





# Development of A Security System in The Location Identification Application for The Blind Disabled Based on Nfc Rfid

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## Abstract.

Cognitive needs are basic human needs that are closely related to the need for information, knowledge and understanding of their environment. For people with visual disabilities, identifying a location is an important thing among their limitations (Widhi, 2013). People with visual disabilities are trained from an early age to be more sensitive in the process of identifying information about the environment using other senses such as touch, hearing, memory, and so on (Widhi 2014). Based on experience and training, they continuously strive to always be able to adapt and identify locations and environmental conditions.

On the other hand, developments in information technology, especially those related to public service information, are developing more in visual form, such as: information on directions, location, time, weather, etc., in addition to conventional visual information in the form of notice boards and other guides. . In the process of identifying a location, people with visual impairments will have difficulty in identifying because facilities such as conventional assistive devices (blind sticks) and existing Guiding Blocks are limited and of course will require other people to help with the identification process (Widhi 2013), apart from the level of vision. Visually disabled people also vary, from low vision to complete blindness.

**Keywords:** Visual Disabilities, Guiding Blind, Location Identification, Security.

## 1 Introduction

Cognitive needs are basic human needs which are closely related to the need for information, knowledge and understanding of their environment, so that cognitive needs are essential needs for humans to develop and adapt to their environment. Humans as social creatures in adapting to the environment require sensory abilities and resources (Susetyo, 2012) as well as means to support the adaptation process.

Cognitive needs are also important for people with disabilities. According to data from the 2012 National Socio-Economic Census (SUSENAS) held by BPS, the number of people with disabilities in Indonesia is 2.45% and the largest number are people with visual impairments or Visual Disabilities at 29.63%.

For people with visual disabilities, getting information about an object or location is an important thing among the limitations they have (Widhi, 2013), because in carrying out their activities and adapting to the environment, people with visual impairments need information, especially identification of a location as a cognitive need to support their daily activities, but this experiences limitations in the identification process.

For this reason, people with visual disabilities are trained from an early age to be more sensitive in the process of identifying a location, especially information about environmental conditions using other senses such as touch, hearing, memory, and so on (Widhi 2014). They are based on experience and training and continuously strive to always be able to adapt and identify environmental conditions.

Technological developments, especially location identification, have occurred using GPS, RFID, and so on. However, implementation in the conditions of the Blind is very limited, especially on public facilities such as roads and sidewalks because environmental location information can be in the form of directions and location guides for the Blind in general, namely those with different levels of vision. Apart from that, location guidance is also needed that can anticipate if it is not supported by an electrical power source that supports electronic location identification. Current conventional guidance is in the form of blind sticks and guiding blocks on the sidewalk. However, the Guiding Block cannot be a guide for people with visual impairments in terms of identifying more detailed locations other than the experiences of people with visual impairments regarding environmental conditions that have been previously understood. So it tends to hinder the travel of the Blind in external environments such as roads and sidewalks.

According to Adnyana (2015), problems in the era of globalization consist of 3Cs, namely: Complexity which is solved with a Holistic approach from multi-interdisciplinary knowledge, Competition with solving the quality of human resources in all aspects, and Change problems which are solved with real action continuously.

For this reason, a Total Ergonomics method will be implemented that uses the SHIP TTG (Systemic, Holistic, Interdisciplinary, Participatory and Appropriate Technology) approach to the problem of identifying locations for people with visual disabilities in an integrated manner both in facilities that utilize information technology that require electrical power, as well as a conventional guide without electricity supply in the social

environment, especially roads and sidewalks which can be identified by people with visual disabilities with different levels of vision.

This activity aims to develop an integrated security system in the location identification application system for the Blind so that the location identification system becomes safer.

## 2 Research Methodology

The concept of this research is outlined in the following chart: Figure 1:

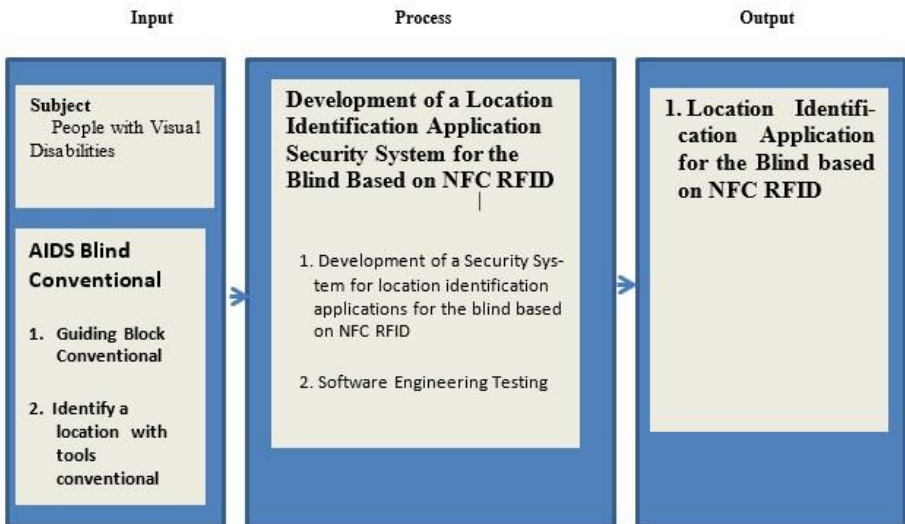


Figure 1. Research Concept Chart

This research is a continuation of research on RFID-based object identification for people with visual disabilities, which further examines the development of a security location identification application system for blind people based on NFC RFID.

The system was built using Android-based PWA (Progressive Web App) technology on the client with NFC (Near Field Communication) reading available on the smartphone to read RFID (Radio Frequency Identification) tags embedded in the guiding blind building which was created to help visually impaired people along the way. on the sidewalk and can provide feedback in the form of sound on the smartphone he uses.

This research test uses White Box testing in Software Engineering and the accuracy of location identification uses the System Usability Scale method.

### 3 Results and Discussion

The output achieved is in the form of an application prototype in the form of developing a security system for a location identification application for the blind based on NFC RFID.

Applications built with the addition of a security system in the form of:

- Development of system security with AES-128 encryption for Write Lock NFC security
- Multi Admin Development
- App Check Development on the Framework

In this system, an Android-based application has been built with NFC RFID reading which contains security to ensure the system is safe to use. Tags containing location data that have been stored on the server are placed on Guiding Blind structures which are placed along pedestrian paths that can be reached by blind people. The guiding blind shape has been adjusted based on an ergonomic system with appropriate technology that allows it to be reached by visually impaired people either manually or with the help of a smartphone that has NFC RFID facilities on the device.

Blind people if they encounter a guiding blind on their journey, if they want to identify the location around them, they can place their smartphone on top of the guiding blind and the smartphone will automatically read the NFC RFID tag embedded on the surface of the guiding blind and provide feedback in the form of a reading sound, and explains the environment around the guiding blind of the attached tag.

If there is no energy or the smartphone is not working, disabled people can also identify the location around them by reading the Braille letters on the surface of the blind.

## Application interface

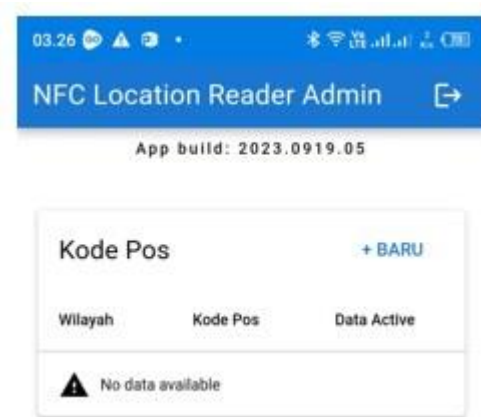


Figure 2. Postal code interface form in the application



Figure 3. Location code interface form in the application

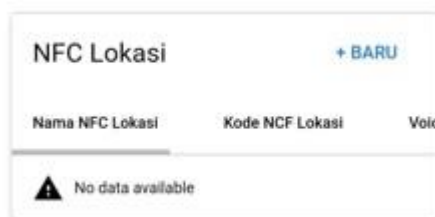


Figure 4. NFC location interface form in the application



Figure 5. Text interface which will later be translated into audio form

***Guiding Blind / a means of guiding location identification for the Blind.***



Figure 6. Guiding Blind with braille location guidance and integrated NFC RFID tag placed on the pedestrian path

## 4 Conclusion

The development of a security system for the location identification application for the blind based on NFC RFID has been completed which is integrated into Guiding Blind for the blind.

System usability testing has been carried out using the System Usability Scale (SUS) method with a result of 85 which indicates that this system can be used well by visually impaired people with visibility less than 20/200 who are used to using Android-based mobile phone tools in their daily lives. be a test respondent in this research.

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