

MASTER'S THESIS Automatic Account Linking for Fraud Detection in E-Commerce**STUDENTS** Ola Berglund, Hampus Mattfolk**SUPERVISOR** Leonard Papenmeier (LTH)**EXAMINER** Jacek Malec (LTH)

Digital Doppelgangers: How AI Unmasks E-Commerce Fraudsters

POPULAR SCIENCE SUMMARY **Ola Berglund, Hampus Mattfolk**

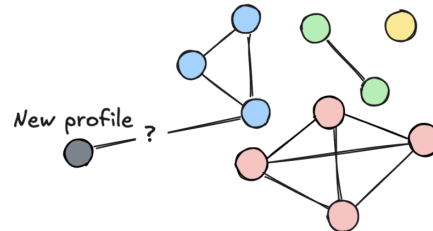
E-commerce platforms face constant threat from malicious users who create multiple profiles to bypass rules, violate policies and commit fraud. This thesis investigates how machine-learning can help these platforms identify and link these malicious accounts, catching the fraudsters before any damage is done.

Have you ever wondered why your favorite on-line store suddenly got a bit stricter with its return policy? It might seem surprising, but this often happens because a small fraction of customers make up for a massive volume of returns, costing companies and the environment a fortune. Some e-commerce platforms enforce fair use policies such as these by temporarily blocking accounts, but what do you do when customers simply create new ones? Faced with this cat-and-mouse game, we reach for automation.

Traditionally, platforms matched emails or phone numbers to catch obvious duplicate accounts, effective but easily evaded. For less obvious cases, human analysts manually spotted patterns and linked accounts. While accurate, this approach is slow, costly and doesn't scale. In particular, these methods fall short against creative fraudsters and the scale of modern e-commerce.

How can a computer find judgment-based links? Two AI candidates were considered for the job. The first one, a Random Forest, can be likened to a team of super-fast analysts. Each looks at a checklist of comparisons between two accounts, then they vote on whether the profiles belong to the same person. The other AI has two "twin"

neural networks. Each twin looks at a profile and creates a unique digital "impression" of it. If the impressions are very similar, the profiles are likely linked.



The Random Forest was able to identify linked accounts much more accurately. For the best model:

- **Precision was 93%**, meaning 93 out of 100 flagged accounts were truly problematic.
- **Recall was 89%**, meaning it caught 89 out of every 100 bad accounts.

These AIs aren't replacing humans but giving them power to work faster and smarter, so rule-breakers will have a harder time hiding. While this was only a study, it shows the potential of AI to tackle complex fraud problems that are too big for manual efforts alone.