Integrating Visual Storytelling in Virtual Surgical Planning

Heejun Lee[1], Peter A. J. Pijpker[2], Joep Kraeima[2], Hylke van der Wel[2], Anne M. L. Meesters[2],
Jasper Prijs[4,5], Job N. Doornberg[3], Fokie Cnossen[1], Jos B. T. M. Roerdink[1], Peter M. A. van Ooijen[3], and Jiří Kosinka[1]

[1] Bernoulli Institute, University of Groningen, The Netherlands
[2] 3D Lab, University Medical Center Groningen, University of Groningen, The Netherlands
[3]Data Science Center in Health (DASH), University Medical Center Groningen, The Netherlands
[4] Orthopedics, University Medical Center Groningen, The Netherlands
[5] Orthopedics, Flinders University, Flinders Medical Center, Adelaide, Australia

Introduction

Bone fracture reduction is a medical procedure to position bone fragments to their anatomical location. Computer-assisted Virtual Surgical Planning (VSP) allows surgeons to plan a surgery by manipulating rendered bone fragments.

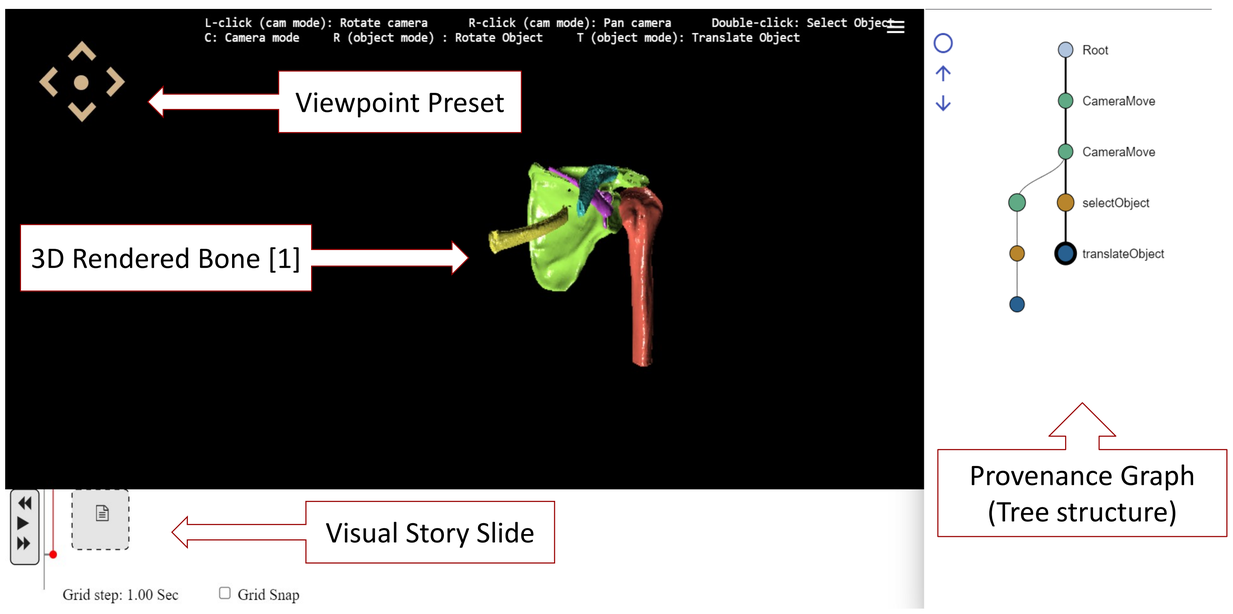
Motivation

"Difficult to manage **multiple alternative surgical plans** with current VSP tool"

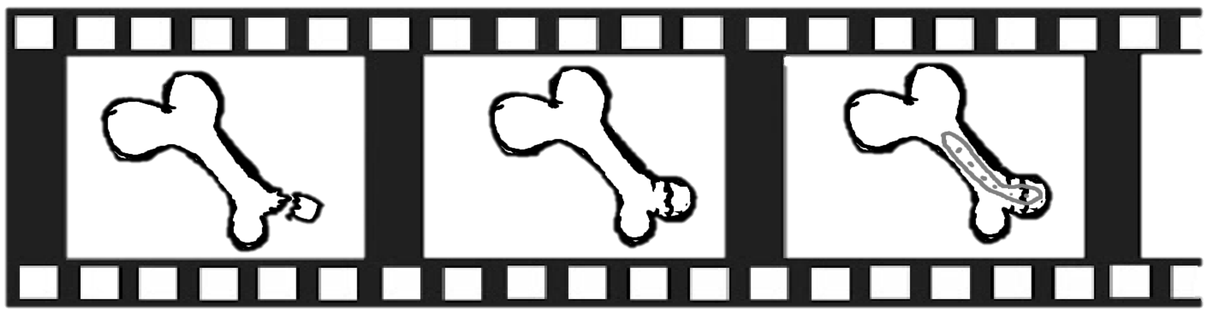
"Would be nice to track and navigate the **previous** planning procedures"

"Want to **reuse** planning procedures on a similar case"

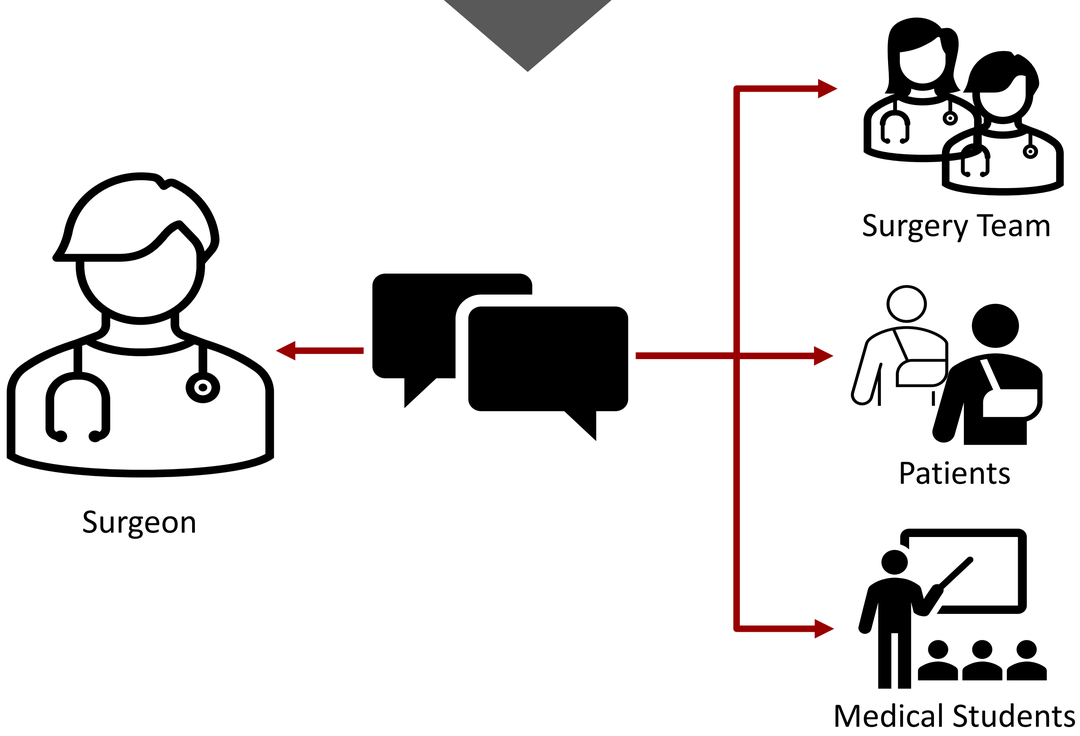
BoneStory



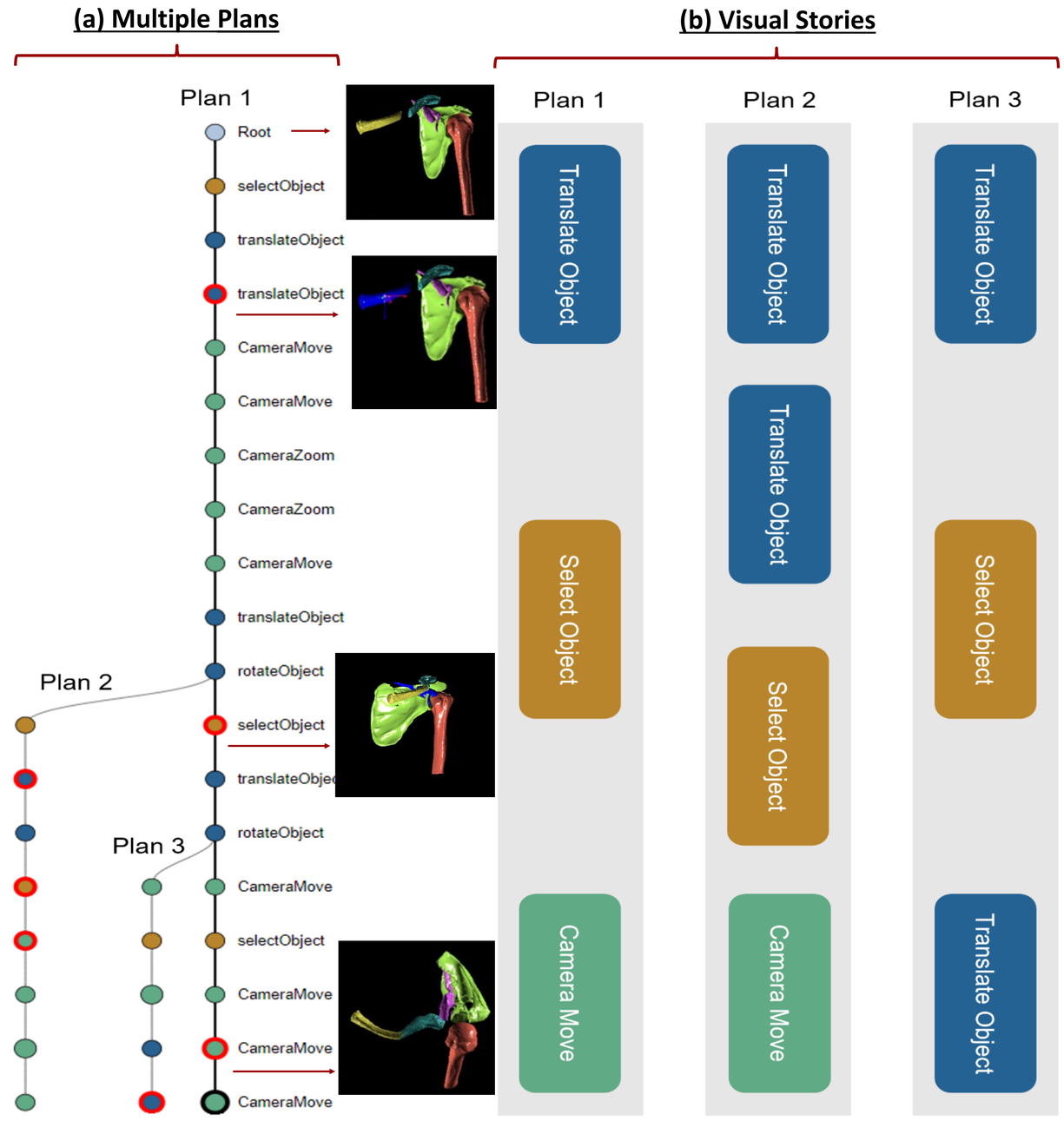
- ✓ Baseline code of a Typescript-based web application (Amabili *et al.* [2])
- ✓ Visual storytelling toolkit from the Netherlands eScience Center [3].



Virtual Surgical Planning + Visual Storytelling



Features



Conclusion

We have developed **BoneStory**, a novel VSP tool that integrates visual storytelling for surgeons to support (a) **visualizing multiple surgical procedures** and (b) **creating multiple visual stories**; this is not possible with conventional VSP tools used for bone fracture reduction. Based on the experts' commentaries, we conclude that our framework has potential for use in practical surgical planning, for enhancing communication among medical experts, and for educational purposes.

References

[1] NIH 3D print exchange - proximal humerus fractures STL image

[2] Amabili et al. "Improving Provenance Data Interaction for Visual Storytelling in Medical Imaging Data Exploration." EuroVis (2018).

[3] Visualstorytelling toolkit: Visualstorytelling GitHub (2019).
URL: https://github.com/VisualStorytelling/

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Scientific Visualization and Computer Graphics
Contact: h.lee@rug.nl