Design and Development of a Virtual Reality Application to support Patient Education in Radiotherapy

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Introduction

- doctor-patient-relation changes
  → shared decision-making process
  → increasing information needs [1]
- high complexity and technical equipment intimidates patients
  → anxiety and distress [2]

Approach

- virtual reality application to enable realistic visualization of radio-therapy process and concepts
  → improve understanding
  → prime for radiotherapy
- find best practices for developing virtual learning environments

Fig. 1: Screenshot of the designed therapy room with a LINAC, CT and some scanned objects.

Material and Methods

- 3D scans of a therapy room
- design of a VR environment with Unreal Engine 4 and HTC Vive

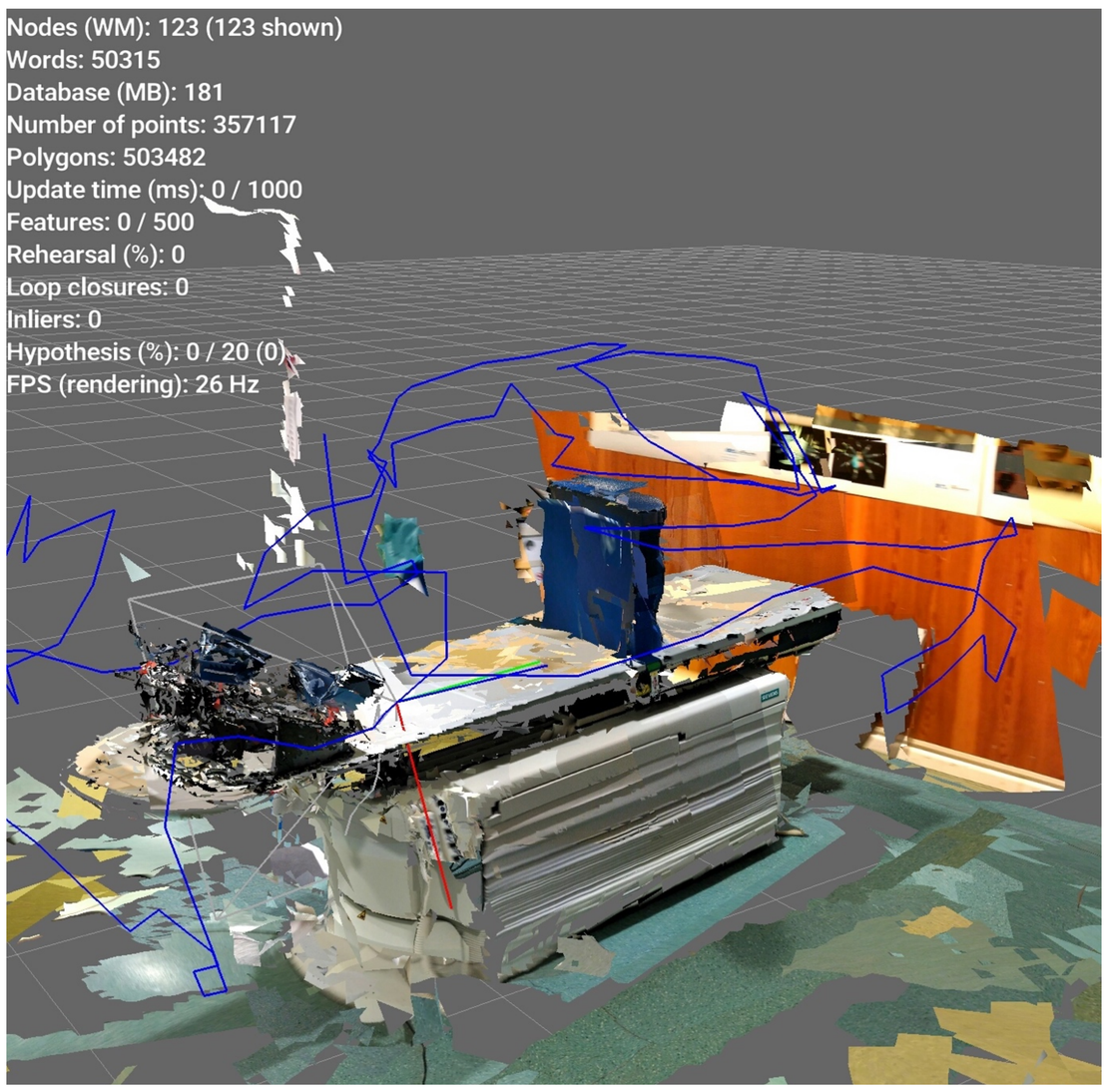

Fig. 3: Live visualization of a 3D scan using the RTAB-Map app.

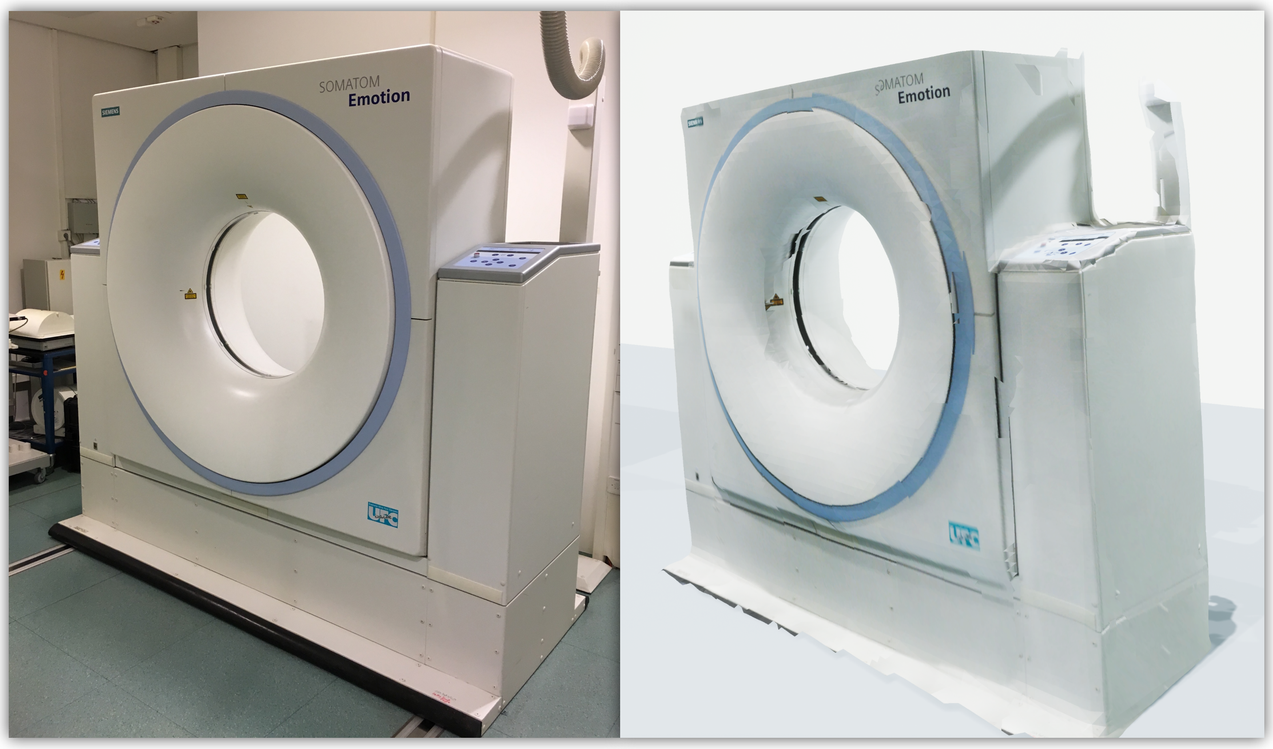

Fig. 2: real (left) and scanned (right) CT scanner with good result

Results

- example scene with a moving LINAC and table in a modeled irradiation room with other scanned objects
- best practices for modelling 3D environments, 3D-scanning & post-processing in acceptable quality

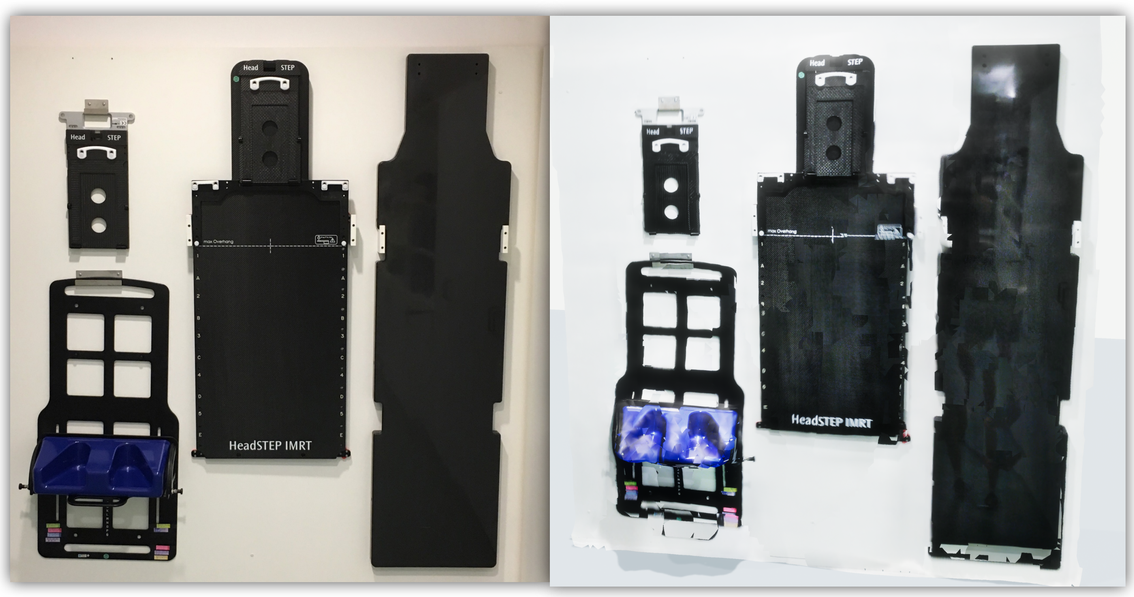

Fig. 4: real (left) and scanned (right) patient bedding tools

Outlook

- create segmented transparent patient model
- record audio instructions and explanations
- scan more objects for even more real experience
- design lesson that covers one radiotherapy concept

Acknowledgements

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[1] Charles C et al. Soc Sci Med 1999

[2] Elsner K et al. JMRS 2017