

Cookietalk Alona Zharova – Transforming Household Energy Consumption with Digitality and Smart Technology

Eliza Mandieva

18.12.2024

Contributors: Carolin Odebrecht, Paul Bayer, Melanie Althage

Alona Zharova (WiWi): Transforming Household Energy Consumption with Digitality and Smart Technology

IZ D2MCM Cookie Talk Series, 18.07.2024, 09.30-10.00 am

In our latest IC D2MCM Cookie Talk, Alona Zharova, a Postdoc at the Chair of Information Systems, School of Business and Economics at Humboldt University of Berlin, presented her research on how smart technology and digitalization can transform household energy consumption and reduce its environmental impact. With household energy use making up about 20% of global energy consumption, it significantly contributes to CO2 emissions, making efficiency improvements crucial. Alona's work highlights the potential of demand management strategies like load shifting, utilizing digital methods and smart technologies.

Digital Methods in Energy Management

Digital methods, powered by smart technology, have revolutionized data collection, analysis, and utilization in energy management. Smart meters and advanced algorithms enable precise monitoring and recommendations for energy use. Alona's research focuses on creating recommendation systems that guide users toward more efficient energy consumption through personalized and generalized suggestions, emphasizing transparency and effectiveness in driving behavioral change.

Key Innovations in Recommendation Systems

Alona explored several innovative systems: - **Personalized Appliance Usage:** a utility-based, context-aware system providing tailored appliance usage recommendations to optimize energy consumption. - **Explainable Multi-Agent System:** this system offers recommendations with clear, understandable reasoning, building trust and encouraging informed decision-making. - **Activity-Based Recommendations:** focusing on household activities rather than individual appliances, this system offers intuitive, low-effort ways to enhance energy efficiency. - **Generalized Recommendation System:** by using local renewable energy data, this system provides flexible, community-level recommendations, aiming to reduce reliance on non-renewable energy sources.

Evaluating Impact

Alona and her team have developed performance evaluation frameworks to assess the effectiveness of these systems in reducing energy consumption and CO2 emissions, with promising results.

Conclusion

Alona's research demonstrates the power of digital methods and smart technology in transforming household energy management. By developing user-friendly systems, we can empower consumers to reduce energy use and contribute to a sustainable future. The Cookie Talk concluded with discussions on data collection challenges and digital method skepticism in Germany, with Alona's research offering valuable insights into addressing these issues.

Publications from the author:

- <https://cleaner-tomorrow-c93527173767.herokuapp.com/>
- Zharova A, Boer A, Knoblauch J, Schewina KI and Vihs J (2024). Explainable Multi-Agent Recommendation System for Energy-Efficient Decision Support in Smart Homes. *Environmental Data Science*, 2024, 3:e7. Code in GitHub. <https://doi.org/10.1017/eds.2024.8>
- Riabchuk V, Hagel L, Germaine F and Zharova* A (2024) Utility-Based Context-Aware Multi-Agent Recommendation System for Energy Efficiency in Residential Buildings. *Information Fusion*, 112, 102559. Code in GitHub. <https://doi.org/10.1016/j.inffus.2024.102559>

If you have further questions, collaboration ideas, or wish to present your research on digitality and digital methods at another Cookie Talk, don't hesitate to get in touch with our Interdisciplinary Centre for Digitality and digital Methods at Campus Mitte: iz-d2mcm.contact@hu-berlin.de.

Updated: 07.02.2025

Citation Information

Author: Eliza Mandieva

Title: Cookietalk Alona Zharova – Transforming Household Energy Consumption with Digitality and Smart Technology

Published: 18.12.2024

Last updated: 07.02.2025

Cite as: Eliza Mandieva: Cookietalk Alona Zharova – Transforming Household Energy Consumption with Digitality and Smart Technology. In: *IZ D2MCM Blog* [Weblog], 18.12.2024. URL: <https://izd2m.hu-berlin.de/blog/> Last updated: 07.02.2025.
