**Requirement Specification**

***Hardware Requirements:***

* **Processor**:
  + Minimum: Intel Core i3 (or equivalent).
  + Recommended: Intel Core i5/i7 or AMD Ryzen for faster processing during facial recognition.
* **RAM**:
  + Minimum: 4 GB.
  + Recommended: 8 GB or higher for smoother operation and image processing.
* **Storage**:
  + Minimum: 20 GB free disk space.
  + Recommended: SSD with at least 100 GB for storing training datasets and attendance records.
* **Camera**:
  + Minimum: 720p resolution webcam for capturing images.
  + Recommended: 1080p or higher resolution webcam for better recognition accuracy.
* **GPU (Optional)**:
  + Recommended for faster training and recognition tasks. Examples include NVIDIA GTX/RTX series or any compatible CUDA-enabled GPU.
* **Peripherals**:
  + A monitor, keyboard, and mouse for GUI interaction.

***Software Requirements:***

* **Operating System**:
  + Windows 10/11, macOS, or Linux (Ubuntu recommended for Python-based applications).
* **Programming Environment**:
  + **Python 3.7 or above**.
* **Python Libraries**:
  + **OpenCV**: For facial recognition and image processing.
  + **Numpy**: For numerical operations.
  + **Pandas**: For data handling and CSV generation.
  + **Tkinter**: For designing the graphical user interface.
  + **dlib**: For advanced facial recognition features.
  + **face\_recognition**: For easy implementation of face detection and recognition.
* **Database**:
  + SQLite (preferred for lightweight solutions) or MySQL for larger deployments.
* **IDE/Code Editor**:
  + PyCharm, Visual Studio Code, or Jupyter Notebook for development and testing.
* **Others**:
  + Web browser for viewing CSV reports, if stored or shared online.
  + Camera drivers for webcam functionality.