

## Mohamed Hamdan Dagalo Audio Clip May 22, 2023

### **CASE DESCRIPTION**

During a [current war](#) in Sudan between the RSF military and the Sudanese National Army, the RSF militia released today a sound recording that claims to belong to its leader, [Mohamed Hamdan Dagalo](#) (who is considered to be dead). The Sudanese people are divided; some believe the leader is already dead and even buried, and this is merely AI-generated content; others are persuaded he is alive and the recording is real. This has the potential to impact the perception of the end of this war.

Link to the audio <https://twitter.com/GeneralDaglo/status/1660680231936557057>

### **ANALYSIS PROCESS**

#### **1. Initial assessment provided by Medex Forensics**

There is a [pattern of pure digital silence](#) (threshold of -42dB) that suggests careful editing at least.

To this point interesting to consider [this analysis, shared on Twitter](#).

#### **2. Detailed analysis provided by DeepMedia**

Utilizing an advanced multi-phase protocol for the rigorous analysis of digital media, the contentious recording was successfully downloaded from Twitter as an mp4 file and subsequently transformed into a workable wav format via ffmpeg, a sophisticated software suite used for handling multimedia data. To ensure maximum precision in analysis, the audio was automatically divided into a series of 2.0 second fragments with a staggered window of 0.2 seconds. This ensured complete coverage of the original audio data without any time lapse.

The fragmented audio was subsequently scrutinized by DeepMedia's proprietary Machine Learning (ML) audio detection algorithm. This system was specifically trained on embedded features of the waveform to provide high accuracy detection of potential AI manipulations.

Our audio detection model has been exhaustively trained on a comprehensive set of artificial and genuine audio datasets. The artificial datasets include over a million synthetic audio samples from over 500 distinct speakers, and have been crafted using several popular AI voice generators/vocoders including ElevenLabs, YourTTS, DeepMedia vocal synthesis, HifiGAN, and BigVGan. This training set covered over 15 languages, notably including Arabic.

The real datasets complementing this included more than 2 million genuine audio samples from over 500 speakers, with 350 of these overlapping with the artificial dataset. This dataset also encompassed the same diversity of languages, including Arabic.

Following this extensive training phase, the model was further validated on additional datasets of artificial and real audios, comprising 200,000+ synthetic and 400,000+ genuine audio samples from a collection of speakers who did not overlap with the training dataset. These validation datasets also covered the same array of languages, AI voice synthesizers and vocoders.

During training and validation, the ML algorithm was further fortified with a suite of data augmentations. These include volume normalization, reverb, low-pass, band-pass, background noise, background music, Gaussian noise, gain fluctuations of  $\pm 6\text{db}$ , polarity inversion, automated post-production simulations, and peak normalization.

The result was an ML algorithm achieving an impressively high accuracy rate of over 96%, with a false positive rate of 3.85% and a false negative rate of 3.52%. Specifically for Arabic, the accuracy level surged to 98%. These metrics were confirmed to hold true across all generator and vocoder types incorporated in the training phase.

In terms of limitations, it is to be noted that the ML algorithm was neither trained nor validated on certain generator types, including RVC, SoVITSVC, Voice.AI, StyleTTS-VC, Vall-e, Bark, and TortoiseTTS. Moreover, potential manipulations using non-AI means, such as splicing together fragments from previous recordings, are outside the scope of this analysis.

**Based on the DeepMedia's custom ML audio detection system's output, the submitted audio file was found to be authentic with 98% confidence.** However, this conclusion is accompanied by the caveat that the model has a false negative rate of 3.52% (1.7% in Arabic) and was not trained on certain generator types as specified above.

In conclusion, based on the high confidence results from our advanced ML algorithm, DeepMedia can affirmatively state that the provided audio sample was unlikely to have been generated through AI, subject to the constraints and limitations noted.