Title : Development of a Touchless Interface for Smartphones Using Motion Detection from the Phone Camera

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Major : Computer Science

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ABSTRACT

This independent study focuses on the development of a touchless interface for smartphones to overcome the limitations of traditional touchscreen interactions. Conventional touchscreens often present accessibility barriers for individuals with physical disabilities, the elderly, or users with limited mobility. While existing assistive technologies like voice control or external accessories are available, they are often hindered by environmental noise, high costs, or portability issues.

The developed system is a stand-alone Android application (minimum Android 9.0) designed to process motion detection directly on the device using the front-facing camera. The architecture integrates ML Kit (Face Detection API), OpenCV, and CameraX to analyze facial movements in real-time. To prioritize user privacy, the application operates entirely offline and does not store any images or video data.

The application is capable of detecting at least three dynamic gestures: eye blinking, mouth opening, and head shaking. Users can flexibly map these gestures to specific actions such as scrolling, clicking buttons, or playing/pausing media within a simulated user interface. Furthermore, the system supports the creation and saving of custom gesture-action sets as shortcuts or macros. This project not only enhances digital accessibility for those with physical constraints but also offers a convenient alternative for general users in situations where manual touch is impractical.

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Assistant Professor	ผู้ช่วยศาสตราจารย์
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