Automated Accessibility Testing for Mobile Apps

Highlights

- Developing a fully automated test generation approach to check the accessibility of mobile Android apps
- Evaluating the usefulness of the approach by assessing the accessibility of existing apps and interacting with their developers
- Evaluating the severity and relevance of the accessibility issues identified with the automated approach, as well as issues missed, using observational studies and interviews with real users with accessibility needs

Overview

An estimated 15% of the world population live with some form of disability and must face multiple barriers in their day-to-day life. In the UK, two million people suffer from sight problems (e.g., blindness, low vision, or colour blindness) and the number is predicted to rise to over 2,250,000 by 2020, according to the Royal National Institute of Blind People. In a society increasingly populated by computer systems, enabling these users to access computer technology effectively is a major concern. According to the Ofcom’s 2015 Communications Market Report, smartphones are the most popular device to access the Internet in the UK, with a third (33%) of British internet users preferring their smartphone over their laptops for going online. This scenario sets an important challenge to the software industry: We must produce mobile apps that not only satisfy basic functional requirements, but also support the population of users with accessibility requirements.

Even when software vendors and developers are aware of accessibility needs, there is an evident lack of tool support to develop accessible apps or assess existing apps’ accessibility. While some accessibility properties can be checked statically, modern development practice indicates that mobile user interfaces are often created dynamically and therefore are not amenable to static checking. And while basic accessibility checking frameworks exist to analyse accessibility properties or mitigate accessibility limitations at runtime, they either require substantial additional effort from developers or are simply not suitable for current mobile development processes. The main aim of this project is to overcome these issues through the use of automated test generation to analyse, assess, and improve the accessibility of mobile apps.

The research objectives for this project are:

- Develop a fully automated test generation approach to check the accessibility of mobile Android apps.
- Evaluate the usefulness of the approach by assessing the accessibility of existing apps and interacting with their developers.
Methodology

- **WP1. Analyse existing accessibility guidelines and standards** and develop a conformance methodology with automated accessibility checks to assist app developers in testing accessibility properties.
- **WP2. Develop an automated test generation approach for accessibility testing**, optimising the exploration of the mobile app’s widgets and states to reveal as many accessibility flaws as possible. An accessibility coverage criterion will be formulated to evaluate the progress of automated accessibility testing.
- **WP3. Enable developers to fix accessibility issues** by providing them with concise, actionable accessibility information. We will categorise and prioritise accessibility issues (e.g., by degree of vision impairment that makes them problematic), and generate minimised, executable accessibility tests.
- **WP4. Empirically study mobile accessibility**, more specifically, the current state of accessibility of apps in existing app stores, and the effectiveness of the proposed accessibility testing approach. Accessibility issues will be collected by observing and interacting with users with accessibility needs and app developers.

Further Reading


Funding

This research project is one of a number of projects in the Department. It is in competition for funding with one or more of these projects. Usually the project which receives the best applicant will be awarded the funding.

**Home/EU Applicants**

This project is eligible for a fully funded College of Science and Engineering studentship which includes:

- A full UK/EU fee waiver for 3.5 years
International Applicants
This project is eligible for a fully funded College of Science and Engineering studentship which includes:

- A full international fee waiver for 3.5 years
- Research Training Support Grant (RTSG)

Application Instructions
The online application and supporting documents are due by Monday 21st January 2019.

Any applications submitted after the deadline will not be accepted for the studentship scheme.

References should arrive no later than Monday 28th January 2019.

Applicants are advised to apply well in advance of the deadline, so that we can let you know if anything is missing from your application.

Required Materials
1. Online application form
2. Two academic references
3. Transcripts
4. Degree certificate/s (if awarded)
5. Curriculum Vitae
6. CSE Studentship Form
7. English language qualification

Applications which are not complete by the deadline will not be considered for the studentship scheme. It is the responsibility of the applicant to ensure the application form and documents are received by the relevant deadlines.

All applications must be submitted online, along with the supporting documents as per the instructions on the website.

Please ensure that all email addresses, for yourself and your referees, are correct on the application form.

For more information, please visit our website at:
https://www2.le.ac.uk/colleges/scieng/research/postgraduate-opportunities/cse-2019/instructions