

Chapter 22

Breaking Barriers: Quantum Computing–enhanced Smart ATM for Multi–Sensory Impairment People Using OpenCV

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ABSTRACT

A quantum computing-based smart ATM is designed to provide secure accessibility in banking services specifically for individuals with hearing, speech, and visual impairments using quantum cryptography which enhances secure transactions. This innovative technology harnesses the capabilities of OpenCV (open source computer vision) to establish an inclusive and easily navigable interface, empowering deaf, mute, and blind users to independently carry out banking transactions. The system integrates speech synthesis and recognition features to facilitate effective communication for mute users. Additionally, for blind users, the Smart ATM incorporates audio feedback and haptic interfaces, ensuring seamless navigation through menus and transaction options.

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I. INTRODUCTION

A significant societal concern in Indonesia revolves around the increasing incidents of fraud cases in ATMs, particularly affecting bank customers. The current security measures rely solely on a 6-digit PIN, leaving vulnerabilities that perpetrators might exploit to steal customer data and PIN information. To address this issue, the concept of a Finger Shield ATM has been introduced. This innovative ATM system incorporates biometric details in the form of fingerprints, integrating smart card technology and a secure database server. Unlike the current ATMs that are primarily designed for the general population, Finger Shield ATM aims to enhance security measures. In the existing system, traditional ATMs are not tailored to meet the specific needs of individuals with hearing, speech, and visual impairments. These ATMs typically utilize standard input mechanisms like keypads and visual interfaces, posing challenges for deaf, mute, and blind users to interact independently. The proposed quantum computing based secure transaction and Finger Shield ATM addresses, these limitations by incorporating features such as quantum cryptography, audio instructions, fingerprint authentication, and braille language support (S. Gabarro-Lopez et al., 2020). This comprehensive approach aims to provide a more secure and inclusive banking experience for all users.

Figure 1. ATM



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