

MOBILE SMART APPLICATION B-HELP FOR BLIND PEOPLE COMMUNITY

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ABSTRACT. *Blindness is a general term used for the condition of a person who experiences a disorder or obstacle in his sense of vision. Based on the level of the disorder, blind people are divided into two: total blind and those who still have the leftover vision (Low Vision). As a result of the loss/reduction of the sensory function of vision, the blind seekers maximize the other sensory functions such as touching, smell, and hearing. Therefore, we have a solution to create a mobile B-Help application that can help the blind and helper communities to deal with and respond to blind people. This smartphone is equipped with a GPS to track blind people by using a smartphone user.*

Keywords: Disability smart mobile applications, Mobile applications for the visually impaired, Mobile applications for people with disabilities, Smart application for blind people, Mobile application for blind people

1. **Introduction.** In this era, many people have imperfect senses, such as eye and foot defects. In our society, there is so much neglect for people with disabilities and one of them is a blind disability. Blind people themselves are those who lose their sense of sight. Blindness itself is divided into two, namely total blind and total blind who still have a low vision [14]. According to the World Health Organization (WHO), in 2009, around 314 million people worldwide experienced visual impairments with 45 million people experiencing blindness or blindness [7,16].

The problem of blindness that occurs in Indonesia is more experienced by adult individuals. Various diseases that cause high rates of blindness in Indonesia include cataracts (0.78%), glaucoma (0.20%), refractive abnormalities (0.14%), while the rest is due to corneal disease (0.10%), retina (0.13%), and vitamin A deficiency (xerophthalmia). Based on the results of the 2008 health survey, Indonesia has a percentage of the blindness of 0.9% and is among countries that have the highest blindness due to cataracts in Southeast Asia [7]. Therefore, we consider blindness to be a problem that cannot be resolved until now.

Persons with visual impairments often face problems in their activities. So, the closest people like the family feel worried when they go alone. This can cause problems from

the family, namely losing one of his family members. Therefore, we have an innovation to create a mobile application that is supported by GPS to process data and track the location of blind people [8]. In this application, the helper can communicate with the helper of other blind people by using the forum feature in the application. Besides that the helper can also find out information about blind people, such as how to deal with blind people, how to communicate well with blind people. This application is connected directly to the helper with visual impairments.

This paper will be organized in 4 sections. It starts with introduction as the explanation about current problems regarding the blind people and their family. And the second section will show the previous research which correlates with the mobile application in order to help blind people. Meanwhile, Section 3 will show our proposed idea using use case diagram, class diagram, and user interface design model and at the end, the conclusion will summarize all the content belonging to the idea in this paper.

2. Previous Research. Persons with visual impairments feel difficulties with all activities carried out. Therefore, there are many technologies to help blind people. The technology is like braille, blind sticks, braille note. The first technology is braille. Braille is a writing system that allows blind people and partial vision to read through touch. The tool was discovered by Louis Braille (1809-1852) who suffered blindness due to an accident and became a teacher of blind people [4]. At the age of 15, he developed a code for the French alphabet as an improvement on night writing. This writing system is written with embossed paper. Braille users can read computer screens and other electronic supports using braille screens [20]. Persons with visual impairments learn braille with slate and stylus without utilizing technology [5,13], particularly for children with visual impairment [3] and automatic alt-text was proposed in order to support the blind user on the social network with computer-generated image description [22]. Meanwhile, in India, social media platforms were proposed in order to support low-income blind people [19]. Moreover, a tool with the highest Optical Character Recognition (OCR) was set up to help blind or visual impairment people when reading a book [24].

For now, there is a finger braille teaching system between recipients who do not experience eye and hearing impairments [1]. This teaching system recognizes the recipient's speech that is not defective and displays the associated point pattern of finger braille [6,9]. The way to interact with large touch surfaces for blind people was conducted in order to help how the blind people to deal with large touch screen gadget between using one and two-handed strategies [11,17].

The second technology is the stick of blind people. The blind stick was introduced to blind people after the first world war as a mobility tool to detect obstacle lines in the user's path [12]. At present, there is an ultrasonic stick technology that serves to detect obstacles that will be faced by blind people during activities running inside and outside the room by utilizing an Arduino Uno type microcontroller as a controller circuit [15,21]. Moreover, there are smart walking sticks proposed in order to help impaired person [23].

The third technology is the braille note. Braille note is a tool designed to help visually impaired people communicate using the braille alphabet [18]. This technology is the same as braille technology [10]. The difference is only in the tools used. Braille still uses embossed paper while braille note already uses tablets. This technology is also equipped with an external braille keyboard so that blind people are easy to carry out their activities. Braille note is also equipped with a touch screen to scroll on the touch screen. Other touch screen braille text was introduced in order to help blind people as well, particularly for children [2].

3. **Proposed Idea.** We will provide an explanation or description of our application, Smart Mobile B-Help. Following are some diagrams and user interfaces that explain how Smart Mobile works.

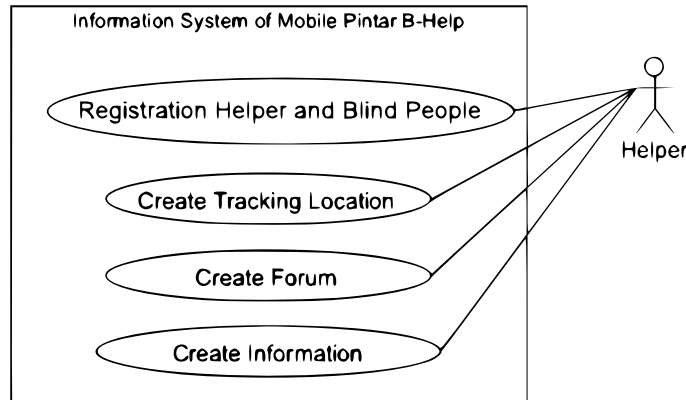


FIGURE 1. Use case diagram of Mobile Smart Application B-Help

3.1. **Registration of helper and blind people.** First, the helper and the blind person must register an account in order to log in as a member. The helper must fill in the data according to Figure 2(a). After filling in the data, the helper and blind person log in and fill in the data according to the data that was registered during the account registration, as shown in Figure 2(b). In our application, we limit one helper to 1 blind person. When they register, the helper must input both of their data, namely helper data and blind person data. The inputted data are a username, password, email, phone number, IMEI number, date of birth, address, and user status. In the status, there are two choices, namely the user registers as a helper or blind person.



FIGURE 2. (a) User interface helper and blind person registration, (b) user interface helper and blind person login, and (c) user interface profile helper and blind person

Based on Figure 2(c), the user can see the data themselves. Also, users can edit their data if there is data that the user wants to change. The appearance of my profile also has a status that matches the data that has been registered at the user registration where each helper is connected to one blind person.

3.2. Tracking location. Based on Figure 3(a), there is the “Track Your B-Friend” button, which serves to track the B-Friend that is already connected via the IMEI number and telephone number. The button “Track Your B-Friend” was carried out by a helper to track down their relatives with visual impairments. After the user clicks the button “Track Your B-Friend” the user can click on the map in Figure 3(b) in order to find out the location of the B-Friend that is already connected to the user’s cellphone. If there is no response to the location of a blind person cellphone, there may be a problem from a blind person cellphone or their cellphone battery has run out.



FIGURE 3. (a) User interface main menu, (b) user interface tracking B-Friend, and (c) user interface forum helper

3.3. Forum. Based on Figure 3(c), there is a forum page that serves to communicate with other helpers and all communities interested in blind people, such as community members who have blind couples, have children with visual impairments who are still children, and families who have blind parents. Besides, the helper can also find out information about other blind persons through other helpers.

3.4. Information. Based on Figure 4(a), there is the main menu page that contains information about blind people. This page is useful for a helper in learning about disability. One example is how to communicate with disabilities, especially blind people. In Figure 4(b), there is a complete explanation of the information that the helper has clicked on.

Based on Figure 5, the database design model is implemented for our application, namely the Smart Mobile B-Help application which contains six tables, namely the forum, helper, blind, tracking location, information and phone. The following are the attributes and relationships of each table in Figure 5.



FIGURE 4. (a) User interface main menu, and (b) user interface information

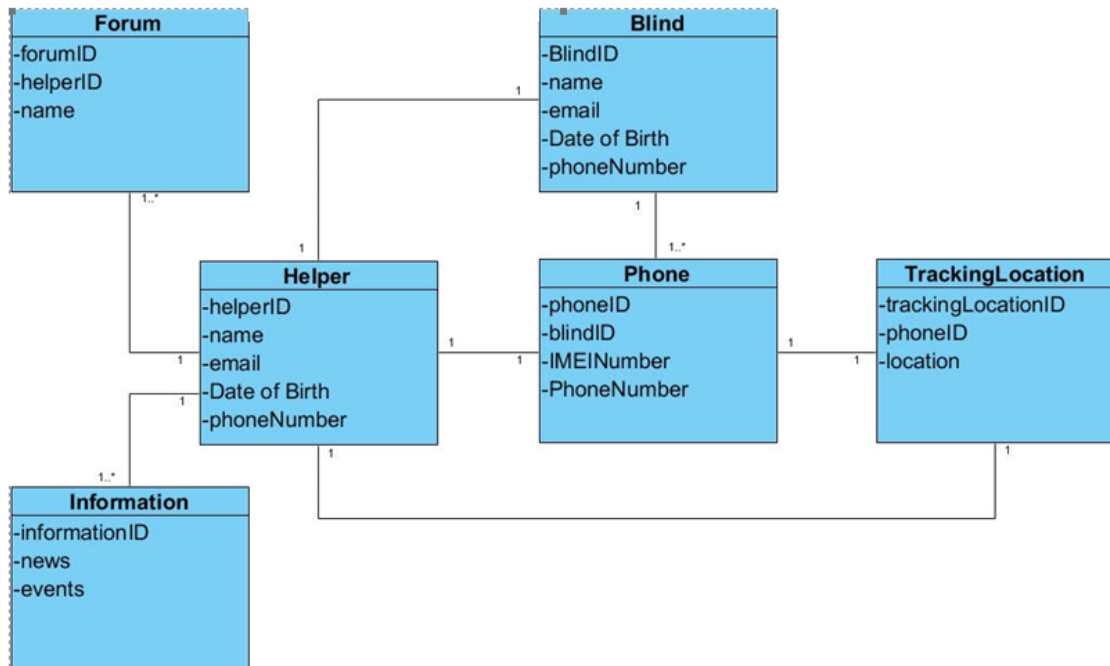


FIGURE 5. Model database application B-Help

1) Forum

In the forum table, there is forumID, helperID, and name. Forum tables are connected to the helper table. Forums can only be used by a helper who has registered an account.

2) Blind

In the blind table, there are BlindID, name, email, Date of Birth, and phoneNumber. The blind table is connected to the helper table and the phone. Every blind person has only one IMEI Number and one telephone number.

3) Helper

In the helper table, there are helperID, name, email, Date of Birth, and phoneNumber. The helper table is connected to the phone table, tracking location, blind, forum, and information. One helper can only connect with one B-Friend.

4) Phone

In the phone table, there is a phoneID, blindID, IMEINumber, and PhoneNumber. One handphone helper can only be connected with one B-Friend handphone. Table phones are connected to the helper table, blind, and tracking location.

5) Tracking Location

In the tracking location table, there is a trackingLocationID, phoneID, and location. Each helper can only track the location of a B-Friend that is already connected to a cellphone helper. The tracking location is connected to the helper table and phone.

6) Information

In the information table, there are informationID, news, and events. The information table is connected to the helper table. Each helper can see much information about the disability.

4. Conclusion. With this, we hope that the use of mobile B-Help applications is beneficial. Because with this application, the helper can track the location of blind people and communicate with other helpers. Also, the helper can find out information about blind people.

In the future, we will improve and add features that can help blind people and helper so that blind people can communicate with other blind people and helpers. The features we will add are like the text to speech and speech to text. We hope that the Indonesian government can work together with us in developing this project so that this project can be realized.

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