Does Fusing Text-Grooming, Deepfake/Voice-Spoof Detection, and Content-Provenance Signals Reduce Missed Impersonations Compared with Any Single Detector Alone?

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Online child grooming is a serious and growing issue that occurs across many digital platforms, making it difficult to detect when only one type of evidence is used. This experiment focuses on developing and testing a multi-modal detection system designed to identify possible grooming behavior through the analysis of screenshots, audio files, video files, and provenance data. All data used in this study was created and recorded entirely by me, with no public examples or direct interaction with human subjects. Research guided the grooming behaviors and indicators included in the system. Each evidence type was evaluated using clear rule based indicators associated with grooming behaviors such as secrecy, trust building, manipulation, and boundary testing. The system assigns numerical risk scores on a 0-100 scale and classifies results as low, medium, or high risk to ensure outcomes are easy to understand and explain. The first data table represents the initial trial set for each detector segment, but those values were not fully accurate due to the inclusion of extra points for parental documentation and reporter roles. After fixes were completed in the app, the bar graph displays corrected numerical data based on the 10 trial mean for each detector segment. Results showed a steady increase in risk scores from low to high across all evidence types. Screenshot evidence produced mean scores of 16, 49, and 87, audio evidence showed 11, 42, and 84, video evidence demonstrated 22, 54, and 93, and provenance data generated scores of 28, 56, and 79, highlighting the importance of contextual metadata. Overall, these findings support the engineering goal that combining multiple forms of digital evidence improves detection accuracy and strengthens early online safety intervention.

Awards Won:
Association for the Advancement of Artificial Intelligence: AAAI Student Memberships for each finalist that is part of the 1st, 2nd, and 3rd Prize Winning projects and 5 Honorable Mention winning projects (up to 3 students per project) (in-kind award / part of the 1st-3rd prize)