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Engineering 110-03

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November 20, 2021

Campus Indoor Wayfinding and Navigation System:

How to make the University of Victoria more inclusive

After the incorporation as a university in 1963, many of the faculty buildings in the University of Victoria campus were designed exclusively for individuals without disabilities. In recent years, despite several attempts to make the university experience much more inclusive by removing several physical barriers on campus, it's still hard for many to navigate around campus buildings, classrooms, labs and lecture halls without asking bystanders for directions. Although navigational software such as, 'Google Maps' makes it easier for most students to navigate around campus buildings - it still does not help much in terms of accessibility, especially inside campus buildings [2, 4]. Having an indoor campus wayfinding system [1, 2] that can be easily accessible to everyone on campus, can be an important first step towards solving the issue of accessibility in the university context. This can also help to better understand how the existing system can become more inclusive towards other minority groups in the university [1, 3]. A navigational wayfinding system can also become a useful tool in the crossings on the Ring Road as well as in pedestrian environments, especially at night when it gets increasingly hard for wheelchair users to navigate around campus [4].

In my research paper, I will argue that there should be an inclusive indoor navigational wayfinding system for the university campus in order to help every member of the university community, especially students with visual, neurological and mobility impairment to navigate through lecture halls, labs and classrooms [2]. If time persists, I would like to do further research on how the system can be equally inclusive and accessible towards other groups, for instance, design inclusive towards students with language barriers and hearing impairment, tourists and newcomers on campus.

Annotated Bibliography on selected sources related to

Indoor Wayfinding and Navigational System

[1]   D. Fogli, A. Arenghi, and F. Gentilin, "A universal design approach to wayfinding and navigation," *Multimedia Tools and Applications*, Dec. 2019, DOI: 10.1007/s11042-019-08492-2.

Fogli is a full-time professor in the Department of Information Engineering of the University of Brescia and has a Ph.D. degree in Information Engineering from the same university. This journal article investigates the problem of accessibility around university campuses as well as urban areas around the university and proposes a navigational system inclusive of universal design for all minority groups, individuals, with visual, motor and mobility impairment. The article evaluates the usability and accessibility of the developed navigational system in the university campus through the help of twenty-five participants inclusive of visually impaired individuals as well as individuals with motor disabilities.

[2]   C. Prandi, G. Delnevo, P. Salomoni, and S. Mirri, "On Supporting University Communities in Indoor Wayfinding: An Inclusive Design Approach," *Sensors*, vol. 21, no. 9, p. 3134, Apr. 2021, DOI: 10.3390/s21093134.

Prandi is a senior assistant professor in the Department of Computer Science and Engineering of the University of Bologna and she has a Ph.D. degree in Computer Science from the same university. In this research paper, the authors investigate the effect of indoor mobility, localization and wayfinding on people with disabilities and also individuals who are moving to an unknown place (i.e visitors and tourists). Through developing an inclusive navigational system that provided wayfinding functions in indoor environments in campus buildings through an accessible mobile application, the authors investigated how the existing system can be improved in the established university context, and which indoor localization strategy provided a good wayfinding experience to the participants of the research.

[3]   C. Prandi, B. R. Barricelli, S. Mirri, and D. Fogli, "Accessible wayfinding and navigation: a systematic mapping study," *Universal Access in the Information Society*, Sep. 2021, DOI: 10.1007/s10209-021-00843-x.

Prandi is a senior assistant professor in the Department of Computer Science and Engineering of the University of Bologna and Fogli is a full-time professor in the Department of Information Engineering of the University of Brescia, both of whom have a Ph.D. in Computer Science and Informational Engineering from the university they teach. In this research paper, the authors surveyed and investigated the various navigational tools and software applications developed for preventing architectural physical barriers in various indoor and outdoor environments around the university campuses as well as public and private buildings inside the campus. This article addresses a number of persisting problems in the navigational systems, reflects on challenges and issues that must be taken into consideration for the design of accessible places in the future, and proposes solutions to some of the issues presented in the given context.

[4]   M. Prescott *et al.*, "An exploration of the navigational behaviours of people who use wheeled mobility devices in unfamiliar pedestrian environments," *Journal of Transport & Health*, vol. 20, p. 100975, Mar. 2021, DOI: 10.1016/j.jth.2020.100975.

Mike Prescott is a Ph.D. candidate and a Research Assistant in the Department of Rehabilitation Sciences at the University of British Columbia, who has a Master's in Urban Planning from the University of Waterloo. The author is examining the Spatio-temporal dynamics of accessibility and navigation as it relates to the mobility of people with disabilities. In this research paper, the authors explore the various challenges faced by individuals who use wheeled mobility devices while navigating in an unfamiliar pedestrian environment. The research finds that experiences among the participants in the research differed on the type of navigational system/tool used by the participants. The authors concluded that the navigational tools should be designed inclusive and accessible to universal needs, in order to meet the needs of all wheeled mobility device users.