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1:20-cv-03010-APM

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Overview

- Intro to the long term value (LTV) function
- Intro to blindness and its applications
- How we set blindness aware reserves
  - Case study: Melting Pot

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Introduction to Long Term Value (LTV) function

$$\text{LTV} = \underbrace{bid \cdot pctr}_{\text{ECPM}} - \underbrace{\beta}_{\text{CPM Cost}}$$

ECPM
(Expected Cost Per Mille)

CPM Cost
("Blindness" cost)

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Challenges of working in a reference space

- Observational data not representative of reference space
  - The vast majority of ads have at least one format, yet reference space is formatless
  - Some ads never get to show in the top position, yet we still need to know how they perform there
- Solution
  - Conduct carefully crafted ablation experiments to measure/learn lifts directly

- Uses of this data:
  - Measurement data: how well are we doing?
  - Training data: constrained optimization in loss function to kill format and position bias

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The dual mission of beta reserves

Beta reserves serve two indissociable purposes:

- Set cost reserves, and thus act as a *pricing* mechanism
  - The higher the reserve the the higher the cost, but also the higher the chances the ad will show at a lower position, or not show at all
- Set "blindness reserves", and thus act as a quality protection for users
  - Higher reserves typically lead to users clicking more on ads (i.e. better quality), and vice versa

In practice, we mostly rely on beta reserves as blindness reserves ⇒ pricing implications ensue

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Blindness in a nutshell

- Certain auction treatments can induce users to click more (sightedness) or less (blindness)
- This effect usually takes time to be observable (i.e. O(weeks))
- How can we reliably measure it?

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- How to measure this change?

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Next 5 slides inspired by https://docs.google.com/presentation/d/1rrZ-ADfoW2j_h_0PLvDczb6owlxiV7MDbZRF3Q2SCvM/edit#slide=id.p

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A framework for thinking about long term revenue

- ➔ User learning is a *user-centric quality metric*.
  - ◆ Plausible that behavior changes reflects user experience
  - ◆ Directly from users, no proxies (duration, click counts, human eval)

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Can we predict blindness outcomes?

Under small variations of the short term metrics: YES

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How do we set blindness-informed reserve costs?

We set reserves to maximize long term revenue

- We run long term blindness experiments, and validate that long term RPM is positive
  - Typically informed by manual tweaking of the terms in the linear functions
- We actively search the space of possible auctions offline through simulation

- We test out specific insights directly
  - rs
  -

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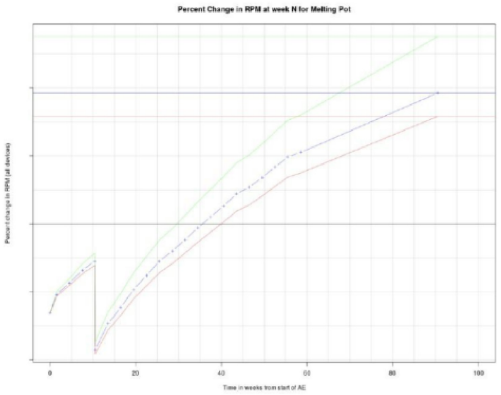
Case study: Melting Pot

What is Melting Pot?

- A collection of quality-oriented changes to our auction
- Dramatic reduction in our ad load through reserve increases
  - → Large short term RPM losses
  - → RPM recovery after several weeks
  - → Revenue recovery after several months
- Also some query learning:
  - Latest results indicate ~+0.4% Query learning



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