DICOM Attribute Manipulation Tool: Easily Change Frame of Reference, Series Instance, and Study Instance UID

Running Title: Simple Unlink DICOM Tool

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Research data are available at <https://github.com/brianmanderson/Unzip_Unlink_Csharp>

Image data available at <https://figshare.com/articles/dataset/Data_from_An_Investigation_of_Machine_Learning_Methods_in_Delta-radiomics_Feature_Analysis/9943334>

# Abstract

Purpose: In radiation oncology, the integration and registration of multiple imaging modalities is a crucial aspect of the diagnosis and treatment planning process. Often, these images are inherently registered, a useful feature in most cases, but possibly a hindrance when manual adjustments and registration modifications are required. To break this registration requires expert knowledge of file structure or specialized software, posing challenges and potential errors in accidentally or unnecessarily changing other attributes. Barring these changes, the clinic would have to make do with imprecise registrations which add to overall treatment uncertainty.

To address these issues, we present a novel tool designed to simplify the task of changing three often edited attributes: the frame of reference, the series instance unique identifier, and the study instance unique identifier. The tool features an intuitive user interface that empowers practitioners, regardless of their expertise, to effortlessly modify these three commonly edited values.

Validation Methods: Publicly available brain MRI images (<https://figshare.com/articles/dataset/Data_from_An_Investigation_of_Machine_Learning_Methods_in_Delta-radiomics_Feature_Analysis/9943334>) were used as testing images. The ability to change the frame of reference, series instance identifier, and study instance identifier using the program was evaluated with both the RayStation treatment planning system and MIM.

Software format and usage notes: The program is written in C#, easily distributed via GitHub or Google drive and compatible with any Windows computer with .NET 4.8 (the standard as of 2023).

Potential applications: This innovation holds promise for improving the overall workflow efficiency and safety within radiation oncology and radiology, where breaking the frame of refence or changing the series/study unique identifiers is a common occurrence.