

Art Heist at the Museum

In order to participate responsibly in a data-driven society, school students need to develop *Data Literacy* (DL) and basic *Data Science* (DS) competencies [1]. This includes the ability to collect, manage, evaluate and apply data in a critical way [2]. However, these com-petencies are rarely addressed in current computer science (CS) curricula and teacher education programs.

Through our research, we explore **Educational Escape Rooms (EERs)** as an **innovative teaching method** to **enhance DS learning**.



Background

EERs embed DS learning in immersive, time-limited scenarios requiring collaboration and problem-solving. They combine clear learning goals with narrative and teamwork to boost engagement. For DS, EERs provide a playful, practice-oriented way to grasp core concepts such as analysis, visualization, and pattern recognition.

Story & Material

The EER is framed as an **art heist investigation**, where players become detectives assisting a fictional commissioner. By working with the open-source **data analysis tool Orange**, learners acquire skills in:

1. Apply Decision Tree Learning to identify likely suspects
2. Use Clustering to analyse shopping data and pinpoint the offender

Clues are delivered by the fictional detective through **multimedia materials** such as **newspaper excerpts**, **videos**, and **data files**. Along the way, participants explore key concepts such as **training vs. test data** and the **principles of classification and clustering**.

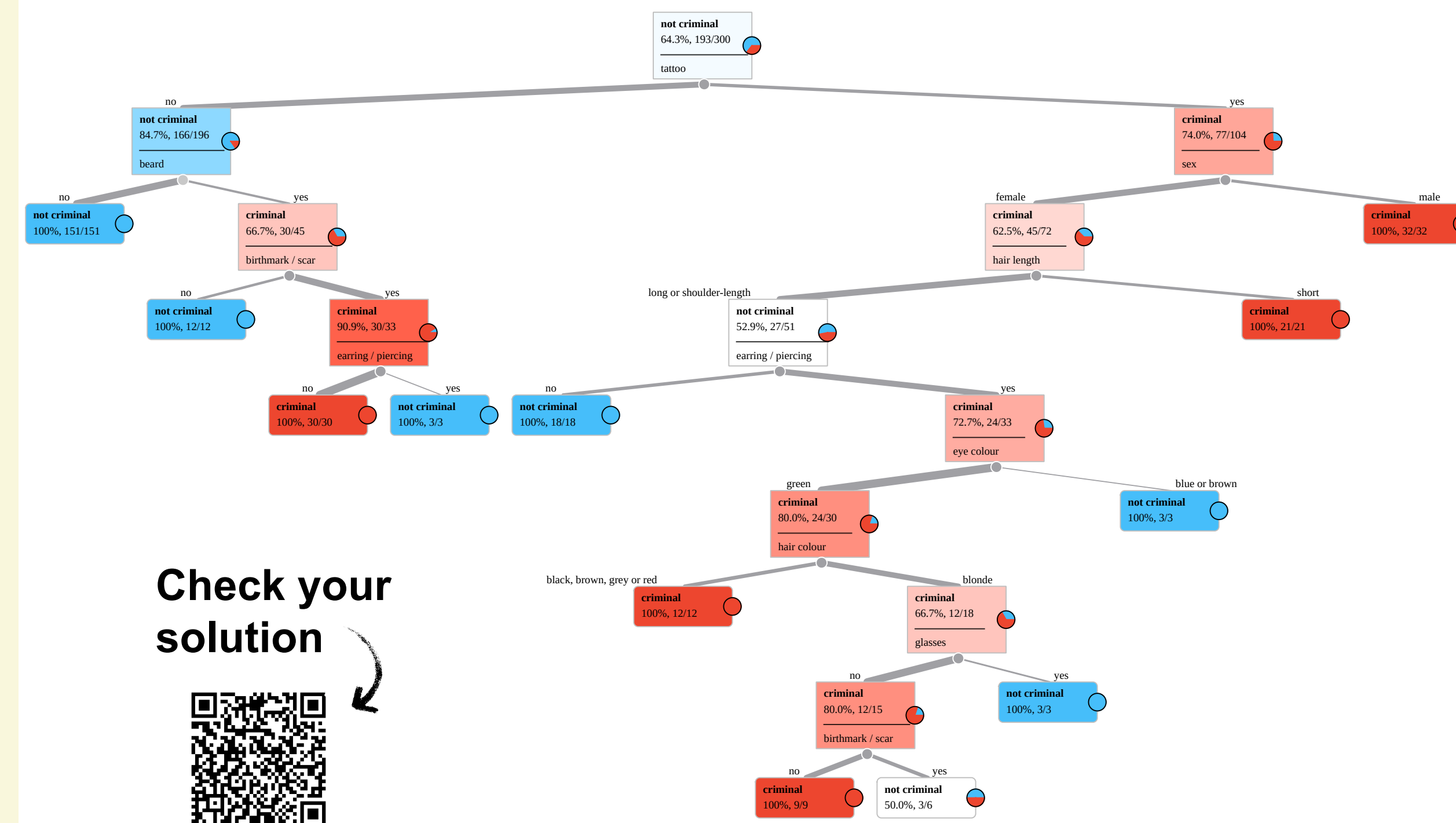


Check out
our material

References

- [1] Engel, J.: Statistical literacy for active citizenship: A call for data science education. *Statistics Education Research Journal* 16(1), 44–49 (2017). <https://doi.org/10.52041/serj.v16i1.213>
- [2] Chantel Ridsdale, James Rothwell, Mike Smit, Michael Bliemel, Dean Irvine, Dan Kelley, Stan Matwin, Brad Wuetherick, and Hossam Ali-Hassan. 2015. *Strategies and Best Practices for Data Literacy Education Knowledge Synthesis Report*

Find the perpetrator



Check your
solution



A reflection phase addresses **ethical issues** and **bias in AI-generated content**, using provocative examples such as a **hypersexualised AI-generated Mona Lisa** and **stereotyped suspect profiles**. These discussions highlight how algorithms can reflect and reinforce social stereotypes related to gender, appearance, and ethnicity.

Observation & Discussion

- **High Level of motivation and engagement** (especially in the 10-14 age group)
- **Effective introduction to practical applications of DS:** Learners showed enthusiasm not only for puzzles but also for underlying data techniques.
- **Supports both technical and socio-critical learning:** integrates supervised learning with ethical reflection on AI bias, fostering critical data literacy.
- **Best suited for consolidation and application of previously introduced content**, ideally embedded in broader teaching sequences with preparation and follow-up.
- **Limitations:** EERs are less suitable as an introduction to DS; core concepts (e.g., clustering, decision tree learning) require prior knowledge or didactic preparation.