

## ABSTRACT

The World Wide Web (web) is ubiquitous - it can be accessed by a small device while the user is mobile or it can be accessed in audio if the user cannot see the content, for instance visually disabled users who use screen readers<sup>2</sup>. However, since web pages are mainly designed for visual interaction; it is almost impossible to access them in alternative forms. Our overarching goal is to improve the user experience in such constrained environments by using a novel application of eye tracking technology. Our **objective** is to use eye tracking data to generate an algorithm for identifying people's scanpaths and relate those scanpaths to visual elements of web pages. In order to achieve that, we have four **major** aims: (1) Identify visual elements of web pages automatically by using the underlying source code; (2) Develop a novel algorithm to identify scanpaths in terms of visual elements; (3) Develop novel transcoding techniques based on this algorithm; (4) Demonstrate that the proposed techniques improve the user experience in constrained environments. As it is presented in this final report, we have achieved our objective and reached the following **results**: (1) visual elements have been identified automatically and their roles been discovered with %80 accuracy; (2) a novel algorithm has been developed that successfully relates scanpaths with the underlying source code and identifies a common scanpath; (3) pages have been successfully transcoded by using the visual elements, their roles and the generated common scanpath; (4) these novel transcoding techniques have shown to improve the user experience. These results demonstrate that the project has successfully been completed and reached its objective. Future work of this project could be: investigating alternative methods to improve the accuracy of automatic role detection, developing alternative algorithms to identify common scanpaths and proposing different transcoding techniques.

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<sup>2</sup> Screen reader is software that presents on screen data in audio.