BACHELOR PAPER

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Integrating Assistive Technology (Working title)

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Kurzfassung

In einer sich rapide entwickelnden Welt entstehen täglich neue experimentelle Softwaretechnologien. Manche davon etablieren sich, manche sind schnell veraltet. Durch den Nutzen dieser Neuerungen in dem Feld der Assistiven Technologien bieten sich jedoch große Möglichkeiten an. Dafür müssen neue Komponenten aber aufgrund der schnellen technischen Entwicklung ebenso schnell in existierende Assistive Toolkits integriert werden. Diese Arbeit beschäftigt sich aus diesem Grund mit dem Prozess der Integrierung neuer Software in ein AT-Toolkit. Dabei werden zuerst verschiedene Methoden zur Bewertung und Integrierung von Software in einem Assistive Technologies-Umfeld besprochen und bewertet. Dies inkludiert eine Methodik zur Analyse von Quell- und Zielsoftware inklusive Erkennung von Gemeinsamkeiten sowie Erweiterbarkeitskonzepten. Aus den Ergebnissen dieser Analyse wird ein Konzept der Implementierung erstellt. Weiters werden mehrere State-of-the-art Technologien wie die Programmiersprachen Java, C++, Python und die Datenaustauschformate XML und JSON anhand ihrer Interoperabilität und Nutzen im assistiven Umfeld untereinander gegenübergestellt und bewertet. Anschließend werden die Ergebnisse im Zuge einer Integrierung von Gestenerkennung mit Intel RealSense-Technologie in das AT-Toolkit "Assistive Technology Rapid Integration & Construction Set" angewendet. Abschließend wird die Effektivität der Methodik anhand der erfolgten Implementierung bewertet und auf positive bzw. negative Aspekte hin analysiert. Aufgeteilt nach Anwendungsfällen werden die Methoden diskutiert und bewertet sowie "Best Practices" aufgelistet.

Schlagworte: Assistive, Technologie, Software, Integration, Einbindung, Bewegungserkennung, Computer Vision

Abstract

In today's rapidly advancing world, new software technologies emerge at an enormous pace. Some may develop to be the next great standard, while others perish into obscurity rapidly. The uses for these emerging technologies in the field of assistive technology are often manifold but the rapid pace of technology demands fast adaption of this software to existing toolkits, or they themselves might soon disappear. This paper brings up the key challenges involved with this implementation and adaption process and possible methods for solving them. First, different processes pertaining to the analysis and integration of software in the context of assistive technologies are analyzed, discussed and rated. This includes workflows with the purpose of analysing source and target software, collecting data such as similarities and expansion concepts. Furthermore, state-of-the-art technologies such as the programming languages Java, C++ and Python as well as the data exchange formats XML and JSON are weighed against each other and rated for their usage in assistive technologies. The results of these discussions and the methods discussed are then applied to an integration of gesture recognition utilizing Intel RealSense technology into the AT-Toolkit "Assistive Technology Rapid Integration & Construction Set", or "AsTeRICS". The paper concludes with a rating of effectiveness as well as positive and negative aspects for the discussed methods, using the aforementioned implementation as a guideline. Sorted by application, the different methods and processes are discussed and a lists of "best practices" are developed.

Keywords: assistive, technology, software, integration, motion recognition, computer vision

Acknowledgements

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List of Abbreviations

ABC Alphabet

WWW world wide web

ROFL Rolling on floor laughing

A Anhang A

B Anhang B