



# (Music) Recommender Systems

Lorenzo Porcaro (he/him) - [lorenzo.porcaro@uniroma1.it](mailto:lorenzo.porcaro@uniroma1.it)

*Human-Computer Interaction, DIAG, Sapienza University of Rome, 10/03/2025*



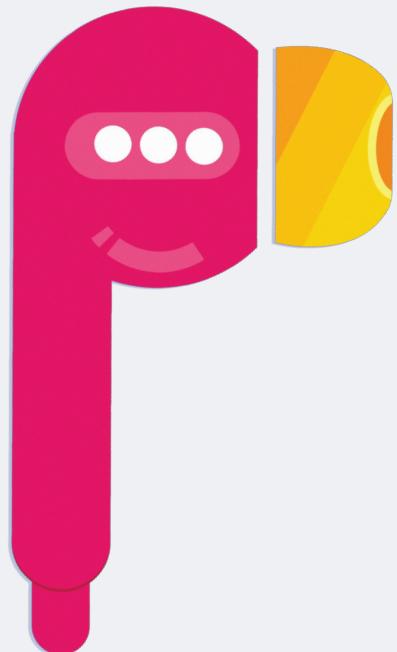
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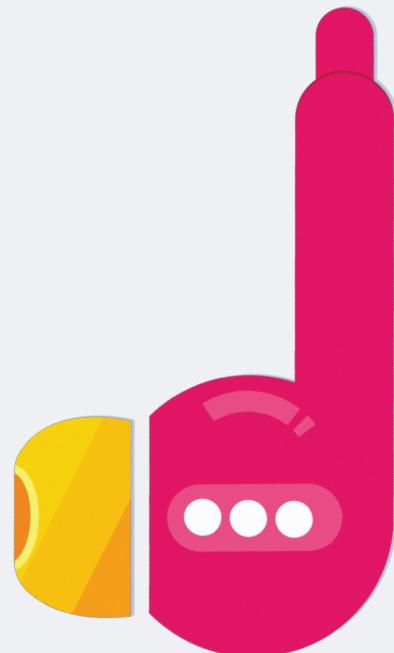


SAPIENZA  
UNIVERSITÀ DI ROMA





Have you interacted  
with a Recommender  
System during the last  
week?



Yes/No/Maybe



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## Who am I?

- Marie Skłodowska-Curie Postdoctoral Research Fellow
- PhD @ Music Technology Group, UPF, Barcelona
- European Centre for Algorithmic Transparency (EC, JRC)
- Data engineer in music industry (SoundCloud, BMAT)



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Univ.-Prof. Mag. DI Dr.

**Christine Bauer**

EXDIGIT Professor of  
Interactive Intelligent Systems

Department of Artificial  
Intelligence and Human  
Interfaces (AIHI)

# Recommender Systems 1

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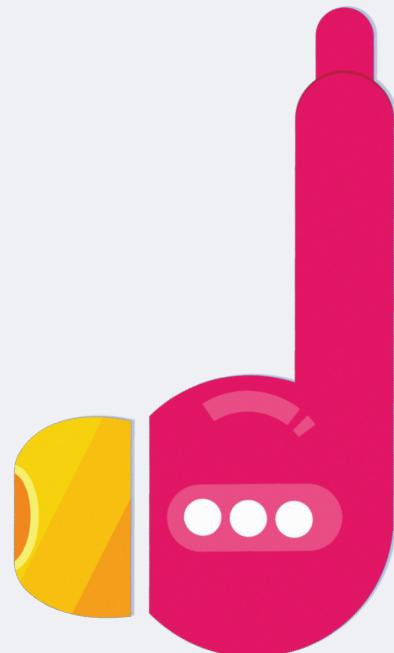
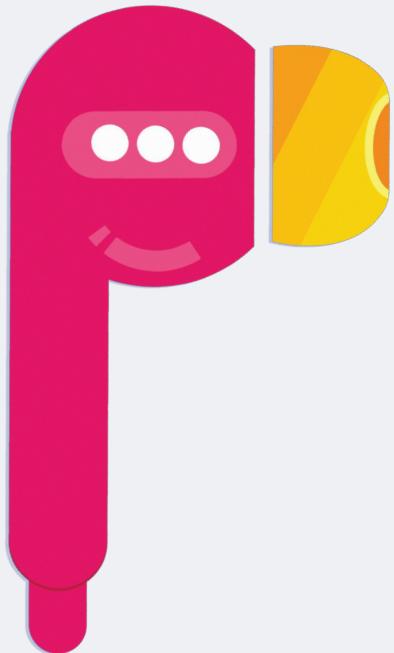
# Write down 2/3 artists that:

1. You have listened recently

*(not necessarily the most listened)*

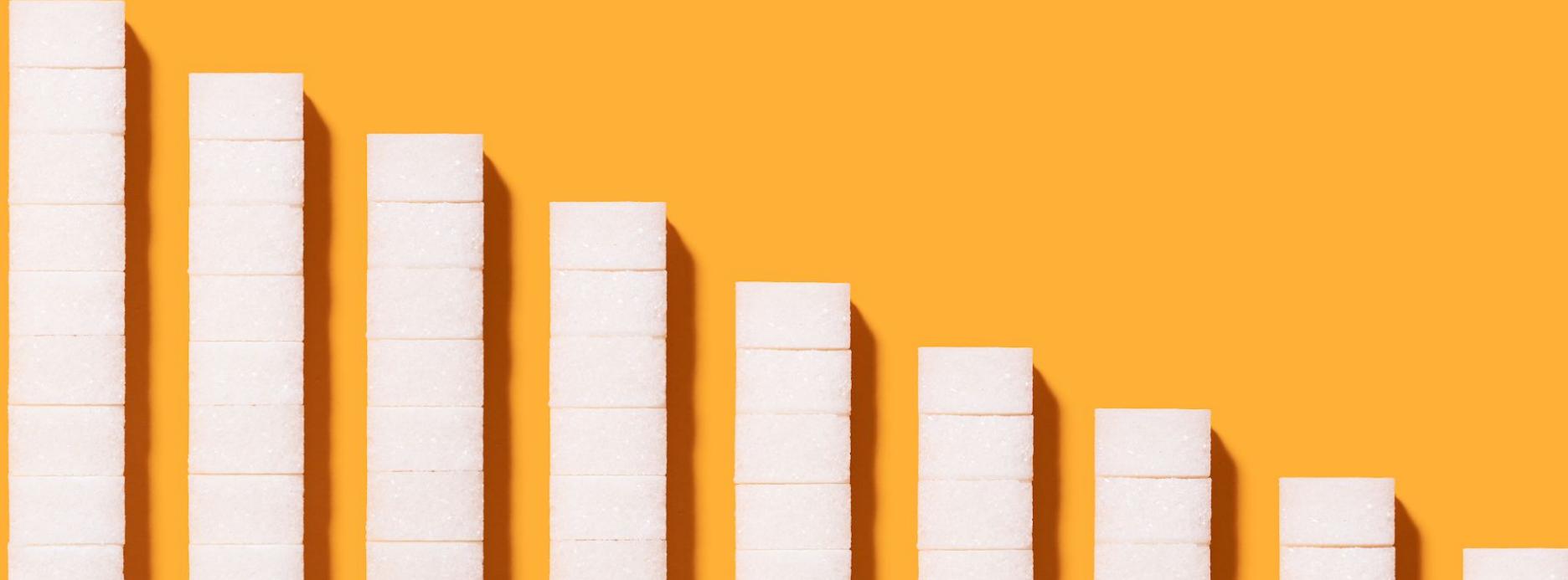
2. You like it

*(not necessarily your favourite)*



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# Algorithmic Auditing for Music Discoverability (AA4MD)



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# Discoverability

- Policy concept

“Discoverability of an item is its availability online and its ability to be found among a wide range of other content, particularly by someone who was not specifically looking for it”\*

- Design concept

Discoverability refers to how easily users can find features, information, or functionalities within a product, service, or system.\*\*

\* Franco-Quebec mission on the online discoverability of French-language cultural content, Technical Report, Bibliothèque et Archives nationales du Québec, 2020. URL: <https://www.vie-publique.fr/rapport/277472-rapport-sur-decouvrabilite-en-ligne-des-contenus-culturels-francophones>

\*\* Norman, D. A. (2013). *The design of everyday things*. The MIT Press.



# Discoverability (cont'd)

- Policy concept

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- Design concept

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\*\* Norman, D. A. (2013). The design of everyday things. The MIT Press.



# Low Discoverability

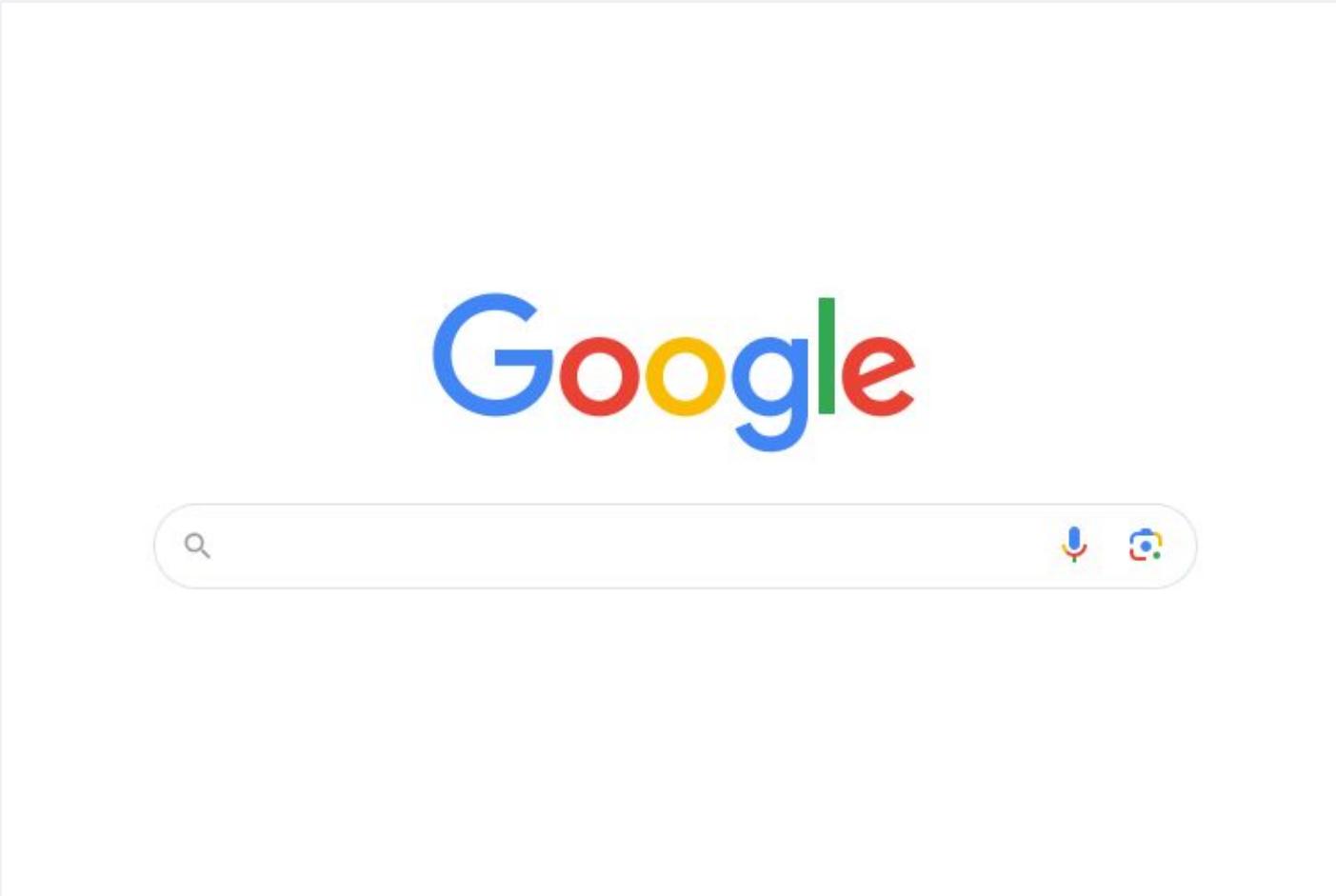


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# High Discoverability



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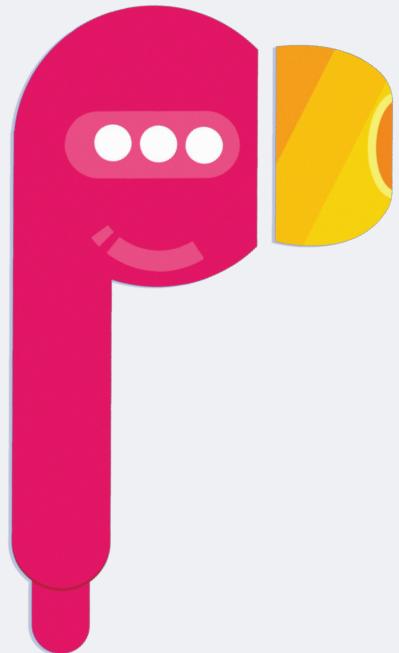
*Def. Discoverability* is the likelihood of an item to  
be found.



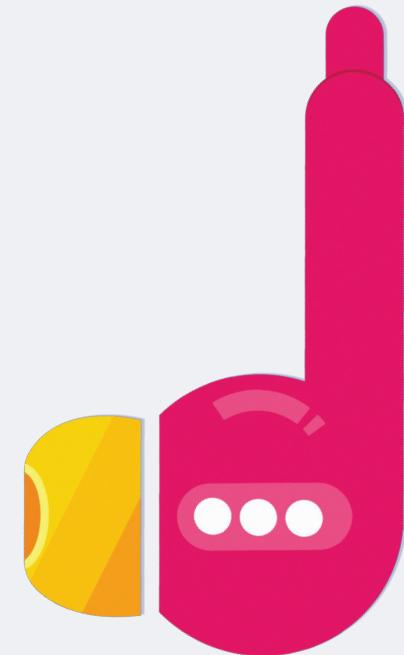
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# What about music discoverability?



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What do you want to play?



Explore Premium

Install App



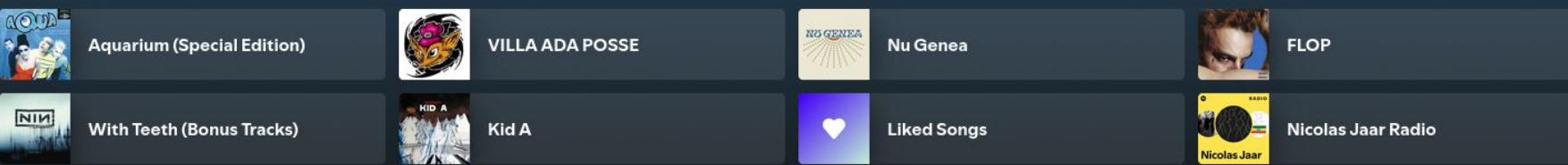
2

Your Library



All Music Podcasts

Playlists Artists Albums

Liked Songs  
Playlist • 715 songsLa nostra playlist  
Playlist • 21kr7ptayrbogafethxautb6iMatrimonio Stella&Lorenzo  
Playlist • 21kr7ptayrbogafethxautb6iLa nostra altra playlist  
Playlist • 21kr7ptayrbogafethxautb6iCYAN — STONE ISLAND SOUND, curated by...  
Playlist • Stone IslandSatie: Avant-dernières pensées (Bonus Trac...  
Album • Erik SatieThe Sound of Bubblegum Dance  
Playlist • The Sounds of SpotifyStratum  
Album • Visible CloaksYELLOW — STONE ISLAND SOUND, curate...  
Playlist • Stone IslandEn Mana Kuoyo  
Album • Ayub OgadaStraniero  
Nu Genea

## Picked for you



## Made For You



Show all

## Recently played



Show all

1:46

2:58

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# Algorithmic Auditing

An empirical study investigating a public algorithmic system for potential problematic behavior.\*\*\*

\*\*\* Bandy, J. (2021). Problematic Machine Behavior: A Systematic Literature Review of Algorithm Audits. Proceedings of the ACM on Human-Computer Interaction, 5(CSCW1). <https://doi.org/10.1145/3449148>



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# Man, what a song: how algorithms reinforce music's gender imbalance

Intelligence researcher Christine Bauer explains how streaming algorithms work – and how exclusionary they can be

AI & Machine Learning

Data & Gender Equality

## Fairness in Question: Do Music Recommendation Algorithms Value Diversity?

**James Blake on TikTok, Streaming Economics: "The Brainwashing Worked and Now People Think Music Is Free"**

*"If we want quality music somebody is gonna have to pay for it"*

MUSIC 09/16/2019

## Martina McBride 'Felt Like We'd Been Erased' When Spotify Didn't Recommend a Single Female Country Artist

Days after Martina McBride aired her grievances with Spotify's lack of female recommendations publicly on Instagram while attempting to make a country music playlist, the singer spoke with Billboard...

PRESS RELEASE

## North Carolina Musician Charged With Music Streaming Fraud Aided By Artificial Intelligence

<https://www.loudandquiet.com/short/man-what-a-song-how-algorithms-reinforce-musics-gender-imbalance/>

<https://www.billboard.com/pro/martina-mcbride-spotify-female-country-artists-interview/>

<https://www.music-tomorrow.com/blog/fairness-and-diversity-in-music-recommendation-algorithms>

<https://exclaim.ca/music/article/james-blake-on-tik-tok-streaming-economics-the-brainwashing-worked-and-now-people-think-music-is-free>

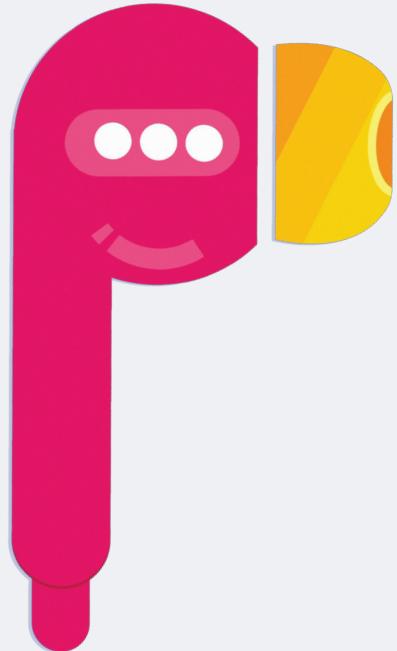
<https://www.justice.gov/usao-sdny/pr/north-carolina-musician-charged-music-streaming-fraud-aided-artificial-intelligence>



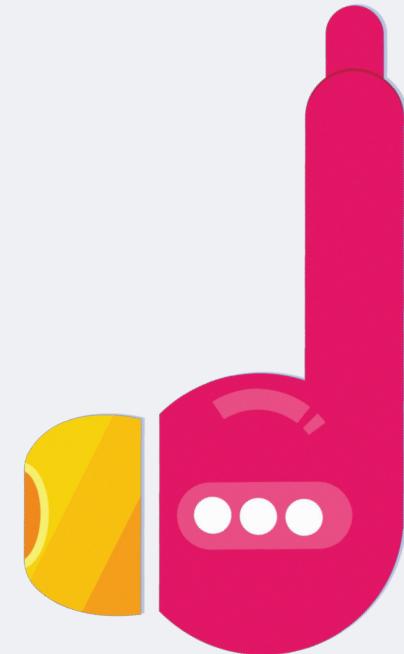
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# Methodology



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# Everyday Algorithmic Auditing

Everyday algorithm auditing is the ways everyday users **detect, understand, and/or interrogate** problematic machine behaviors via their **day-to-day interactions** with algorithmic systems.

Initiation → Awareness Raising → Hypothesizing & Testing → Remediation

Shen, H., Devos, A., Eslami, M., & Holstein, K. (2021). Everyday Algorithm Auditing: Understanding the Power of Everyday Users in Surfacing Harmful Algorithmic Behaviors. Proceedings of the ACM on Human-Computer Interaction, 5(CSCW2). <https://doi.org/10.1145/3479577>

Devos, A., Dhabalia, A., Shen, H., Holstein, K., & Eslami, M. (2022, April 29). Toward User-Driven Algorithm Auditing: Investigating users' strategies for uncovering harmful algorithmic behavior. Proceedings of the ACM on Human-Computer Interaction. <https://doi.org/10.1145/3491102.3517441>

Lam, M. S., Gordon, M. L., Metaxa, D., Hancock, J. T., Landay, J. A., & Bernstein, M. S. (2022). End-User Audits: A System Empowering Communities to Lead Large-Scale Investigations of Harmful Algorithmic Behavior. Proceedings of the ACM on Human-Computer Interaction, 6(CSCW2). <https://doi.org/10.1145/3555625>



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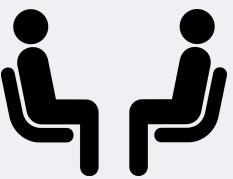


# Methodology

## EVIDENCE GATHERING



Literature  
review



Think-aloud  
interviews



Diary  
study

## FRAMEWORK DEVELOPMENT



Workshop



Web-tool  
design



Usability  
test

## ANALYSIS / SYNTHESIS



Audit  
analysis



Synthesis



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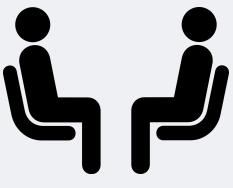


# Methodology (cont'd)

## EVIDENCE GATHERING



Literature  
review

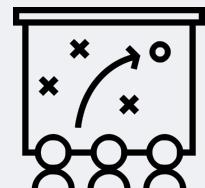


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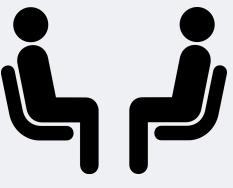


# Methodology (cont'd)

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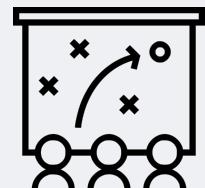


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If you want to know more

Lorenzo Porcaro, Emilia Gómez and Tiziana Catarci. (2024). End-user Algorithmic Auditing for Music Discoverability: A Research Roadmap. 2nd Music Recommender Systems Workshop (MuRS 2024), co-located with the 18th ACM Conference on Recommender Systems.

<https://ceur-ws.org/Vol-3787/paper4.pdf>



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# Algorithmic Auditing for Music Discoverability

lorenzo.porcaro@uniroma1.it

<https://lorenzoporcaro.me>

<https://aa4md-project.eu>



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