

ABSTRAK

Penelitian ini menganalisis rekaman suara sebagai barang bukti untuk mengungkap kasus tindak pidana siber dengan menerapkan teknik audio forensik dan kerangka kerja Digital Forensics Research Workshop (DFRWS). Penelitian bertujuan memverifikasi keaslian serta kesamaan sumber suara pada 50 rekaman (10 barang bukti dan 5 rekaman pembandingan) menggunakan pendekatan pitch, spectrogram, dan formant. Proses akuisisi data dilakukan dengan perangkat lunak Autopsy dan FTK Imager, sedangkan analisis suara menggunakan Audacity dan Praat. Perbandingan dilakukan melalui analisis nilai pitch dan formant, dilengkapi uji statistik ANOVA serta perhitungan Likelihood Ratio untuk pembuktian kuantitatif. Hasil analisis menunjukkan bahwa formant 3 dan 4 memiliki variasi sinyal signifikan dan dapat menjadi fokus utama. Kecocokan sumber suara teridentifikasi antara beberapa bukti dan rekaman pembandingan, seperti Bukti 1, 2, dan 10 yang paling mirip dengan Wanita 2, serta lainnya memiliki kemiripan dengan berbagai pembandingan pria dan wanita. Temuan ini konsisten dengan hasil Likelihood Ratio. Kesimpulannya, teknik audio forensik berbasis DFRWS terbukti efektif untuk identifikasi dan validasi rekaman suara. Penelitian merekomendasikan penggunaan teknologi lanjutan seperti formant tracking otomatis, voice biometrics, dan standar operasional berbasis DFRWS bagi penegak hukum.

Kata kunci: Audio forensic, DFRWS, Pitch dan Formant, Anova, Likelihood Ratio

ABSTRACT

This study analyzes voice recordings as digital evidence to uncover cybercrime cases by applying audio forensic techniques and the Digital Forensics Research Workshop (DFRWS) framework. The research aims to verify the authenticity and source similarity of 50 recordings (10 evidence recordings and 5 reference recordings) using pitch, spectrogram, and formant analysis. Data acquisition was conducted using Autopsy and FTK Imager, while voice signal analysis was performed with Audacity and Praat. The comparison involved analyzing pitch and formant values, supported by statistical ANOVA tests and Likelihood Ratio calculations for quantitative validation. The results indicate that formants 3 and 4 show significant signal variation and can serve as key indicators. Voice source similarity was identified, with several evidence recordings such as Evidence 1, 2, and 10 most closely matching Reference Female 2, while others showed similarity to various male and female references. These findings are consistent with the Likelihood Ratio results. In conclusion, the DFRWS-based audio forensic technique proved effective in supporting the forensic identification and validation of voice recordings. The study recommends the use of advanced technologies such as automatic formant tracking, voice biometrics, and the implementation of DFRWS-based standard operating procedures for law enforcement agencies in handling digital voice evidence to ensure its admissibility in court.

Key words: Audio forensic, DFRWS, Pitch and Formant, Anova, Likelihood Ratio