

## **SPECIFICATIONS OF UPGRADATION OF AUDIO VIDEO FORENSIC TOOL**

**THE FOLLOWING REQUIREMENTS HAVE TO BE SATISFIED AND SUCCESSFULLY DEMONSTRATED ON INSTALLATION**

### **I. PLAYER FOR ANALOGUE AUDIO/VIDEO SAMPLES AND ITS CONVERTER**

#### **(1) Camcorder/Handycam**

1. 30x Optical / 60x Clear Image Zoom or better to get closer to the action.
2. 26.8mm or better wide angle Lens.
3. Should create automatically highlight video in MP4 from multiple clips.
4. Optical Steady Shot image stabilization with Active mode.
5. Built-in USB cable for easy file transfer and charging.
6. Should be able to Face Detection with voice enhancement and noise reduction.
7. 1920x1080 Full HD 60p with CMOS Sensor.

#### **(2) VHS tapes and cassette player**

1. Play the analogue audios in magnetic tapes.
2. Record the voice sample in analogue mode.
3. Built-in USB cable for easy file transfer and charging.

#### **(3) Mini DV Player**

1. Should be able to convert old video tapes, camcorder tapes, videos from VHS, VCR's, DVD Players, DVR's, Hi8 & Gaming Systems in digital format.
2. Should be able to convert old music to digital format directly. With 3 inch TFT screen, preview & playback video directly.
3. Should have 8 GB or more internal memory inside.
4. Should support extra Micro SD Card input up to 32 GB.
5. Should have Remote control & internal rechargeable battery to use device outdoors to record & preview.

#### **(4) Analogue to digital converter for Audio**

1. Should be able to connect audio component, like a sound bar to receiver/preamp, audio processor, DAC or other analogue devices.
2. Should be multi-channel, fiber-optic digital audio output through lightweight, flexible cable and it includes removable rubber tips to protect cable when not plugged in
3. Cable length: minimum 6 feet
4. Outer layer should be durable PVC; corrosion resistant gold plated connectors and buffer tubing for optimal signal transfer.

### **(5) High quality Microphones**

1. Should be side-address studio condenser with USB digital output (Windows and Mac compatible)
2. Should be natural sound for podcasting and capable for home studio recording, field recording, and voiceover use.
3. Low mass diaphragm provides extended frequency response and superior transient response.
4. Low self-noise: perfectly suited for sophisticated digital recording equipment

### **(6) High quality Studio monitoring Speakers**

1. 2-way active studio monitors ideally suited for computer studios, audio and multimedia workstations and keyboard monitoring.
2. Built-in powerful 2 x 20-Watt amplifiers with immense headroom.
3. Powerful woofers and high-resolution tweeters provide an ultra-linear frequency response.
4. Should have ultra-high resolution 24-bit/192 kHz D/A converters for an incredible dynamic range.
5. Optical and coaxial inputs to directly connect digital audio sources by S/PDIF interface.

### **(7) Professional grade monitoring head phones**

1. Should have very good clarity throughout an extended frequency range with deep and accurate bass response.
2. Should be with circular design contours around the ears for excellent sound isolation in loud environments.
3. Should have 90 degree swiveling ear cups for easy, one-ear monitoring, professional-grade ear pad and headband material delivers more durability and comfort.

## **II. FORENSIC WORKSTATIONS FOR AUDIO AUTHENTICATION, AUDIO-VIDEO MATCH, TO DETECT TAMPERING OR EDITING IN AUDIO SIGNALS, ANALYSIS OF AUDIO ENVIRONMENT AND RECORDING CONDITIONS:**

1. Should be capable to open files of other formats from the application window for majority of audio and video file formats.
2. Should have Oscillogram/energy, spectrogram/LPC-spectrogram, cepstrogram signal representation.
3. Should be able to analyze the minimum, medium and maximum pitch values.
4. Signals synchronization by time, by selection or by view, representation synchronization

with user marks and notes.

5. Batch audio processing (precise re-sampling, filtering, bit resolution change).
6. Should be able to export image files, documents, reports.
7. Real-time spectrogram/cepstrogram.
8. Speaker phrases text decoding, text-to-signal connection, search by text.
9. Text import from a document with marking of phrases borders.
10. Different colour marks, mark list with commentaries and export capabilities.
11. Filtering by/to sample, equalization, signal normalization, mixing, merging, appending of mono and stereo signals.
12. Rich colour pallet and user hot-keys customization.
13. Automatic search for MATCHING signal fragments, Differentiation, Automated creation of speaker file – file containing speech of only selected speaker; Speech quality (sound-to-noise) and speech range assessment.
14. Automatic extraction of pitch and pitch distribution statistics, formant tracks, matching articulations.
15. In-built International Phonetic Alphabet chart and functionality for collection of speaker phonemes.
16. Creation and comparison of speaker phonetic sets.
17. Powerful histogram of samples tool (asymmetry, autocorrelation, smoothing).
18. Levelogram for signal amplification/compression detection.
19. DC-Offset time dependence graph (with smoothing).
20. Repeating samples automatic search.
21. Powerful multi-cursor tool and possibility to build periodic grid over all signal to check for event periodicity.
22. Matching fragments automatic search (copy/paste detection) implemented by different methods.
23. Extraction of selected harmonics phase, phase shift and harmonic energy graph.
24. Assigning original audio signal to down-sampled signal copy for parallel critical listening and phase investigation.
25. Background noise continuity investigation.
26. Traces of previous re-sampling detection.
27. Up-to-date automatic detection of MP3, WMA, AAC and OGG codec traces (including coding parameters: bit rate, sampling rate).

28. Automatic extractor of exact frames types and positions (determined by signal properties), frame shift time dependence calculation.
29. List of editing features, established by critical listening and linguistic approach.
30. Precise file structure parsing and file format check over in-built file format database; Automatic match search and interpretation options.
31. Particular frames allocation map (inside file cluster sequence).
32. Automatic detection most used audio software applications.
33. Automatic extraction of particular recorders traces.
34. Suitable computer, monitor.

### **III. FORENSIC WORK STATIONS FOR AUTHENTICATION OF VIDEO SIGNALS AND IDENTIFY THE RECORDING DEVICE**

#### **Should be able to,**

1. Analyze the file structure for inconsistencies or traces of hidden data.
2. Extract the EXIF and Metadata information.
3. Extract and compare the JPG quantization tables against reference databases.
4. Extract and plot the JPG Discrete Cosine Transform (DCT) AC and DC coefficients.
5. Analyze the compression level of the evidence image.
6. Display the Colour Filter Array analysis of the evidence image.
7. Detect traces of green/blue screen image processing.
8. Split the evidence image in the main colour space layers (e.g. RGB, CMYK, HSL), compute and display the Discrete Cosine Transform Map.
9. Compression Level Map, Colour Filter Array Map.
10. Differential Map, mathematical difference, correlation and mean quadratic difference between evidence and a same size reference image.
11. To detect traces of local manipulation and to investigate the compression history of the evidence file.
12. Pixel level correlation to detect traces of local editing.
13. Probability map and block level algorithms to detect traces of manipulation.
14. Histogram equalization per each layer.
15. Extract and analyze several PRNU (Photo Response Non-Uniformity) or Residue maps.
16. Detect traces of clone stamp or copy/paste/move.
17. Compare the evidence vs a set of reference images.
18. Sort Folder analyzes all the images in a folder and sorts them in separate subfolders

based on Make, Model, and editing traces fast analysis by running only Structure, EXIF, JPG QT, JPG DCT and G/B create a ZIP file containing the evidence and all the analysis results, and its HASH report.

19. Auto archive of Case works during a File or Folder Batch session.

20. Suitable computers, monitors.

#### **IV. FORENSIC IMAGE ENHANCEMENT TOOL**

1. Video image duplication

2. Processing and enhancement

3. Independent 2D and 3D numerical visualization.

4. Required Filters: De-noise, De-blocking, Pattern removal, Frame Fusion, Variation De-noise filter, Adaptive Blur, Motion De-blur, Total Variation Deblur, Face Fusion3D Reconstruction filter or more.

5. Automatic Camera Calibration

6. A full 360° stitched panorama from fisheye images.

7. Real-time Lens Correction, 50% file size reduction to raw video without any loss of content or quality and is 100% reversible.

#### **V. FORENSIC WORK STATIONS TO DETECT MORPHING OF VIDEOS IN VIDEO SIGNALS AND TAMPERING OR ANY TYPE OF EDITING IN VIDEO SIGNALS**

1. Bring higher clarity from low-quality images, records to facilitate forensically-valid evidence for court.

2. Unique filters recover unidentifiable details from original objects including faces, license plate numbers, and typescripts making it possible to enhance the quality of images considerably for identification purposes.

3. To detect tampering and falsification of digital records from any source.

4. Intelligent algorithms analyze image metadata and image parameters such as record and image sequences on video, the direction of light sources on the image, detection of cut-in and duplicated frames in the video stream, as well as compression and second compression analysis.

#### **VI. FORENSIC MOBILE PHONE DATA EXTRACTOR**

1. Should contain a phone cloud extractor, data analyzer and report generator all in one solution.

2. Should contain physical and logical data acquisition methods for advanced application analyzer and deleted data recovery.

3. Should support wide range of phones including most feature phones.
4. Generate fine-tuned reports and concurrent phone processing and easy-to-use user interface.
5. The password and PIN breaker to gain access to locked ADB or iTunes backups with GPU acceleration and multi-threaded operations for maximum speed.
6. Should contain Camera Ballistics - scientific image analysis, Huge number of supported phones, Integrate with other tools, Message analysis and timeline, filter results to find data faster, Bypass the pass code on OS using the lockdown files method, Live view data, Bypass the PIN code with the SIM Cloning Tool.

#### **VII. FORENSIC CARD READER**

1. Card Imaging, data forensics and recovery of contents.
2. Retrieval — Recalling Deleted Entries & Content

#### **VIII. AN ADDITIONAL SYSTEM FOR VIRUS SCANNING OF THE MATERIAL OBJECTS**

A High end computer HP/DELL make with monitor for sample scanning for virus should be supplied.

#### **IX. ADDITIONAL REQUIREMENTS**

1. 500TB or more external hard disk.
2. Antivirus on all systems. Original windows licensed software along with Microsoft office full version.

**X. The proposed solution should work in tandem with the existing facility.**

**XI. Warranty : 3 years.**

**XII. AMC rates for the next three years have to be offered.**

**XIII. Training shall be provided to the experts concerned.**

**XIV. Soundproofing and acoustic treatment for AV Lab: Isolation & elimination of noise within the room, acoustic treatment to avoid frequency absorption and reflection from surfaces such as walls, floors etc.**

**XV. Suitable furniture and infrastructure for lab set up should be provided.**

**Note:-1) Before supplying the above Hardware/Software, the supplier should prove the functionality of the Hardware/Software they have supplied.**

**2) Validity of the License should be from the date of installation.**