**Research Base**

**Subject**

Digital Accessibility

**Theme**

Accessibility in georeferencing apps for people with disabilities (PwD)

**Research Problem**

How do accessible georeferencing applications for PwD be implemented?

**Hypothesis**

* The technical artifacts for building accessible interactive systems assist the georeferencing app development team in digitally including PwD.
* The georeferencing application development team will not call on technical representatives to make it inclusive for PwD.

**Scientific database**

The databases used should be ACM Digital Library and IEEE Xplore because they concentrate articles relevant to computing, specifically in the areas of Software Engineering and Human-Computer Interaction (KITCHENHAM, 2007).

**Control papers**

The articles by Cheraghi et al. (2021), Dissanayake et al. (2021), G et al. (2024), Palazzi and Bujari (2016) and Wortmann et al. (2024) will be used as control for searching and selecting primary articles.

**Framework PICOC**

**1. Population**

People with disabilities

**2. Intervention**

Implementation of digital accessibility

**3. Comparation**

*Not applied*

**4. Outcomes**

Interactive resources, context of use, methodological and technical artifacts

**5. Context**

georeferencing apps

**Search string**

**1. First version**

("People with disabilities") AND ("digital accessibility") AND ("Interactive resources" OR "Technical artifacts")

**2. Second version**

(“impairment” OR “disability” OR “blind” OR “deaf” OR “autism” OR “neurodivergent”) AND ("georeferencing" OR "geolocation") AND ("application" OR "app") AND ("accessibility" OR "inclusion")  
**3. Third version**

(“PwD” OR “impair\*” OR “disab\*” OR “blind” OR “deaf” OR “autism” OR “neurodivergent”) AND ("georeferencing application" OR "geolocation application" OR "mapping tool” OR “geo-platform” OR “location service” OR “Navigation app” OR “tracking system”) AND ("accessibility" OR "inclusion" OR "ally" OR "a11y")

**4. Forth version**

(PwD OR impair\* OR disab\* OR blind OR deaf OR autism OR neurodivergent) AND (georeferencing OR geolocation OR mapping OR location OR navigation) AND (app OR service OR system OR application OR tool) AND (mobile OR smartphone OR cellphone) AND (accessibility OR inclusion OR ally OR a11y)

**5. Fifth version**

(PwD OR impair\* OR disab\* OR blind OR deaf OR autism OR neurodivergent) AND (georeferencing OR geolocation OR mapping OR location OR navigation) AND (app OR service OR system OR application OR tool) AND (mobile OR smartphone OR cellphone) AND (accessibility OR inclusion OR ally OR a11y)

**6. Sixth version**

(PwD OR impair\* OR disab\* OR blind OR deaf OR autism OR neurodivergent) AND (georeferenc\* OR geolocat\* OR map\* OR locat\* OR navigat\* OR rout\*) AND (app\* OR service OR system OR tool) AND (accessibility OR inclusion OR ally OR a11y)

**Exclusion Criteria**

EC1. Duplicate papers in research databases

EC2. Not a research paper or complete papers (e.g. short-paper, abstracts, posters, reports, ongoing research)

EC3. Unavailable papers in research databases

EC4. Papers that aren’t focused on Human-Computer Interaction or Software Engineering

**Inclusion Criteria**

EC1. English written

EC2. Journal papers and Conference proceedings

EC3. Peer-reviewed studies

EC4. Primary studies

EC5. Studies that focused on the inclusion of PwD in georeferencing apps

EC6. Published from 2015 to 2024

### **Quality Assessment Checklist**

The checklist questions should be evaluated between the answer options “yes”, “partially”, and “no”. Each QC was given the values ​​“yes”, “partially” and “no”. The weights should be considered, respectively, from the values ​​“1”, “0.5” and “0”. In total, primary studies should be considered if they obtained a total score between “2.0” and “3.0”. In total, three questions are important for the quality assessment checklist, namely:

**1. Does the study resource a mobile app?**

*Description: studies that targeted mobile apps due to their practicality and provided users with mobility and access to information about physical spaces and environments.*

**2. Are the apps' resources dependent only on the smartphone?**

*Description: studies of an app that uses only smartphone resources, such as native sensors, to obtain or generate access information to a physical space. In the “partially” case, external devices support PwD, e.g., sensor devices. Still, the smartphone also has the necessary resources and external devices to help them.*

**3. Was the study focused PwD inclusion?**

*Description: studies that focused on PwD, considering their conditions to ensure that the apps' resource proposals effectively met their needs.*

**Research Questions**

The SLR will be carried out through four research questions:

**1. What accessible resources are implemented in georeferencing apps?**

*Description: to collect the interactive resources implemented to strengthen user accessibility in a georeferencing app. The resources can be under the interface or as a requirement of the app to support PwD.*

**2. Who benefits from the accessible resources implemented in georeferencing apps?**

*Description: to observe which users benefited from primary studies and which conditions of these people with disabilities were met by a georeferencing app. For this, the users benefited can be: blind or visual impaired (BVI), d/Deaf or hard of hearing (DHH), motororphysical impaired (MPI), neurodivergent people (NDV), intellectual or developmental disabilities (IDD), general disability, and other. ROCHA et al. (2024) group these users in the Systematic Literature Review.*

**3. How are the accessible resources of georeferencing apps garanteed?**

*Description: to collect the methodological and technical artifacts used to guarantee the accessibility requirements of PwD in georeferencing apps: interview, questionnaire, focus group, heuristic evaluation, cognitive path, semiotic inspection, field study, usability test, communicability, paper prototyping and other. We used the general aspects evaluated through each method presented by BARBOSA et al. (2021).*

**4. In which usage context does PwD use these georeferencing apps?**

*Description: georeferencing app was aimed at the context of indoor, outdoor or general wayfinding.*

**References**

**ROCHA, Thayssa A. da; SOUZA, Cleidson de; TERAN, Luciano; MOTA, Marcelle.** Effective inclusion of people with disabilities in software development teams. In: **ACM/IEEE INTERNATIONAL SYMPOSIUM ON EMPIRICAL SOFTWARE ENGINEERING AND MEASUREMENT, 18.**, 2024, Barcelona. *Proceedings [...]* New York: Association for Computing Machinery, 2024. p. 447–453. Disponível em:<https://doi.org/10.1145/3674805.3690749>. Access on: 13th June, 2025.

BARBOSA, Simone D. J.; SILVA, Bruno S. da; SILVEIRA, Milene S.; DARIN, Ticianne; BARBOSA, Gabriel D. J. Human-Computer Interaction and User Experience. Autopublication. ISBN 978-65-00-19677-1.

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DISSANAYAKE, D. M. L. V. et al. Navigate-Me: Secure voice authenticated indoor navigation system for blind individuals. In: **INTERNATIONAL CONFERENCE ON ADVANCES IN ICT FOR EMERGING REGIONS (ICTER)**, 21., 2021, [S. l.]. [S. l.]: IEEE, 2021. p. 219-224.

G, A. K. et al. Echo Guidance: Voice-Activated Application for Blind with Smart Assistive Stick Using Machine Learning and IoT. In: **INTERNATIONAL CONFERENCE ON ADVANCES IN DATA ENGINEERING AND INTELLIGENT COMPUTING SYSTEMS (ADICS)**, 2024, [S. l.]. [S. l.]: 2024 International Conference on Advances in Data Engineering and Intelligent Computing Systems (ADICS), 2024. p. 01-06. DOI: 10.1109/ADICS58448.2024.10533517.

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CHERAGHI, S. A.; NAMBOODIRI, V.; ARSAL, G. CityGuide: A Seamless Indoor-Outdoor Wayfinding System for People With Vision Impairments. In: **IEEE INTERNATIONAL CONFERENCE ON PERVASIVE COMPUTING AND COMMUNICATIONS WORKSHOPS AND OTHER AFFILIATED EVENTS (PERCOM WORKSHOPS)**, 2021, [S. l.]. [S. l.]: 2021 IEEE International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops), 2021. p. 105-110. DOI: 10.1109/PerComWorkshops51409.2021.9431138.

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