

Biometric App Development Competition

The AI Vision, Health, Biometrics, and Applied Computing (AVHBAC) lab and Biomedical Signal Analysis Lab (Biosal) are jointly organizing a Biometric Mobile App Development competition this fall. The app can be developed for Android or iOS platforms.

This competition is limited to only Clarkson Undergraduate and graduate students. Student teams (a team can be of the highest two members) need to submit a 1-page project proposal (due 31st August 2023), a full description (due 15th October 2023), a video demonstration (due 20th October 2023), and a live demonstration (21st October 2023) of the App.

The top projects will be invited to [CITeR](#) Fall Meeting to be held at Clarkson University (24-25 October 2023). CITeR is an NSF IUCRC researching the rapidly growing areas of identity science and biometric recognition through the interdisciplinary group of faculty, researchers, students, and industry personnel.

The competition winners will be announced on 25th October 2023. The top student projects will be awarded a 300\$ Amazon gift card (each project).

One outstanding project will receive a **500\$** Amazon gift card.

The developed app should be made open-source, and the project files be shared through a Public Github repository.

The timeline of the competition:

1. 1-page project proposal and competition registration (due 31st August 2023),
2. 4-page (max) project description and GitHub repository link for the developed app (due 15th October 2023),
3. A 3-minute (max) video demonstration (due 20th October 2023),
4. A live demonstration of the app (21st October 2023),
5. Participation of Top Projects in the CITeR Fall Meeting (24-25th October 2023).
6. Winner Announcement (25th October 2023).

For any detailed information, please contact Prof [Masudul Imtiaz](#) at mimtiaaz@clarkson.edu

1-Page Project Proposal:

Send a 1-page project proposal to Prof Imtiaz at mimtiaaz@clarkson.edu by 31st August 2023. The proposal should have a project name, project personnel-maximum of two student members, an abstract of the project, the name of the tools and IDE to be used, the debug procedure, and the possible applications of the Mobile app.

A few sample app concepts are provided below. The students can choose one of those apps or can propose a different mobile app related to biometric systems.

- **Concept1. Biometric Game:**

Create a biometric game that increases player engagement significantly! The biometric technology used in this game allows for real-time monitoring and analysis of players' physiological responses, including heart rate and stress levels. The biometric game dynamically adapts as players start their gaming journey, changing gameplay elements and difficulty levels in response to their physical responses. The player's distinctive biometric data is taken into account when the gameplay is intense, challenges appear, and the storyline develops, resulting in a personalized and engrossing adventure unlike any other.

- **Concept2. Contactless Fingerprint Authentication App:**

Creating a fingerprint authentication application that uses fingerprint recognition to access the app and carry out secure transactions revolutionizes user security. The app takes high-quality fingerprint pictures of users during the initial setup process by using the front or back camera of the device. To ensure the best fingerprint quality, these images are then subjected to cutting-edge image processing techniques, such as segmentation and enhancement. The app's sophisticated fingerprint-matching algorithm, which uses cutting-edge machine learning or pattern recognition techniques to precisely identify and authenticate users based on their distinctive fingerprint patterns, is at its core. The same idea can be applied to facial, palm, and iris recognition.

- **Concept3. Voice Biometric Security:**

Through sophisticated voice print analysis and verification, create a voice authentication application that transforms user security. This app accurately recognizes and authenticates users based on their distinctive vocal patterns using cutting-edge machine learning algorithms. The app produces a safe and trustworthy voice print for each user by recording and analyzing different voice characteristics, such as pitch, tone, cadence, and pronunciation.

- **Concept4. Heart Rate Biometrics:**

Create a Heart Rate Biometrics application that uses this distinctive physiological feature for both biometric authentication and the built-in sensors of devices to measure users' heart rates. The app accurately captures and analyzes users' heart rate patterns using cutting-edge algorithms and signal processing techniques, producing a unique biometric standard that acts as an efficient and secure form of authentication.

- **Concept5. Multiple biometric systems:**

Develop an application by integrating multiple biometric authentication methods, including fingerprint, facial recognition, and voice. Using cutting-edge machine learning

algorithms and advanced image and voice processing techniques, the system captures and analyzes the unique biometric features of each user, making impersonation virtually impossible.

- **Concept6. Biometric Encryption:**

Use a data encryption application that uses biometrics as the key to encrypt and decrypt sensitive data stored on the device.

- **Concept7. Gait Recognition:**

Develop an application that uses the device's accelerometer and gyroscope sensors to analyze and recognize the user's unique gait pattern (walking) for accuracy.