Prof. R. Wattenhofer

BA/MA/SA/Group/Lab:

Online Matching (in Gaming Platforms)

Consider an online gaming platform supporting two-player games such as Chess, Scrabble, or Street Fighter 4. The platform tries to find a suitable opponent for each player connecting to it; matching two players initiates a new game between them.

The platform should minimize two criteria: (i) the difference between the matched players' rating (e.g., a positive integer that represents the player's skill), so that the game is challenging for both players; and (ii) the waiting time until a player is matched and can start playing since waiting is boring. In reality, the 1-dimensional player rating space is often generalized to a more complex metric space by taking into account additional parameters such as the network distance between the matched players. It turns out, though, that these two minimization criteria are often conflicting: What if the pool of players waiting for a suitable opponent does not contain anyone whose rating is close to that of a new player? Should the system match the new player to an opponent whose rating differs significantly from hers?

The naive approach that matches players immediately does a terrible job: Murphy's Law may strike, and right after matching a player, a perfect opponent will emerge: Haste makes waste, unbounded waste in fact. To cope with this challenge, we must allow the platform to delay its service in a *rent-or-buy* manner.

In this project, we need to devise competitive algorithms and/or show hardness of this problem. It would also be interesting to consider variations of this problem and related problems. We already have some ideas, but new ideas are always welcome. If this sounds interesting to you, do not hesitate to contact me so we can have a chat.

Requirements: Interest in algorithms and theory. There will be regular meetings to discuss progress and questions.

Interested? Please contact us for more details!

Contacts

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