From RankNet to LambdaRank to LambdaM RT: n Overview

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bstract

LambdaM RT is the boosted tree version of LambdaRank, which is based on RankNet. RankNet, LambdaRank, and LambdaM RT have proven to be very successful algorithms for solving real world ranking problems: for example an ensemble of LambdaM RT rankers won Track 1 of the 2010 Yahoo! Learning To Rank Challenge. The details of these algorithms are spread across several papers and reports, and so here we give a self-contained, detailed and complete description of them.

1 Introduction

LambdaM RT is the boosted tree version of LambdaRank, which is based on RankNet. RankNet, LambdaRank, and LambdaM RT have proven to be very successful algorithms for solving real world ranking problems: for example an ensemble of LambdaM RT rankers won the recent Yahoo! Learning To Rank Challenge (Track 1) [5]. lthough here we will concentrate on ranking, it is straightforward to modify M RT in general, and LambdaM RT in particular, to solve a wide range of supervised learning problems (including maximizing information retrieval functions, like NDCG, which are not smooth functions of the model scores).

This document attempts to give a self-contained explanation of these algorithms. The only mathematical background needed is basic vector calculus; some familiarity with the problem of learning to rank is assumed. Our hope is that this overview is sufficiently self-contained that, for example, a reader who wishes to train a boosted tree model to optimize some information retrieval measure they have in mind, can understand how to use these methods to achieve this. Ranking for web search is used as a concrete example throughout. Material in gray sections is background material

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