multi-task framework, in which K online learners are sharing a single annotator with limited bandwidth. This limitation, does not allow the algorithm to query the true label from more than one task at a time. On each round, each one of theK learners receives an input example, and makes a prediction about the label of that input. Then, a shared (stochastic) mechanism decides which one of the K inputs will be annotated. This decision is based on the estimation of the nature of each task relative to the other and exploited this diversity to focus on harder tasks over the easier. The learner that receives the feedback (label) may update its prediction rule, and then we proceed to the next round.
We develop online algorithms set for multi-task binary classification that learns in this setting, and bound its performances in the worst-case setting. The algorithms applies an exploration-exploitation approach in order to allocate the limited feedback in a way that focuses on the feedback of the harder tasks and as a result, reduces the total number of prediction mistakes.
Additionally, we show that our algorithm can be used to solve two bandits

problems: contextual bandits, and dueling bandits with context, both allowed to decouple exploration and exploitation. Empirical study with OCR data , vowel prediction (VJ project) and NLP - sentiment analysis and document domain classification
data shows that our algorithms outperforms algorithms that use uniform allocation, and essentially produces better performance for the same labour of the annotator._____