(HU) profiles in relevant positions and histograms of a 2\(\times\)2 cm area in the tongue region inside the dental arc were compared with and without (NO-MAR) the use of the MAR algorithm.

**Results:** For MAR acquisitions, CT numbers were identical in any slices without artifact compare to the NO-MAR in both cases. For the case 1, the edge of the implants are better defined (sharper gradient of HU) and the repartition of HU in central region is mean (m): 46.4, std: 60.8, range: [-134,295] in the MAR images compare to the baseline m: 26.6, std: 91.1, [-301,203]. Concerning the case 2, a better definition of the interface with the metal implant was obtained with MAR too. HU values in the central area were m: -77.1, std: 740.8, [-1000,2296] in the NO MAR image and (m: 189.7, std: 209.1, [-715,832] in the MAR one. In the slice presenting the more artifacts, these results are m: 95.1, std: 642.9, [-1000,1780] and m: 10.8, std: 258.4, [-733,546] in the NO MAR and MAR images respectively. Outside of the dental arc, profile results in a fictive parotid area are m: -88.1, std: 485.3, [-1000,1212] for the NO MAR image and m: -6.6, std: 126.7, [-587,406] with the algorithm use.

**Conclusions:** Uses of MAR algorithm improve image quality in these very difficult case were many metal implants are near one from the others. Compare to baseline, a big improvement is found when high density material is present in the image, especially inside the area encountered by the artifacts where accuracy HU is increase.

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**EP-1533**

ICE-Studio - An Interactive visual research tool for image analysis

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**Purpose/Objective:** Research projects involving image analysis are frequent in the modern radiotherapy environment, where we often have access to CT, MR and PET data for our patients. There is a lack of tools that are both complete but still flexible enough to facilitate advanced research. Therefore it is common that the image analysis is performed in a mixture between commercial softwares and for example Matlab.

The aim of this project was to develop an open software that combines the flexibility of for example Matlab, with an easy to use user interface for setup of analysis workflows. The workflows can then be applied to large cohorts of patients. It is important to note that the software can be used by researchers without any prior knowledge of programming.

**Materials and Methods:** ICE-Studio is built in the .NET framework. The interface is constructed in C#, but certain features use C/C++, such as the registration module. Actions are represented by boxes, which can be connected to form a workflow. Images are imported through a database, or from folders containing DICOM files, and results can be exported as DICOM files, Excel files or meta image format files (mhd/raw). Analysis algorithms have been implemented in MATLAB and verified to give the same results. The code is structured so that implementing a new action box for a new analysis step is easy. The developer has to define how many inputs and outputs are needed and what object types they are (e.g. images, masks, RTSTRUCTs, etc), and finally the algorithm to produce the output data given the input data.

**Results:** The software has action boxes to set up a complete Dynamic contrast-enhanced MRI (DCE-MRI) workflow, rigid and non-rigid registrations, arithmetic operations, statistical filters, creating air masks, creating masks from RTSTRUCT files, smoothing filters, edge enhancing filters and texture information. More filters are easily imported from the ITK\(^2\) filter libraries.

2 ITK: enabling reproducible research and open science. Frontiers in neuroinformatics 8(13) 1-13 (2014)

**Conclusions:** The software simplifies the setup and design of analysis workflows, which can be applied to individual or sets of patients in the database. The software will be freely accessible from www.radiotherapy.se.

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Quantitation of PET/CT registration

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**Purpose/Objective:** During last decade, Positron Emission Tomography (PET) has been widely included into radiotherapy treatment planning due to the possibility of incorporating metabolic information when defining the Gross Tumour Volume (GTV) in the computed tomography (CT). The proper definition of GTV is directly related to the accuracy of the registration of the different imaging techniques used in the treatment planning process. As part of the quality control of PET/CT registration, IAEA Publication 1393 recommends a visual analysis of the centres of the spheres of IEC Body Phantom for PET and CT images. Instead of this subjective method, we propose a new way to