Trading Agent Competition
The Ad Exchange Game (TAC AdX)

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Ad Exchange

• An ad exchange is a **technology** platform that facilitates the **buying** and **selling** of media advertising from multiple **ad networks**

• An online **advertising network** or **ad network** is a company that **connects advertisers** to web sites that want to host advertisements
Ad Exchange - Schematic

Publishers

HTML

Impression Opportunity

Ad Exchange

Bid

Ad Network

Bid

Ad Network
Ad Network Key Challenge

Fulfill advertising contracts at minimum cost while sustaining and attracting advertisers by achieving high quality targeting.

Efficient Marketing Effectiveness
TAC AdX

One of many Trading Agent Competition Games

In a nutshell: the game reflects the challenges faced by an Ad Network as it bids for display ads opportunities.

https://sites.google.com/site/gameadx/
TAC AdX - Overview

**Agents:**
Implement Ad Network challenge, i.e., perform a bidding strategy.

**Game Server:**
Simulates the behavior of users, web sites, advertisers, and an Ad Exchange for a number of days.
Agents participate in 3 *types of Markets*:

1. Campaigns Market
2. Impressions Market
3. User Classification Server Market
Advertising campaigns are created by advertisers to promote their brands, and the AdNet’s role is to carry them out.

A campaign:

- Targets a subset of users (Market Segment).
- Predefined number of impressions (Reach).
- Lasts a number of simulated days (Start/End Day).
Campaigns Market (continued)

• A new campaign is announced and auctioned every day.

• A campaign is allocated to the Agent that bids to execute the campaign at the lowest cost (reverse auction!) to the advertiser (Budget).

• Upon termination of a campaign, the agents gets paid the difference between the actual reach and the cost of the impressions.
Impressions Market

• Each day, a number of users from different Market Segments is simulated.

• Each user generates an impression opportunity.

• Each impression opportunity is allocated via a second price auction.
UCS Market

• Well, actually, an agent might not know the market segment of a user.
  – The quality of the matching depends on the UCS level purchased.

• UCS level is a probability of actually knowing the users’ market segment

• GSP: the highest bidder get 1.0 level, the second gets 0.9, the third 0.9^2, and so on. (ith gets 0.9^i).
Mechanics of the Game

For a given day $n$
A few more details

**Quality Score**: a measure of the effectiveness of an agent to deliver on the promises made.

✔ Higher quality score means the agent fulfills on its promises (campaigns)

The quality score imposes a lower/upper bound on the admissible campaign bids.

Can effectively throw an Agent out of the game!
Next Lab: One Day Game

We will play a (very!) simplified version of game.

1. Only one day.
2. No Campaign Bidding – Agents need to fulfill their initial campaign only.
3. No UCS.
4. No Quality Score.
Next Lab: One Day Game (continued)

Your Agent’s job is to determine:
1. Where to bid? (which market segment(s))
2. What to bid?

Knowing:
1. Distribution of impressions
2. Distribution of campaigns
   (but not exactly other agents’ campaigns!)