Facilitating Experiment Reproducibility Through Data Federation and Image Processing Tools Integration

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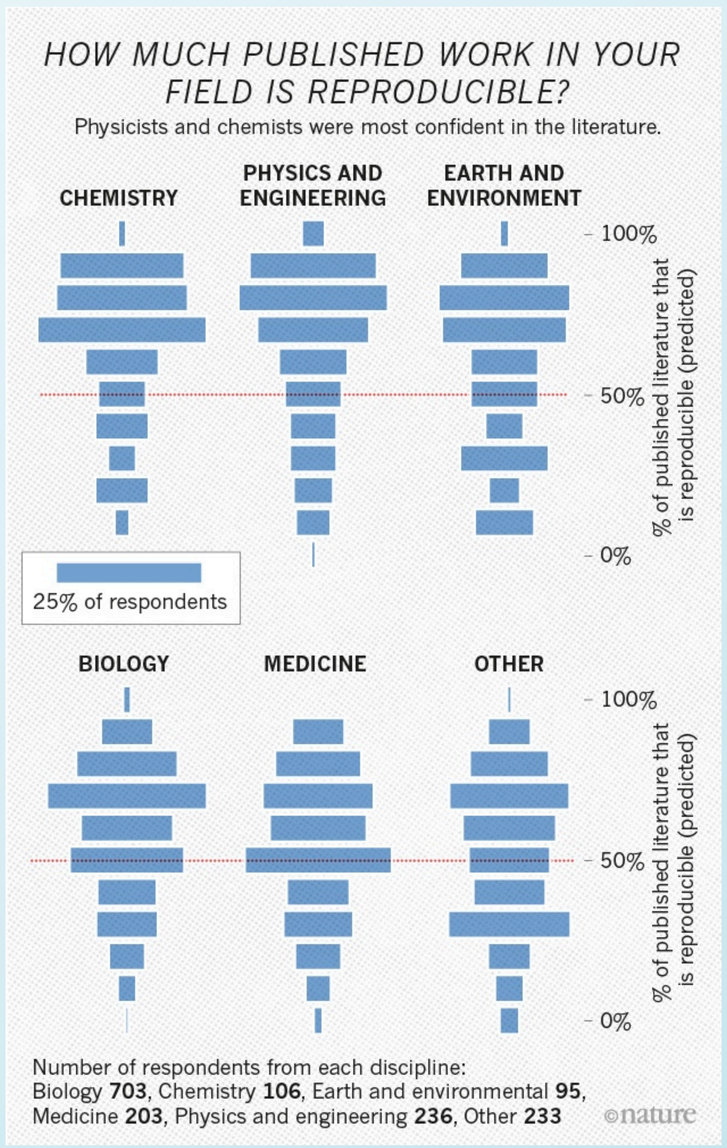
INTRODUCTION

The primary motivation of this work is to improve the state of clinical research data organization in order to facilitate data sharing across institutions and collaborators and ultimately to facilitate the **reproducibility of clinical trials.**

Many scientific findings cannot be easily replicated by other groups. This situation has drawn the attention of the scientific community.

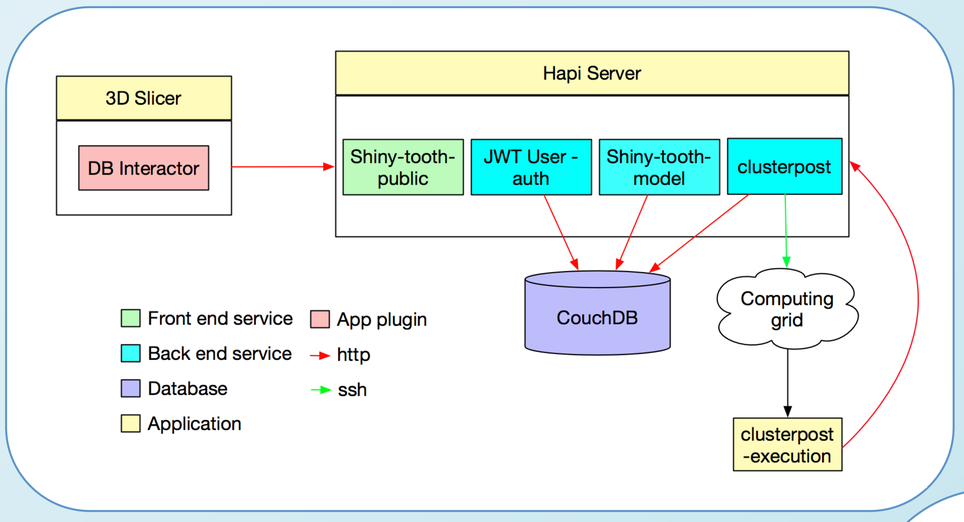


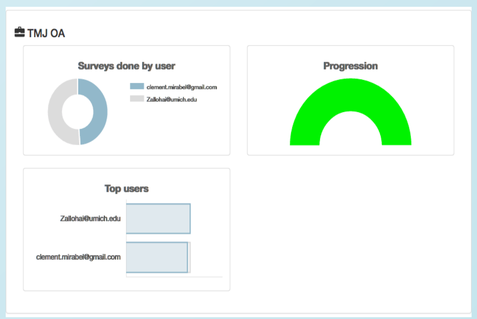
http://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970

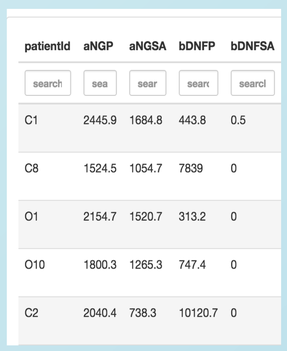
We present **Shiny-tooth**, a web based application created to facilitate:

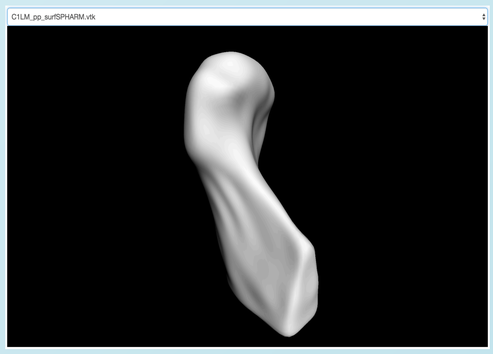
1. Data federation of clinical and morphological data derived from medical images.
2. Web interactive data visualization.
3. Statistical analysis in remote computing grids using heterogeneous data sources.
4. Interaction with one of the most popular software for medical image analysis 3D Slicer.
5. Shape analysis using ***Deep Learning toolkits***

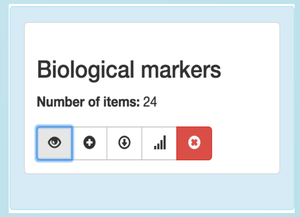
RESULTS

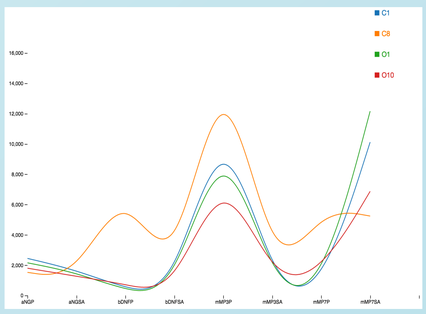


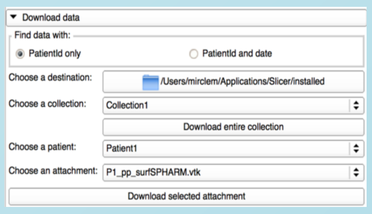












METHODS

CONCLUSIONS

The application allows gathering clinical data and morphological data in a structured but flexible manner.
Several tools and plug-ins have been published and are available in the node package manager (**npm**) repository.
An extension is developed for one of the most popular software for medical image processing and three-dimensional visualization.
The 3D-Slicer plug-in facilitates interaction with the data stored in the system.
With the tools presented here, we seek to provide new possibilities to record previous studies, facilitate data-sharing, improve experiment reproducibility and usage of deep learning toolkits.

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