UNDERGRADUATE THESIS

MOBILEVIT-BASED DEEPFAKE DETECTION WITH SPATIAL-FREQUENCY FEATURE FUSION USING FFT AND MODIFIED CBAM

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Hereby declares that this undergraduate thesis contains no part of any other scientific work that has been submitted to obtain an academic degree at any higher education institution. Furthermore, it does not contain any work or opinions previously written or published by others, except for those which are explicitly cited in this thesis and listed completely in references.

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ABSTRACT

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Thesis Title:	MobileViT-Based Deepfake Detection With Spatial-Frequency Feature Fusion Using FFT and Modified CBAM
Supervisor:	1. Dr. Faisal Muttaqin, S.Kom., M.T. 2. Budi Mukhamad Mulyo, S.Kom., M.T.

The increasing realism of AI-generated deepfake content has made manipulated media more difficult to differentiate from genuine material. This challenge requires detection approaches that can maintain reliable classification performance, recognize subtle traces of manipulation, adapt to previously unseen data, and remain suitable for mobile-device implementation. This study proposes a deepfake detection model that combines MobileViT, Fast Fourier Transform (FFT), and Modified Convolutional Block Attention Module (CBAM). During preprocessing, YOLOv11n identifies the facial region and extracts it from each input frame. The extracted face is then represented through two complementary domains: RGB information provides the spatial representation, while FFT produces the frequency representation. These features are integrated using Fusion Convolution before further processing by MobileViT and Modified CBAM. FaceForensics++ (C23) serves as the secondary dataset, containing 20,000 frames equally divided into 10,000 real and 10,000 fake images. In addition, a primary dataset comprising 500 frames obtained from 50 videos is used to examine the model's ability to generalize beyond the training-data characteristics. Model performance is measured using accuracy, precision, recall, and F1-score. On the secondary dataset, the proposed MobileViT + FFT + Modified CBAM model achieves 95.30% accuracy, 0.9512 precision, 0.9550 recall, and an F1-score of 0.9531, exceeding the MobileViT baseline accuracy of 94.80%. Evaluation on the primary dataset yields 85.80% accuracy, 0.8594 precision, 0.8560 recall, and an F1-score of 0.8577 for the proposed model, whereas the baseline obtains 69.40% accuracy. These findings show that incorporating FFT and Modified CBAM into MobileViT strengthens classification performance, with a particularly substantial improvement when the model is evaluated on data with different characteristics. The proposed model is subsequently converted to TensorFlow Lite and deployed on-device within Telisik, a Flutter-based Android prototype developed for video deepfake detection.

Keywords: deepfake, MobileViT, FFT, Modified CBAM, Android

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The author realizes that this thesis proposal is far from perfect and still contains shortcomings. Therefore, constructive criticism, feedback, and suggestions from readers are highly welcomed for future improvement. Finally, the author hopes that this report will provide meaningful insights and be useful for all parties concerned.

Surabaya, September 14th 2026

Author

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