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# Web-based visualization and review of longitudinal tumor mappings from medical image analysis

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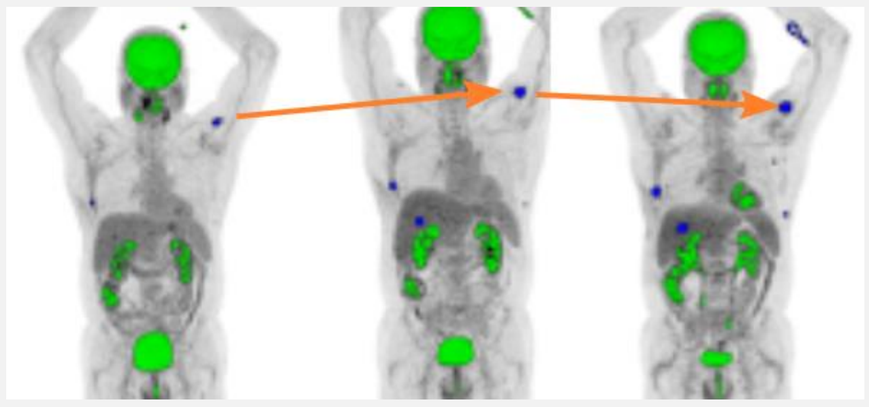
## Summary

The longitudinal tumor mapping is crucial to assess a patient's response to treatment. The goal of this work is to build a web application that allows visualization, manipulation, and persistence of the automatically constructed graphs of individual patients in order to facilitate the review and correction of longitudinal tumor mappings.

## Introduction

- **Medical imaging** plays an important role in tumor lesions detection and monitoring of treatment response. To observe the evolution of **tumor lesions** and thereby correct the treatment, the radiologist needs to compare the corresponding lesions across imaging examinations.

- To facilitate such comparison, an **automated** process of identification of the corresponding lesions over time was introduced.

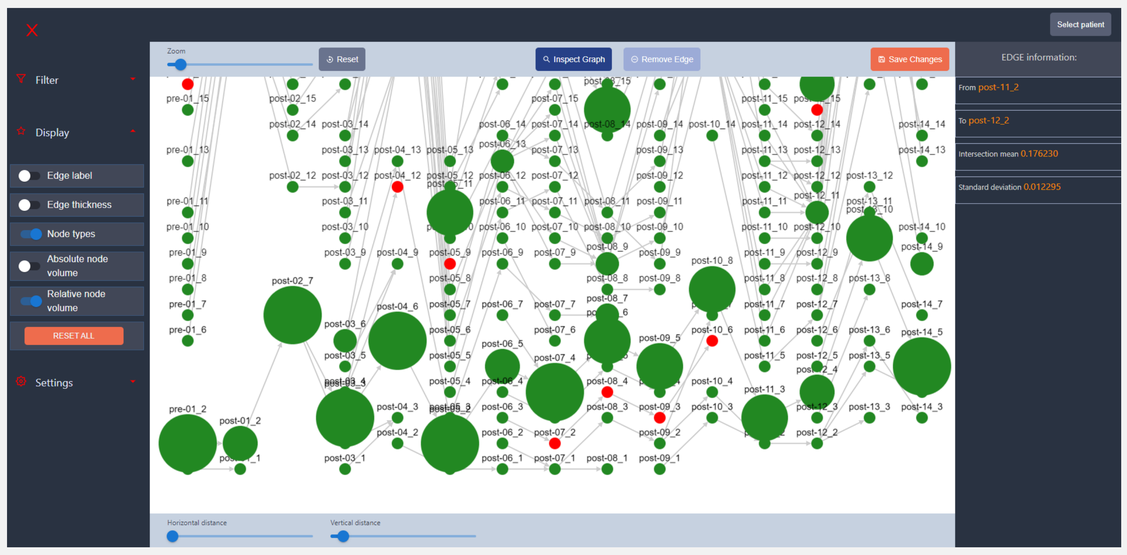


- Referred as "**longitudinal tumor mappings**", the automatically generated connections (orange) between tumor lesions (blue) must be manually reviewed and corrected in order to ensure accurate results.

- Tumor mappings are captured by a **graph structure**, where the **nodes** of the graph represent the tumor lesions, and the **edges** of the graph represent the longitudinal links between tumor lesions.

## Results

- A full stack application that allows visualization, manipulation, and persistence of the graphs.




- The developed interface allows the user to:
  - load an existing mapping graphs,
  - retrieve the information about nodes and edges,
  - apply visual and filtering settings on a graph,
  - remove the automatically generated connections between nodes,
  - save an updated graph.

## Steps

- State of the art of graph-structured data representation
- Analysis and selection of the appropriate library for the graph visualization in a web environment
- Selection of the architecture and technologies for the project
- Implementation of the application

## Technologies

Cytoscape.js

MERN

## Conclusions

- The application facilitates the review and correction of longitudinal tumor mappings to assess a patient's response to treatment.
- The results may be used for further development of the longitudinal mapping and review process.

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