VIRTUAL REALITY IN THE MEDICINE SECTOR, VISUALIZATION CT I MRI, PET

Assoc. Prof. Eng. Piotr Kardasz [1,2]

Krzysztof Kolebski[3]

Vincent Peter[4]

PhD Assoc. Prof. Eng Piotr Jednaszewski[5]

[1]University College of Professional Education in Wroclaw, **Poland**

[2]Foundation for Research, Development and Innovation, Wroclaw, **Poland**

[3]Developer Team Ltd., Bydgoszcz, **Poland**

[4]Ready For Future Ltd., Wroclaw, **Poland**

[5]St Mary's Institute Limited, Dublin, **Ireland**

ABSTRACT

Virtual reality (VR) is becoming an increasingly valuable tool in modern medicine, with a wide range of applications across diagnostics, therapeutic interventions, patient care, and professional training. This paper presents an overview of current VR technologies used to visualize medical imaging data such as CT, MRI, and PET scans in three-dimensional environments. Both global and Polish markets offer a variety of VR-based software solutions ranging from commercial products to open-source platforms that enable detailed exploration of anatomical structures. These tools are especially useful in preoperative planning, offering immersive, interactive experiences that can enhance clinical precision and decision-making.

Beyond imaging, VR is being utilized for pain and stress management, particularly in pediatric care and chemotherapy, where immersive environments help reduce discomfort and anxiety. It also plays a significant role in neurorehabilitation and psychiatric treatment, supporting recovery through simulation-based exercises and exposure therapy. Additionally, VR is becoming an essential element in medical education, allowing healthcare professionals to gain practical experience in a risk-free, virtual setting.

The integration of VR into routine medical practice is likely to expand, supported by growing compatibility with standard imaging formats like DICOM and NIfTI. Overall, VR presents a promising frontier for improving both the quality and accessibility of healthcare services.

Keywords: virtual reality, VR, medical imaging, imaging medicine

INTRODUCTION

Although the term Virtual Reality (VR) was coined only in 1987, its origins date back to the early 20th century. The first step in the development of this field was the flight simulators created by Edwin Albert Link [1], which allowed for safe pilot training. In

https://www.sciencesalibrary.at