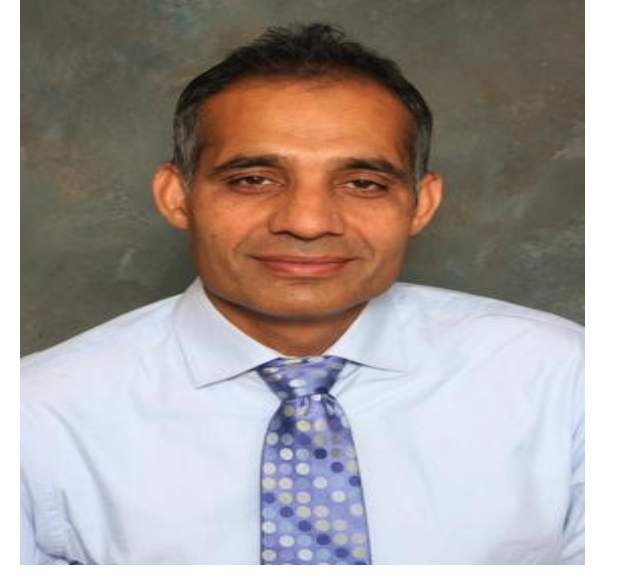




# Forensic Examiner: Testbed for Benchmarking Digital Audio Forensic Algorithms

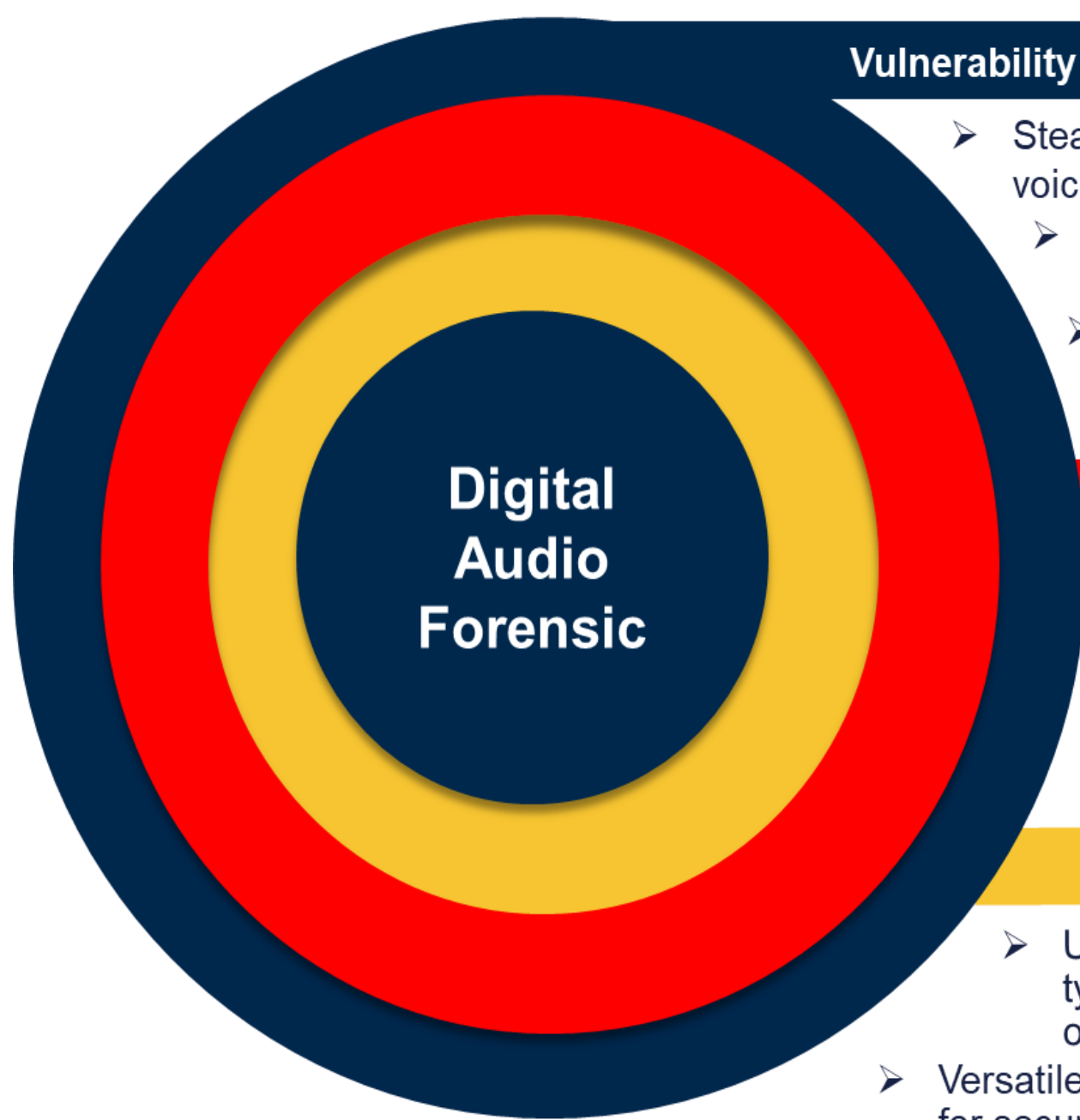


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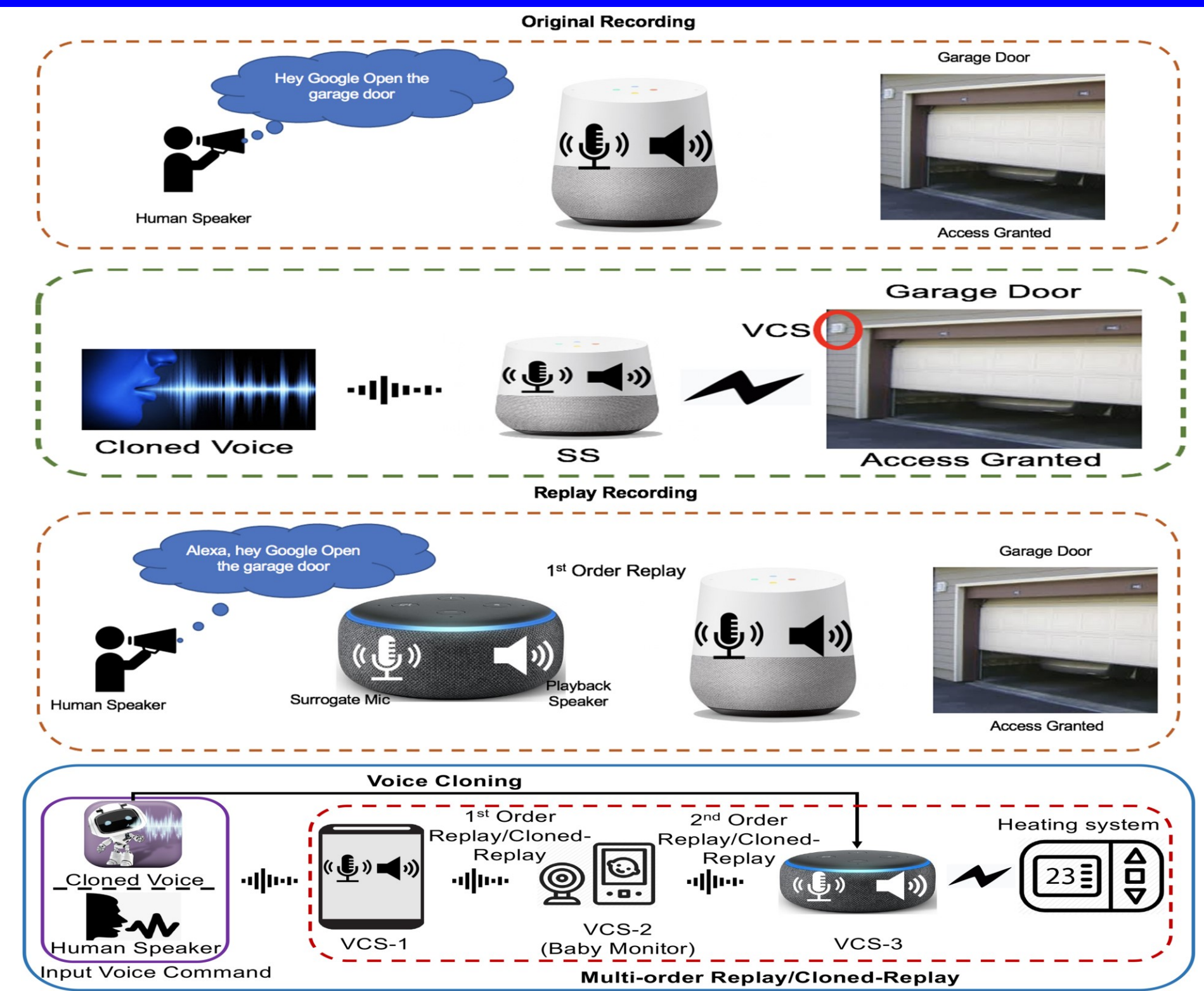
The objective of this project is to establish a platform for digital audio forensic analysis, which involves investigating anti-forensic attacks and their impact on countermeasures, as well as single and multi-order replay and cloning attacks on speaker recognition systems and designing such a benchmarking testbed.

## Key Challenges



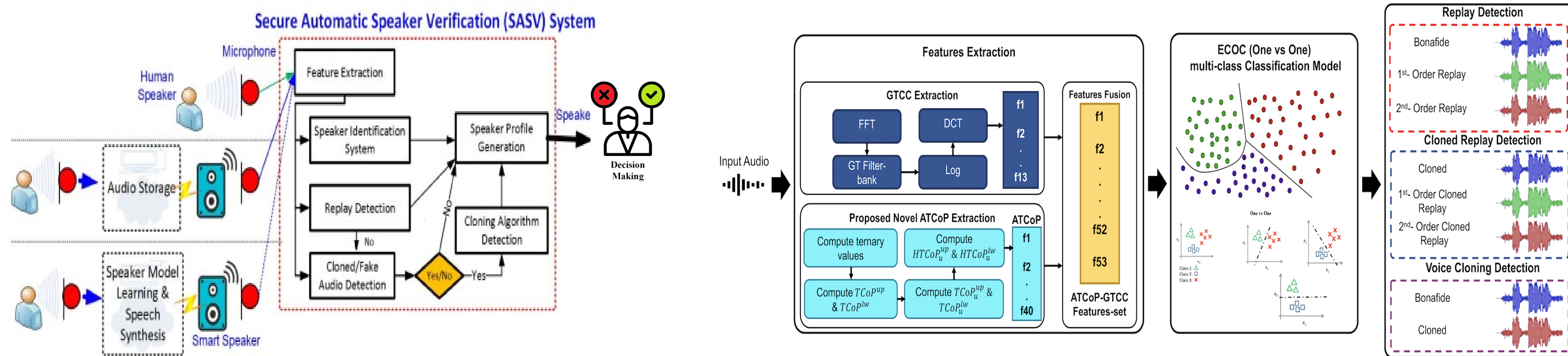
- Vulnerability 1**
  - Steadily increasing attack surface for voice-controlled systems.
  - Sophisticated tools and technologies posing a real threat.
  - Spoofing attacks can portray a false identity and are conceivable with Automated Speaker Verification.
- Existing Material 2**
  - Scarcity of comprehensive Voice Related Datasets.
  - Typically, datasets cover a specific type of attack, e.g., replay attacks.
  - Diverse multi-order replay spoofing corpus's with micro-phonics dynamics are required.
- Scalability 3**
  - Unified solutions are needed to combat all types of mass-produced emerging attacks on voice Enables systems.
  - Versatile Secure ASV system are in need for secure bio metric systems.

## Threat Modeling of Voice-Controlled Systems



## Unified Framework for Multiple Voice Spoofing Attack Detection

Acoustical intense framework for identifying different sorts of forgeries, as well as a securing automatic speaker verification and speech recognition systems



## Broader Impact

### Scientific and Societal

- ❖ Securing voice-controlled systems against emerging threat vectors including LASER injection attacks.
- ❖ Robust integrity verification of audio recordings by detecting and localizing tempering.
- ❖ Investigate impact of anti-forensic attacks on existing deep fake and other forgery detectors
- ❖ Ensure privacy and security of all users via effective liveness detection to detect and prevent spoofing attacks on voice-controlled systems.

### Education and Outreach

- The educational goal of this project is to
  - Provide a venue for the study of theoretical and practical aspects of the next generation of digital technologies in an integrated fashion.
  - Increase the number of students choosing STEM careers.
  - Prepare future generation of forensic investigators capable of developing investigation tools.

### Participation and Potentials

- ✓ Mentored and trained 14 undergraduate students under REU program, 4 high school students
- ✓ Media Coverage
  - TV7: <https://bit.ly/2mbx7FM>
  - <https://record.umich.edu/articles/um-dearborns-hafiz-malik-is-battling-the-future-of-fake-news/>
  - <https://umdearborn.edu/news/all-news/articles/associate-professor-hafiz-malik-battling-future-fake-news>