Machine Learning - Exploratory Data Analysis (Unit 2)

Overview

This unit focused on Exploratory Data Analysis (EDA) as a key first step in ML. It covered checking data quality, exploring features, spotting anomalies, and using visuals to find patterns. EDA also links to feature selection and engineering. We also revisited and responded to peers' Unit 1 posts.

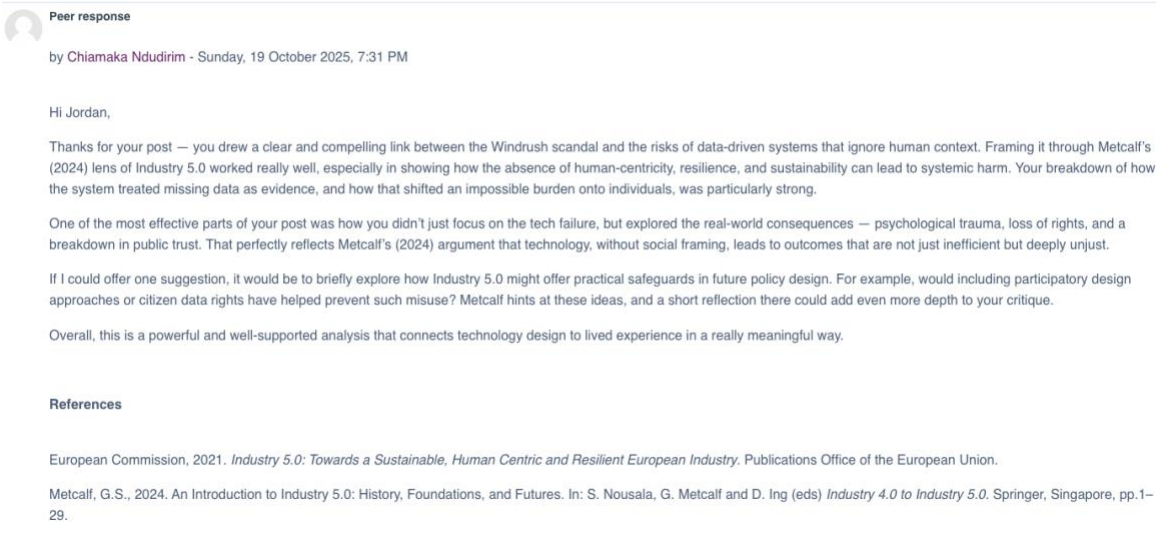
What I Have Learned

This week clarified the value of EDA in spotting issues early and guiding better feature choices. I learned how to explore data, identify outliers or gaps, and trust the results. A key takeaway was that data science isn't always linear—EDA often leads to revisiting earlier steps.

Collaborative Discussion 1: The 4th Industrial Revolution (Peer responses)

In response to the Industry 5.0 discussion (Metcalf, 2024), I engaged with peers on tech system failures. I noted how rigid systems, lack of oversight, and small errors can all cause harm. These examples reinforced that Industry 5.0 is about building tech that genuinely serves people.

Screenshots of my responses are below.



Peer response

by Chiamaka Ndudirim - Sunday, 19 October 2025, 7:31 PM

Hi Jordan,

Thanks for your post — you drew a clear and compelling link between the Windrush scandal and the risks of data-driven systems that ignore human context. Framing it through Metcalf's (2024) lens of Industry 5.0 worked really well, especially in showing how the absence of human-centricity, resilience, and sustainability can lead to systemic harm. Your breakdown of how the system treated missing data as evidence, and how that shifted an impossible burden onto individuals, was particularly strong.

One of the most effective parts of your post was how you didn't just focus on the tech failure, but explored the real-world consequences — psychological trauma, loss of rights, and a breakdown in public trust. That perfectly reflects Metcalf's (2024) argument that technology, without social framing, leads to outcomes that are not just inefficient but deeply unjust.

If I could offer one suggestion, it would be to briefly explore how Industry 5.0 might offer practical safeguards in future policy design. For example, would including participatory design approaches or citizen data rights have helped prevent such misuse? Metcalf hints at these ideas, and a short reflection there could add even more depth to your critique.

Overall, this is a powerful and well-supported analysis that connects technology design to lived experience in a really meaningful way.

References

European Commission, 2021. *Industry 5.0: Towards a Sustainable, Human Centric and Resilient European Industry.* Publications Office of the European Union.

Metcalf, G.S., 2024. An Introduction to Industry 5.0: History, Foundations, and Futures. In: S. Nousala, G. Metcalf and D. Ing (eds) *Industry 4.0 to Industry 5.0.* Springer, Singapore, pp.1–29.

Peer Response

by Chiamaka Ndudirim - Sunday, 19 October 2025, 7:21 PM

Hi Jose,

Thanks for your post — you've done a strong job connecting the impacts of the Fourth Industrial Revolution to current energy and sustainability challenges. Your focus on the role of data as a form of currency and the call for transparency in state-controlled energy sectors like Mexico adds a relevant real-world lens.

What stood out most to me was your point about digital twins and energy management systems. That reflects what Metcalf (2024) discusses about Industry 5.0's potential to support resilient infrastructures. While Industry 4.0 focused on efficiency and automation, Industry 5.0 brings a layer of human-centric design that aims to balance innovation with environmental and social needs.

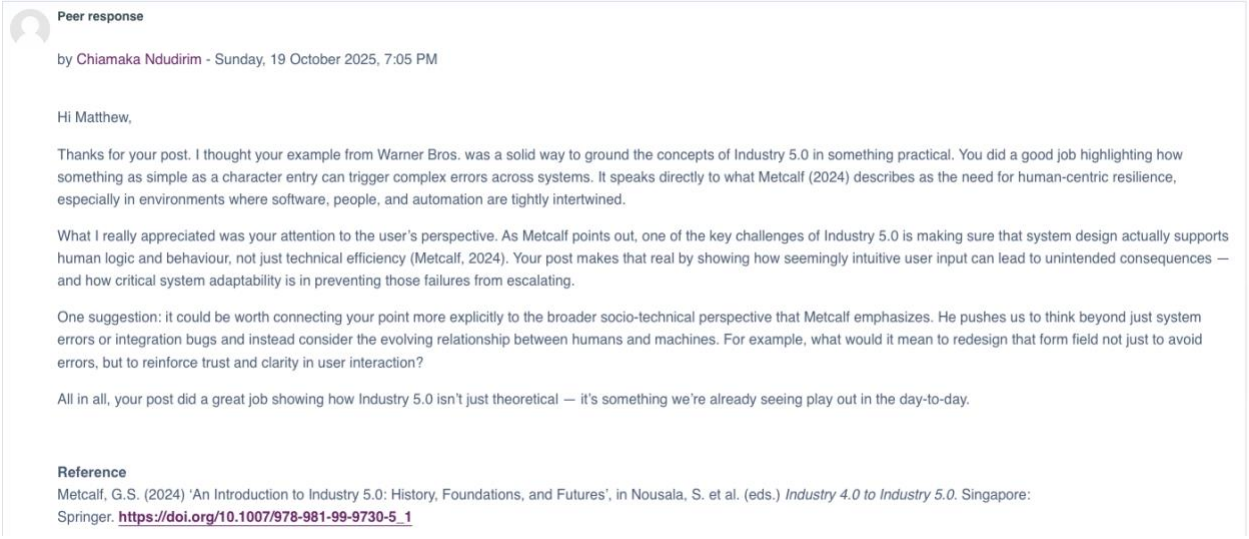
One thing you could strengthen is the connection between your argument and the evolving worker–machine relationship that Industry 5.0 emphasizes. Metcalf (2024) suggests that this new phase isn't just about better tech — it's about redefining how people engage with it, especially in complex, data-driven environments. For example, how might these smart energy systems impact workers who interact with them daily? Will they enhance agency or create new forms of dependency?

Overall, your post shows solid understanding and a clear line of argument. With a bit more engagement in the human-facing side of the shift — which is at the heart of Industry 5.0 — your analysis could go even deeper.

References

European Commission et al., 2021. *Industry 5.0: Towards a sustainable, human centric and resilient European industry.* Publications Office of the European Union.

Metcalf, G.S., 2024. An introduction to Industry 5.0: history, foundations, and futures. In: S. Nousala et al. (eds.) *Industry 4.0 to Industry 5.0.* Singapore: Springer. **https://doi.org/10.1007/978-981-99-9730-5_1**



Peer response

by Chiamaka Ndudirim - Sunday, 19 October 2025, 7:05 PM

Hi Matthew,

Thanks for your post. I thought your example from Warner Bros. was a solid way to ground the concepts of Industry 5.0 in something practical. You did a good job highlighting how something as simple as a character entry can trigger complex errors across systems. It speaks directly to what Metcalf (2024) describes as the need for human-centric resilience, especially in environments where software, people, and automation are tightly intertwined.

What I really appreciated was your attention to the user's perspective. As Metcalf points out, one of the key challenges of Industry 5.0 is making sure that system design actually supports human logic and behaviour, not just technical efficiency (Metcalf, 2024). Your post makes that real by showing how seemingly intuitive user input can lead to unintended consequences — and how critical system adaptability is in preventing those failures from escalating.

One suggestion: it could be worth connecting your point more explicitly to the broader socio-technical perspective that Metcalf emphasizes. He pushes us to think beyond just system errors or integration bugs and instead consider the evolving relationship between humans and machines. For example, what would it mean to redesign that form field not just to avoid errors, but to reinforce trust and clarity in user interaction?

All in all, your post did a great job showing how Industry 5.0 isn't just theoretical — it's something we're already seeing play out in the day-to-day.

Reference

Metcalf, G.S. (2024) 'An Introduction to Industry 5.0: History, Foundations, and Futures', in Nousala, S. et al. (eds.) *Industry 4.0 to Industry 5.0.* Singapore: Springer. **https://doi.org/10.1007/978-981-99-9730-5_1**

Reference

Metcalf, G.S. (2024) in Nousala, S. et al. (eds) *Industry 4.0 to Industry 5.0*. Springer.