Hands-on Tutorial: Experimentation with fairness-aware recommendation using `librec-auto`

Robin Burke
University of Colorado Boulder
Boulder, USA
robin.burke@colorado.edu

Masoud Mansoury
Eindhoven University of Technology
Eindhoven, the Netherlands
m.mansoury@tue.nl

Nasim Sonboli
University of Colorado Boulder
Boulder, USA
nasim.sonboli@colorado.edu

ABSTRACT

The field of machine learning fairness has developed metrics, methodologies, and data sets for experimenting with classification algorithms. However, equivalent research is lacking in the area of personalized recommender systems. This 180-minute hands-on tutorial will introduce participants to concepts in fairness-aware recommendation, and metrics and methodologies in evaluating recommendation fairness. Participants will also gain hands-on experience with conducting fairness-aware recommendation experiments with the LibRec recommendation system using the `librec-auto` scripting platform, and learn the steps required to configure their own experiments, incorporate their own data sets, and design their own algorithms and metrics.

CCS CONCEPTS

• **Information systems** → **Recommender systems**; **Relevance assessment**; • **Human-centered computing** → **Collaborative filtering**; • **Social and professional topics** → **User characteristics**; • **Software and its engineering** → *Software libraries and repositories.*

KEYWORDS

recommender systems, fairness, evaluation, software

ACM Reference Format:
Robin Burke, Masoud Mansoury, and Nasim Sonboli. 2020. Hands-on Tutorial: Experimentation with fairness-aware recommendation using `librec-auto`. In *Conference on Fairness, Accountability, and Transparency (FAT* '20), January 27–30, 2020, Barcelona, Spain.* ACM, New York, NY, USA, 1 page. https://doi.org/10.1145/3351095.3375670

1 INTRODUCTION

Research on fairness in machine learning systems has recently been extended to fairness in learning-based personalized systems, in particular recommender systems [2, 7]. However, in contrast to the recent explosion of interest in fairness in machine learning systems generally, research in fairness-aware recommendation has lagged.

One of the challenges in conducting this research is that fairness in recommender systems is strictly more complex than in classification systems. Recommender systems are often embedded in multisided platforms [3, 6] and may have fairness concerns for multiple parties. Research distinguishes between C-fairness (fairness towards individuals consuming recommendations) and P-fairnesss (fairness towards those whose items are being recommended) [1]. Depending on the application context, other parties may also need to be considered. In addition, because of their personalized nature, recommender systems are designed to provide unique experiences to all users and standard measures of impact and harm are not always appropriate.

The aim of this workshop is to support researchers who have an interest in fairness and recommendation by offering

- An introduction to the unique and complex aspects of fairness in the recommender systems context,
- An introduction to methodologies for off-line recommender systems evaluation using the LibRec 3.0 platform [4],
- Experience designing and configuring fairness-aware recommendation experiments using the `librec-auto` tool [5].

Participants will leave the workshop with the ability to conduct fairness-aware recommendation experiments on their own data sets, and for the more technically-inclined, with the foundations necessary to conduct experimental research in fairness-aware recommendation including implementing and evaluating fairness-aware recommendation algorithms and creating new fairness metrics for such experiments.

2 ACKNOWLEDGEMENTS

This work has been supported, in part, by the National Science Foundation IIS #1911025 and by the University of Colorado, Boulder.

REFERENCES

[1] Robin Burke. 2017. Multisided Fairness for Recommendation. *CoRR* abs/1707.00093, Article 15 (2017), 5 pages. arXiv:1707.00093
[2] Michael Ekstrand and Amit Sharma (Eds.). 2017. *1st FATRec Workshop on Responsible Recommendation.* Held at RecSys 2017, Como, Italy.
[3] David Evans, Richard Schmalensee, Michael Noel, Howard Chang, and Daniel Garcia-Swartz. 2011. *Platform economics: Essays on multi-sided businesses.* Competition Policy International. http://ssrn.com/abstract=1974020
[4] Guibing Guo, Jie Zhang, Zhu Sun, and Neil Yorke-Smith. 2015. LibRec: A Java Library for Recommender Systems. In *UMAP 2015 Extended Proceedings.* CEUR, Article 9, 4 pages.
[5] Masoud Mansoury, Robin Burke, Aldo Ordonez-Gauger, and Xavier Sepulveda. 2018. Automating recommender systems experimentation with librec-auto. In *Proceedings of the 12th ACM Conference on Recommender Systems.* ACM, 500–501.
[6] Jean-Charles Rochet and Jean Tirole. 2003. Platform competition in two-sided markets. *Journal of the European Economic Association* 1, 4 (2003), 990–1029.
[7] Pierre-Nicolas Schwab, Toshiro Kamishima, and Michael Ekstrand (Eds.). 2018. *2nd FATRec Workshop on Responsible Recommendation.* Held at RecSys 2018, Vancouver, Canada.

FAT '20, January 27–30, 2020, Barcelona, Spain*

ACM ISBN 978-1-4503-6936-7/20/02.
https://doi.org/10.1145/3351095.3375670