Recommending for Impact: Intentions, Algorithms, and Metrics

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A Bit of History

» **Researchers**
- MAE, MSE, RMSE
- Correlation (rate/pred)
- Error Rates
- Retention Rates
- Top-k Metrics
- Survey Preferences

- *Most of all: statistically-significant improvements!*

» **Businesses**
- Click-through rate
- Conversion rate
- Lift

- Customer return and retention rates
- Time-on-site

- *Most of all: customer engagement, retention, and revenue*

This Isn't the Talk I had Prepared

» I became upset during the conference

- Research papers showing results that were only better under non-existent circumstances – and worse otherwise!

- Research papers making assumptions that had no grounding in reality, with no recognition or path towards generalizing.

- Papers claiming important and statistically significant results so tiny it is hard to see how they may to actual impact.

Three Views on Impact

» Business impact of a recommender system (or innovation)

» Impact of a research innovation

» Impacts on users (individually or collectively) beyond business

Common Ideas

» Algorithms are just one part of a complex system

- Domain
- User base
- Available data
- User interface
- Broad usage context ….

Common Ideas

» **Impact is always compared with some reasonable alternative or baseline**

- We're almost entirely past the age of being impressed that we can beat random

- The relevant alternative is not always obvious

- Recommendations come with a cost: computation, space/time/attention

  - E.g., if we took "comparative products" off the page, would more people look deeply at and buy *this* product? Would they be happier?

My Goal Here

» Not to:
  - Share research results
  - Offer brilliant and tidy solutions

» Instead to offer:
  - Some provocative thoughts
  - An articulation of what we might already agree upon
  - A bit of critique of where we are, and hope for where we might go

Business Impact

» This is an area where we're actually somewhat good, but often have too much tunnel vision

- What's good – reduction of value to terms of art in business.

- How do we move from immediate impact towards lifetime value?

- Incorporating a broader view of possible "dividends" of effective recommendation.

- Beyond the single firm? Results in shareable and aggregable form.

Research Impact

» **Getting beyond inward-looking metrics**

» **Greater access to experimentation, user impact**

» **Studying recommender impact in context of full system**

- **What are characteristics of use?**
- **What are realistic alternatives?**

Broader Impact

» **How do we consider other benefits, such as:**

- Diversifying somebody's perspective
- Connecting people
- Improving a whole industry

» **And where to we measure/consider broader negative impact?**

- Disproportionate/biased recommendation

A Few Other Thoughts

» I believe in metrics … somewhat

  • Never singular – need multiple perspectives

  • Need to be careful to capture meaningful differences, meaningful baselines

» And we clearly need new ones

  • User engagement, user experience, user task success, site/corporate brand and reputation, …

A Few Other Thoughts

» Industry believes there is tremendous impact; how do we quantify this across the field, and trace it back to the research innovations that spawned it?

- Critical for justifying continued investment in research, both from industry and from public sources

- "Tire tracks" examples that trace specific wins back to funding sources that contributed

A Few Other Thoughts

» **The role of knowledge, theory, expertise in an era of data …**

- How do we ensure that knowledgeable alternatives force our algorithms to consider incorporating knowledge
  - Understanding humans, domain, features, heuristics, etc.
- Examples: coins, decision-making, …

Impact is Hard Word

» Data makes statistical significance free

» How to encourage, reward research and presentations that address impact

» Not hard for its own sake, but valuing impact

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DISCUSSION