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An Educational Tool for Learning about Social Media Tracking, Profiling, and Recommendation

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***Abstract*—This paper introduces an educational tool for classroom use, based on explainable AI (XAI), designed to demystify key social media mechanisms—tracking, profiling, and content recommendation—for novice learners. The tool provides a familiar, interactive interface that resonates with learners' experiences with popular social media platforms, while also offering the means to "peek under the hood" and exposing basic mechanisms of datafication. Learners gain first-hand experience of how even the slightest actions, such as pausing to view content, are captured and recorded in their digital footprint, and further distilled into a personal profile. The tool uses real-time visualizations and verbal explanations to create a sense of immediacy: each time the user acts, the resulting changes in their engagement history and their profile are displayed in a visually engaging and understandable manner. This paper discusses the potential of XAI and educational technology in transforming data and digital literacy education and in fostering the growth of children's privacy and security mindsets.**

***Index Terms*—social media, K-12, educational tool, artificial intelligence, somekone**

I. Introduction

Social media has become an integral element of daily life for many people, fundamentally influencing the way people of all ages, including children, perceive and interact with the world [1]. Research studies have highlighted the importance of educating users, especially the youth, about how to mitigate risks related to social media, focusing on misinformation, privacy, and personal cybersecurity. Consequently, social media education has primarily meant guidelines on themes like information literacy, privacy policies, and preventing cyberbullying. Many of these initiatives avoid discussing the actual mechanisms and algorithms used by social media platforms, such as profiling, so that most people resort to "folk theories" when asked to explain their functioning [2].

We argue that, while important, education focusing on personal safety awareness and guidelines is not enough: learning about the mechanisms underlying social media platforms is necessary for preparing learners to understand the algorithm-driven dynamics on social media platforms, including behavior engineering and opinion swaying. Going beyond surface-level understanding also enables children to assume a more active role in envisioning alternative solutions that better meet their needs and expectations.

A challenge in educating learners about the mechanisms of social media lies in the absence of practical, classroom-ready tools that work at a level of abstraction that exposes the mechanisms at play but does not bury those mechanisms under complicated technical detail. Unplugged methods can provide a bird's eye view on demystifying these complex mechanisms, but they fall short in terms of demonstrating how automation and scale change the dynamics. Unplugged methods are also challenged by the multiplicity of ways in which behavioral patterns are captured and aggregated into digital footprints and targeted content through profiling and recommendation algorithms. There is a need for tools elucidating mechanisms underlying social media platforms in safe and engaging ways, allowing children to learn through hands-on experience without compromising their personal data.

This paper presents Somekone (https://somekone.gen-ai.fi/), an educational tool for learning the mechanisms of data collection, profiling, and recommendation in social media. The tool provides learners an image feed app with the usual social media engagement modalities. Learners can monitor and explore the depth of data collection either on the app or by connecting another smartphone for monitoring. They can explore how profiles develop through different kinds of user engagement, and explore how recommendations are made based on data and profiles. At the same time the teacher can visualize on a projector how the classroom's social network develops in real-time as learners scroll through images and engage with them (Fig. 2c). The tool we describe serves as an example of GDPR-safe social media educational technology that respects children's privacy in a safe learning environment.

II. Design of the Tool

Somekone (literally translated as "social media machine") has a user interface reminiscent of Instagram, which allows children to learn in an easy-to-use environment that many

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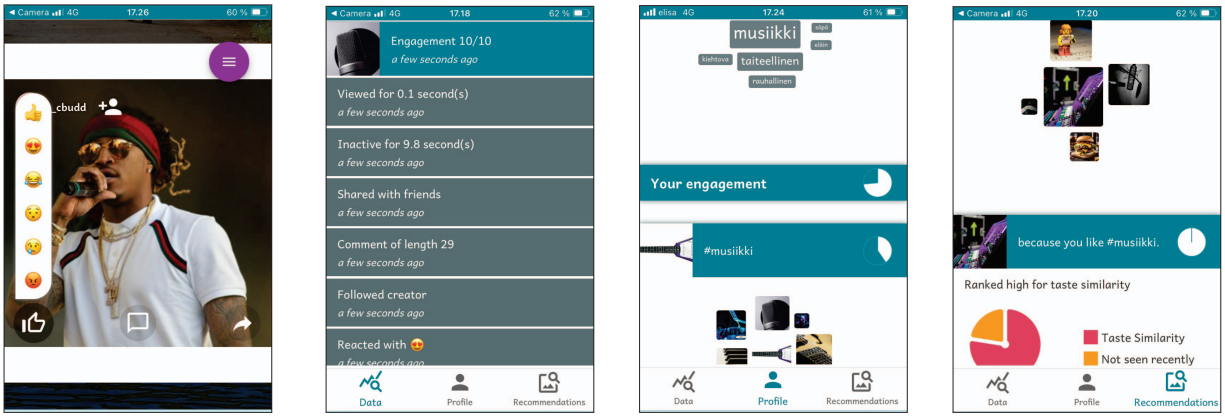


(a) Browsing images on Somekone. (Jarmo's phone)

(b) Live view of the data Jarmo's browsing is generating. (Anna's phone)

(c) Somekone-generated live profile of Jarmo. (Anna's phone)

(d) Upcoming recommendations (live), explained. (Anna's phone)

Fig. 1: Anna is Jarmo's pair in the exercise, and her device is connected to Jarmo's device. Anna can choose between real-time views of all the data Jarmo's browsing generates, the profile Somekone has built of Jarmo, and the upcoming recommendations.

are already familiar with [3]. It provides an infinite scrolling feed of images, coupled with a set of generic social media engagement features, such as liking, reacting with emoji, commenting, following other users, and sharing with everyone, friends, or privately. The image set is derived from a hand-picked and labeled set of 727 images.

The tool is designed to respect children's privacy. All data are collected and stored locally. Only the app and the content are retrieved from outside the classroom. Peer-to-peer communication (WebRTC) eliminates the need for an Internet connection beyond the initial signaling.

a) Data Collection (Tracking): The first of the three key social media mechanisms that Somekone is designed to teach is data collection (tracking). It is implemented by tracking a variety of engagement metrics from the user's browsing session. These metrics include seeing an image, time spent viewing an image, likes, comments and their length, periods of user inactivity, reactions with one of five different emoji, following the image creator, and sharing the image privately, with friends, or publicly. Figure 1a shows a screenshot of the interface when the user engages with the like button, revealing the range of available reactions.

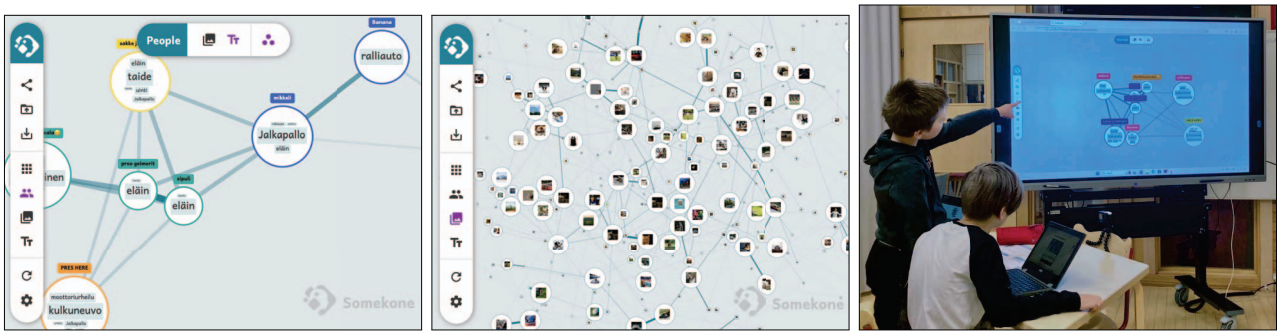
To facilitate exploration of the relationship between their engagement scores and the data collected in the user's action log during their browsing sessions, children can access a real-time visualization of the action log. Somekone offers two methods for this: An integrated "Engagement Overview" tab for individual use case, and the same view from a separate device for pair work (Figure 1b). This paper presents a pair work example: "Jarmo" browses the image feed on his device and "Anna" monitors, on her own device, the underlying data collection process as Jarmo engages with the image feed. In Figure 1b Anna connects her device to Jarmo's, allowing her to view a live feed of all the data Somekone is tracking about Jarmo's session.

b) Profiling (User Modeling): The second key concept that Somekone is designed to teach is profiling. The profiles in this tool are primarily composed of topic affinities, updated based on the user's engagement with labeled images. The user's action log is then used to generate an engagement score for each image. Each type of interaction carries a different weight, contributing more or less to the engagement score. These scores, combined with the labels of the images, update the user's affinity for each label. Similarity scores between users are used as weights on a social network graph's edges, facilitating clustering of users with similar tastes for visualization purposes.

Content profiling is also enhanced by user data, where related images are connected using co-engagements. Collaborative filtering allows for the identification of relationships between images beyond their labels, although it requires substantial interaction data. Figure 2b presents an image co-engagement network after a learning session with 18 learners.

To facilitate children's exploration of how their profiles are created, Somekone offers a range of visualizations of the profiling mechanisms. It combines image tags and engagement scores to list the most engaged topics, visualizing tags as a word cloud. For each tag the tool displays a set of images that the user engaged with more than others. It also visualizes which topics received the most engagement through actions such as sharing, following, reacting with emoji, and viewing. Figure 1c shows a screenshot where Anna is analyzing Jarmo's live profile on her device.

c) Recommendation: The third key concept, recommendation, was implemented by ranking image candidates based on a number of criteria: a) collaborative-filtering using engagement by other similar user profiles; b) content-based filtering using the user's topic affinities identified from tag engage-



(a) Users and their most engaged topics. (b) Picture co-engagement network. (c) Children watching their profiles cluster.

Fig. 2: The classroom views show a live social network of the classroom.

ments; c) collaborative-filtering via image co-engagement and popularity (images engaged with together in a session); and d) occasionally, random selection. Each of these candidates is scored and ranked using a range of user and content features, with the most significant score component being provided as an explanation of the ranking. Children learn that recommendations in social media do not require the systems to *understand* or care about the image content or semantics and that their continuous interaction with social media also influences other users' experience with the platform. Figure 1d shows a screenshot where Anna is analyzing Jarmo's recommendations. She can see Jarmo's queue of upcoming images and scroll down for a detailed explanation of why each of the next five images is being recommended.

d) Social network: To illustrate what "similarity" means and to show how clusters of similar users develop in social media services, Somekone shows a real-time visualization of social network of the session, clustered by profile similarity. Children learn that clustering forms around not just their friends or whom they follow but around anyone with a similar profile. They also learn how clustering influences the recommendations they see. Figure 2c shows the teacher view, shown to children on the classroom projector. It shows eight children's profiles as nodes labeled by their nicknames and filled with their most engaged images. The teacher can swap between a variety of visualizations such as tag cloud (Fig. 2a) and engagement score, highlight profiles and their connections, examine each children's profile (data log, profile, recommendations), or display image co-engagement (Fig. 2b) networks.

III. Discussion

This paper presents an educational tool for exposing and explaining the processes by which social media platforms track users, profile them, and tailor recommendations. It aims to foster the development of data agency and critical data-conscious mindsets among children at a crucial age when their ability to safely navigate the digital environment and their personal data strategies are being formed [4]. It also aims to enable children to understand the implications of their online behaviors on their own social media experience as well as that of others.

This tool bridges the gap in existing educational tools for teaching social media mechanisms by simplifying complex concepts without overwhelming young children with technical details. The tool's main innovation lies in its real-time visualizations and the immediacy of its interactive elements, enhancing the learning experience: Every action a user takes on on one device immediately impacts the displays on other devices, illustrating the dynamics of data collection, profiling, and recommendations in an understandable and tangible manner. The tool serves as an example of how explainable AI (XAI) principles can be applied in a practical, educational context to help learners develop their understanding of digital technologies beyond folk theories that people commonly resort to in order to explain their everyday experiences [2].

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