## CHAPTER – 1

## INTRODUCTION

“The worst thing about a disability is that people see it before they see you”

- Dr. Laugesen

People with disabilities are one of the most marginalised and excluded groups in society. Facing daily discrimination in the form of negative attitudes, lack of adequate policies and legislation, they are effectively barred from realising their rights to health care, education, and even survival.

Saksham is an open-source Android app. It connects the vernacular audience, disabled to be precise with users of the same kind or normal citizens.

Technology has been changing our lives drastically, nowadays smartphones are part of our lives as a personal assistant however disabled are not able to use it efficiently. To enhance the acceptance of smartphones evenly by the disabled community our proposed android application makes the day-to-day usage of smartphones apps convenient and easy.

This Application provides the disabled with the convenience of calling freely to anyone, messaging in the form of speech using Morse code or speech-to-text recognition, calculator using the natural language processing, Read rich text as audio-book using text-to-speech with support of several regional languages and Navigator to guide the route. It also has a Sign language recognition using image processing for deaf and dumb.

## CHAPTER – 2

**LITERATURE SURVEY**

Literature survey or a literature study is a text of a scholarly paper, which includes the current knowledge including substantial finding as well as theoretical and methodological contributions to a particular topic.

* DISABILITY AND ASSISTIVE TECHNOLOGY:Omer Faruk ISLIM, Middle East Technical University, islim@metu.edu.tr, Kursat CAGILTAY, Middle East Technical University, kursat@metu.edu.tr,

There are nearly one billion people with disabilities all over the world and more than a hundred million people have heavy disabilities and need assistance (WHO, 2012). Disability is not a fault and people with disabilities are a part of our community and have equal rights with us. According to United Nations

Convention on the Rights of Persons with Disabilities (CRPD) (2006), providing assistance to disabled people to maximise functioning, support independence and, participate in the community is the duty of governments.The Assistive Technology is an umbrella term that covers many technologies, devices or only methods to

support people with disabilities.The assistive technology varies from a low-tech pen grip to a high-tech multi-touch tablet pc. The common point of all is removing the barriers in front of the disabled people.

⚫ Understanding User Centred Design (UCD) for People with Special Needs  
Harold W. ThimblebyPublished in ICCHP 2008  
"User centred design" (UCD) has become a central, largely unquestioned, tenet of good practice for the design of interactive systems.

With the increasing recognition of the importance of special needs in influencing design, UCD needs to be re-examined, in particular to be clear about the difference between using its methods, which may not suit special needs, and achieving its objectives.

This paper introduces a simple two-category classification of special needs, to which UCD applies very differently and which are heavily affected by developments in technology; in other words, the role of UCD, particularly with respect to special needs, will continue to change and demand close scrutiny.

* Obstacle Detection and Avoidance System Based on Monocular Camera and Size Expansion Algorithm for UAVs.

Obstacle detection and warning can improve the mobility as well as the safety of visually impaired people specially in unfamiliar environments. For this, firstly, obstacles are detected and localized and then the information of the obstacles will be sent to the visually impaired people by using different modalities such as voice, tactile, vibration. In this paper, we present an assistive system for visually impaired people based on the matrix of electrode and a mobile Kinect. This system consists of two main components: environment information acquisition and analysis and information representation. The first component aims at capturing the environment by using a mobile Kinect and analyzing it in order to detect the predefined obstacles for visually impaired people, while the second component tries to represent obstacle’s information under the form of electrode matrix.

## CHAPTER – 3

**PROBLEM IDENTIFICATION**

To develop an android application to make the use of smartphones convenient and equally acceptable by disabled people. It provides several features like calling, text messaging, reading, sign language recognition, calculator.

From time immemorial, man has been struggling against the ravages wrought by disease, accident or feud. The problem of the physically handicapped is, therefore, as old as human life itself. Problems of the physically handicapped vary in time and space. Their problems are multi- dimensional physical, psychological, social, cultural, educational and vocational. Each category of disability poses a different set of problems.

* Problem of Physical Mobility
* Problem of Reading and Communication
* Lack of job-oriented training facilities

## CHAPTER – 4

**OBJECTIVES**

⚫ To make this app beneficial for the disabled and aid them in every possible way.

⚫ Provide the best interface which makes it user-friendly.  
⚫ Make and receive calls.  
⚫ Write and read SMS.(Morse Code or Speech Recognition and Gestures)

⚫ Identify the phone number of an incoming call before you answer.

⚫ Read rich text as audio-book using text-to-speech with support of several regional languages.

⚫ GPS Navigator to guide the route.  
⚫ Calculator using the Natural Language Processing (NLP) along with Unit Converter.

## CHAPTER – 5

**REQUIREMENTS**

Write **Software** and **Hardware** requirements for your projects

## CHAPTER – 6

**METHODOLOGY**

## CHAPTER – 7

**PROPOSED WORK PLAN**

**References**

1. Bernabei, D., Ganovelli, F., Di Benedetto, M., Dellepiane, M., Scopigno, R.: A low-cost time-critical obstacle avoidance system for the visually impaired. In: International conference on indoor positioning and indoor navigation (IPIN) (2011)[Google Scholar](https://scholar.google.com/scholar?q=Bernabei%2C%20D.%2C%20Ganovelli%2C%20F.%2C%20Di%20Benedetto%2C%20M.%2C%20Dellepiane%2C%20M.%2C%20Scopigno%2C%20R.%3A%20A%20low-cost%20time-critical%20obstacle%20avoidance%20system%20for%20the%20visually%20impaired.%20In%3A%20International%20conference%20on%20indoor%20positioning%20and%20indoor%20navigation%20%28IPIN%29%20%282011%29)
2. Calder, D.J.: Assistive technology interfaces for the blind. In: 3rd IEEE international conference on digital ecosystems and technologies, pp. 318–323, June (2009)[Google Scholar](https://scholar.google.com/scholar?q=Calder%2C%20D.J.%3A%20Assistive%20technology%20interfaces%20for%20the%20blind.%20In%3A%203rd%20IEEE%20international%20conference%20on%20digital%20ecosystems%20and%20technologies%2C%20pp.%20318%E2%80%93323%2C%20June%20%282009%29)
3. Multi-kinect camera calibration. <http://doc-ok.org/?p=295>. Accessed 25 July 2016
4. Chen, G., Can, Z., Jun, P.: An intelligent blind rod and navigation platform based on zigbee technology. In: 2011 International conference on E-Business and E-Government (ICEE), pp. 1–4, May (2011)[Google Scholar](https://scholar.google.com/scholar?q=Chen%2C%20G.%2C%20Can%2C%20Z.%2C%20Jun%2C%20P.%3A%20An%20intelligent%20blind%20rod%20and%20navigation%20platform%20based%20on%20zigbee%20technology.%20In%3A%202011%20International%20conference%20on%20E-Business%20and%20E-Government%20%28ICEE%29%2C%20pp.%201%E2%80%934%2C%20May%20%282011%29)
5. Hersh, M., Johnson, M.A.: Assistive Technology for Visually Impaired and Blind People, 1st edn. Springer, London (2008)[CrossRef](https://doi.org/10.1007/978-1-84628-867-8)[Google Scholar](http://scholar.google.com/scholar_lookup?title=Assistive%20Technology%20for%20Visually%20Impaired%20and%20Blind%20People&author=M.%20Hersh&author=MA.%20Johnson&publication_year=2008)
6. Hoang, V.N., Nguyen, T.H., Le, T.L., Tran, T.T.H., Vuong, T.P., Vuillerme, N.: Obstacle detection and warning for visually impaired people based on electrode matrix and mobile kinect. In: 2nd National foundation for science and technology development conference on information and computer science (NICS), pp. 54–59, Sept (2015)[Google Scholar](https://scholar.google.com/scholar?q=Hoang%2C%20V.N.%2C%20Nguyen%2C%20T.H.%2C%20Le%2C%20T.L.%2C%20Tran%2C%20T.T.H.%2C%20Vuong%2C%20T.P.%2C%20Vuillerme%2C%20N.%3A%20Obstacle%20detection%20and%20warning%20for%20visually%20impaired%20people%20based%20on%20electrode%20matrix%20and%20mobile%20kinect.%20In%3A%202nd%20National%20foundation%20for%20science%20and%20technology%20development%20conference%20on%20information%20and%20computer%20science%20%28NICS%29%2C%20pp.%2054%E2%80%9359%2C%20Sept%20%282015%29)
7. Holz, D., Holzer, S., Rusu, R.B., Behnke, S.: Real-time plane segmentation using rgb-d cameras. In: Röfer, T., Mayer, N. M., Savage, J., Saranlı, U. (eds.) RoboCup 2011: robot soccer world cup XV, pp. 306–317. Springer, Berlin (2012)[Google Scholar](https://scholar.google.com/scholar?q=Holz%2C%20D.%2C%20Holzer%2C%20S.%2C%20Rusu%2C%20R.B.%2C%20Behnke%2C%20S.%3A%20Real-time%20plane%20segmentation%20using%20rgb-d%20cameras.%20In%3A%20R%C3%B6fer%2C%20T.%2C%20Mayer%2C%20N.%20M.%2C%20Savage%2C%20J.%2C%20Saranl%C4%B1%2C%20U.%20%28eds.%29%20RoboCup%202011%3A%20robot%20soccer%20world%20cup%20XV%2C%20pp.%20306%E2%80%93317.%20Springer%2C%20Berlin%20%282012%29)
8. Nicolas Burrus HomePage. [http://nicolas.burrus.name](http://nicolas.burrus.name/). Accessed 25 July 2016
9. Huang, H.C., Hsieh, C.T., Cheng-Hsiang, Y.: An indoor obstacle detection system using depth information and region growth. Sensors **15**, 27116–27141 (2015)[CrossRef](https://doi.org/10.3390/s151027116)[Google Scholar](http://scholar.google.com/scholar_lookup?title=An%20indoor%20obstacle%20detection%20system%20using%20depth%20information%20and%20region%20growth&author=HC.%20Huang&author=CT.%20Hsieh&author=Y.%20Cheng-Hsiang&journal=Sensors&volume=15&pages=27116-27141&publication_year=2015)
10. Jameson, B., Manduchi, R.: Watch your head: a wearable collision warning system for the blind. In: 2010 IEEE sensors, pp. 1922–1927, Nov (2010)[Google Scholar](https://scholar.google.com/scholar?q=Jameson%2C%20B.%2C%20Manduchi%2C%20R.%3A%20Watch%20your%20head%3A%20a%20wearable%20collision%20warning%20system%20for%20the%20blind.%20In%3A%202010%20IEEE%20sensors%2C%20pp.%201922%E2%80%931927%2C%20Nov%20%282010%29)
11. Joachim, A., Ertl, H., Thomas, D.: Design and Development of an indoor navigation and object identification system for the blind. In: Proc. ACM SIGACCESS accessibility, computing, pp. 147–152 (2004)[Google Scholar](https://scholar.google.com/scholar?q=Joachim%2C%20A.%2C%20Ertl%2C%20H.%2C%20Thomas%2C%20D.%3A%20Design%20and%20Development%20of%20an%20indoor%20navigation%20and%20object%20identification%20system%20for%20the%20blind.%20In%3A%20Proc.%20ACM%20SIGACCESS%20accessibility%2C%20computing%2C%20pp.%20147%E2%80%93152%20%282004%29)
12. Johnson, L.A., Higgins, C.M.: A navigation aid for the blind using tactile-visual sensory substitution. In: 28th Annual international conference of the IEEE engineering in medicine and biology society, pp. 6289–6292 (2006)[Google Scholar](https://scholar.google.com/scholar?q=Johnson%2C%20L.A.%2C%20Higgins%2C%20C.M.%3A%20A%20navigation%20aid%20for%20the%20blind%20using%20tactile-visual%20sensory%20substitution.%20In%3A%2028th%20Annual%20international%20conference%20of%20the%20IEEE%20engineering%20in%20medicine%20and%20biology%20society%2C%20pp.%206289%E2%80%936292%20%282006%29)
13. Kaczmarek, K.A., Webster, J.G., Bach-y Rita, P., Tompkins, W.J.: Electrotactile and vibrotactile displays for sensory substitution systems. IEEE Trans. Biomed. Eng. **38**(1), 1–16 (1991)[CrossRef](https://doi.org/10.1109/10.68204)[Google Scholar](http://scholar.google.com/scholar_lookup?title=Electrotactile%20and%20vibrotactile%20displays%20for%20sensory%20substitution%20systems&author=KA.%20Kaczmarek&author=JG.%20Webster&author=P.%20Bach-y%20Rita&author=WJ.%20Tompkins&journal=IEEE%20Trans.%20Biomed.%20Eng.&volume=38&issue=1&pages=1-16&publication_year=1991)
14. Nguyen, T.H., Le, T.L., Tran, T.T.H., Vuillerme, N., Vuong, T.P.: Antenna design for tongue electrotaticle assitive device for the blind and visually impaired. In: 7th European conference on attennas and propagation (2013)[Google Scholar](https://scholar.google.com/scholar?q=Nguyen%2C%20T.H.%2C%20Le%2C%20T.L.%2C%20Tran%2C%20T.T.H.%2C%20Vuillerme%2C%20N.%2C%20Vuong%2C%20T.P.%3A%20Antenna%20design%20for%20tongue%20electrotaticle%20assitive%20device%20for%20the%20blind%20and%20visually%20impaired.%20In%3A%207th%20European%20conference%20on%20attennas%20and%20propagation%20%282013%29)
15. Nguyen, T.H., Nguyen, T.H., Le, T.L., Tran, T.T.H., Vuillerme, N., Vuong, T.P.: A wearable assistive device for the blind using tongue-placed electrotactile display: design and verification. In: International conference on control, automation and information sciences (ICCAIS), pp. 42–47 (2013)[Google Scholar](https://scholar.google.com/scholar?q=Nguyen%2C%20T.H.%2C%20Nguyen%2C%20T.H.%2C%20Le%2C%20T.L.%2C%20Tran%2C%20T.T.H.%2C%20Vuillerme%2C%20N.%2C%20Vuong%2C%20T.P.%3A%20A%20wearable%20assistive%20device%20for%20the%20blind%20using%20tongue-placed%20electrotactile%20display%3A%20design%20and%20verification.%20In%3A%20International%20conference%20on%20control%2C%20automation%20and%20information%20sciences%20%28ICCAIS%29%2C%20pp.%2042%E2%80%9347%20%282013%29)
16. Nguyen, T.H., Nguyen, T.H., Le, T.L., Tran, T.T.H., Vuillerme, N., Vuong, T.P.: A wireless assistive device for visually-impaired persons using tongue electrotactile system. In: Advanced technologies for communications (ATC), 2013 international conference on, pp. 586–591, Oct (2013)[Google Scholar](https://scholar.google.com/scholar?q=Nguyen%2C%20T.H.%2C%20Nguyen%2C%20T.H.%2C%20Le%2C%20T.L.%2C%20Tran%2C%20T.T.H.%2C%20Vuillerme%2C%20N.%2C%20Vuong%2C%20T.P.%3A%20A%20wireless%20assistive%20device%20for%20visually-impaired%20persons%20using%20tongue%20electrotactile%20system.%20In%3A%20Advanced%20technologies%20for%20communications%20%28ATC%29%2C%202013%20international%20conference%20on%2C%20pp.%20586%E2%80%93591%2C%20Oct%20%282013%29)
17. Rodrguez, S.A., Yebes, J.J., Alcantarilla, P.F., Bergasa, L.M., Almazan, J., Cela, A.: Assisting the visually impaired: obstacle detection and warning system by acoustic feedback. Sensors **12**, 17476–17496 (2012)[CrossRef](https://doi.org/10.3390/s121217476)[Google Scholar](http://scholar.google.com/scholar_lookup?title=Assisting%20the%20visually%20impaired%3A%20obstacle%20detection%20and%20warning%20system%20by%20acoustic%20feedback&author=SA.%20Rodrguez&author=JJ.%20Yebes&author=PF.%20Alcantarilla&author=LM.%20Bergasa&author=J.%20Almazan&author=A.%20Cela&journal=Sensors&volume=12&pages=17476-17496&publication_year=2012)
18. Sainarayanan, G., Nagarajan, R., Yaacob, S.: Fuzzy image processing scheme for autonomous navigation of human blind. Appl. Softw. Comput. **7**(1), 257–264 (2007)[CrossRef](https://doi.org/10.1016/j.asoc.2005.06.005)[Google Scholar](http://scholar.google.com/scholar_lookup?title=Fuzzy%20image%20processing%20scheme%20for%20autonomous%20navigation%20of%20human%20blind&author=G.%20Sainarayanan&author=R.%20Nagarajan&author=S.%20Yaacob&journal=Appl.%20Softw.%20Comput.&volume=7&issue=1&pages=257-264&publication_year=2007)