Industry 4.0 and Augmenting the Millennial Worker

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Summary

Augmented Reality (AR) technology has the potential to provide automated on-site support and improved communications to workers performing complex maintenance operations on remote offshore sites. This project aims to explore the best ways of deploying AR in offshore wind, and to evaluate its effectiveness in a real world setting.

Abstract

Augmented Reality (AR) refers to technologies which display additional virtual information as an overlay to the real world, providing relevant information, at the point of use, without taking the user's attention away from the task at hand. This has the potential to benefit technicians working on offshore wind turbines, who may usually be required to split their attention between several tasks while working in challenging environments. By presenting information automatically and in the user's line of sight, mental workload of tasks may be reduced as the user's attention is not distracted by mundane tasks such as locating instructions. Studies have suggested industrial task completion times and error rates may be reduced in comparison to more traditional instruction delivery methods, particularly for inexperienced workers (Havard et al [1], Fiorentino et al [2]). Ultimately it is hoped this will contribute to a reduction in O&M costs, which form a significant fraction of the overall cost of energy for offshore wind (Tavner [3]).

Much of the research to date focusses on assembly line tasks and laboratory environments, where conditions are typically known and well controlled. Therefore, this project focusses on exploring the most suitable interaction methods, database configurations, and display methods for deployment in the offshore environment. Once a suitable system has been created, it will be evaluated in a real offshore turbine to compare performance against traditional instructional methods, which will then be used to perform cost modelling to assess which applications can most benefit from implementing AR.

Work completed so far includes review of literature and exploration of current industrial applications of AR and survey to explore attitudes towards AR and potential implementation issues within the offshore wind and industrial maintenance communities. The next stage of the project will be to develop a pilot study using AR for a simple assembly task to use as a baseline result, and to obtain more information about the offshore environment via visits, interviews and access to maintenance documents.

This project is undertaken as part of the Renewable Engine INTERREG VA programme [4] to encourage cross-border research in the field of Renewable Energy and Advanced Manufacturing. All work presented here is performed as a collaboration between the University of Strathclyde and the industrial partner, Booth Welsh.

References

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