



**IMMERSIVE VIRTUAL REALITY FOR WORKFORCE
TRAINING IN ADVANCE MANUFACTURING
INDUSTRY: A FIELD RESEARCH AT SIEMENS
ADVANCE MANUFACTURING TRANSFORMATION
CENTRE (AMTC) SINGAPORE**

MASTER'S FINAL PROJECT
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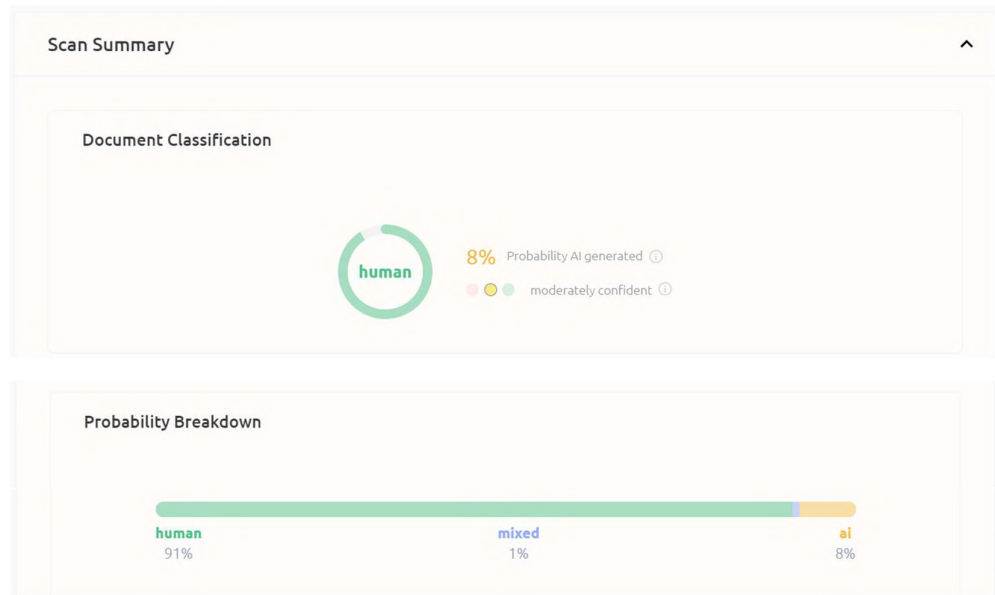
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ABSTRACT

Digital transformation is propelling rapid changes in advance manufacturing, necessitating a highly skilled workforce capable of operating increasingly complex technologies. However, traditional training methods face limitations in providing realistic and immersive learning environments, often resulting in productivity losses, safety risks, and high costs. The background highlights the growing new dimension of learning in manufacturing and the challenges from conventional training approaches. The research aims to examine how Siemens AMTC leverages VR technology for training and assess its effectiveness compared to traditional methods. Field research was employed, involving observation, interviews, and document analysis with qualitative approach at Siemens AMTC Singapore. The study found that VR training offers significant advantages over traditional approaches, including enhanced realism, reduced training time and production losses, improved safety, lower costs, better scalability, and improved work quality. Immersive virtual reality potential to be an effective new dimension of learning for upskilling manufacturing workers, enabling continuous learning and accelerating digital transformation in the industry.

Keywords:

Advance Manufacturing; Digital Transformation; Virtual Reality Training; Workforce Training

ABSTRAK

Transformasi digital mendorong perubahan cepat dalam manufaktur tingkat lanjut, yang membutuhkan tenaga kerja yang sangat terampil yang mampu mengoperasikan teknologi yang semakin kompleks. Namun, metode pelatihan tradisional menghadapi keterbatasan dalam menyediakan lingkungan pembelajaran yang realistis dan mendalam, yang sering kali mengakibatkan kerugian produktivitas, risiko keselamatan, dan biaya tinggi. Latar belakang menyoroti dimensi baru pembelajaran yang berkembang dalam manufaktur dan tantangan dari pendekatan pelatihan konvensional. Penelitian ini bertujuan untuk memeriksa bagaimana Siemens AMTC memanfaatkan teknologi VR untuk pelatihan dan menilai efektivitasnya dibandingkan dengan metode tradisional. Penelitian lapangan digunakan, yang melibatkan observasi, wawancara, dan analisis dokumen dengan pendekatan kualitatif di Siemens AMTC Singapura. Studi tersebut menemukan bahwa pelatihan VR menawarkan keuntungan signifikan dibandingkan pendekatan tradisional, termasuk realisme yang ditingkatkan, mengurangi waktu pelatihan dan kerugian produksi, meningkatkan keselamatan, biaya yang lebih rendah, skalabilitas yang lebih baik, dan meningkatkan kualitas kerja. Realitas virtual yang mendalam berpotensi menjadi dimensi pembelajaran baru yang efektif untuk meningkatkan keterampilan pekerja manufaktur, memungkinkan pembelajaran berkelanjutan dan mempercepat transformasi digital dalam industri.

Kata kunci:

Manufaktur Tingkat Lanjut; Transformasi Digital; Pelatihan Realitas Virtual; Pelatihan Tenaga Kerja

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