Cinebot: Efficient Creation of Movies and Animated Gifs for Presentation and Education Directly from PACS

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Background/Problem Being Solved

Radiology education and presentations are enhanced by dynamic rather than static images as this better recreates real-world interpretation and gives a more robust appreciation of the case. Additionally, anonymized dynamic images can be shared as interesting cases in formats that are scrollable on a computer or mobile device. Typically it has been challenging to create movies or animated gifs because of technology obstacles in converting Digital Imaging and Communications in Medicine (DICOM) or concerns regarding protected health information (PHI). We have solved this problem by creating a simple one-click method to generate an anonymized dynamic movie or animated gif across all modalities including stacked and cine image formats.

Interventions

We integrated a custom Javascript plugin into our Picture Archiving and Communication System (PACS) that allows a user to request a movie by right clicking on any radiology image (Figure 1).
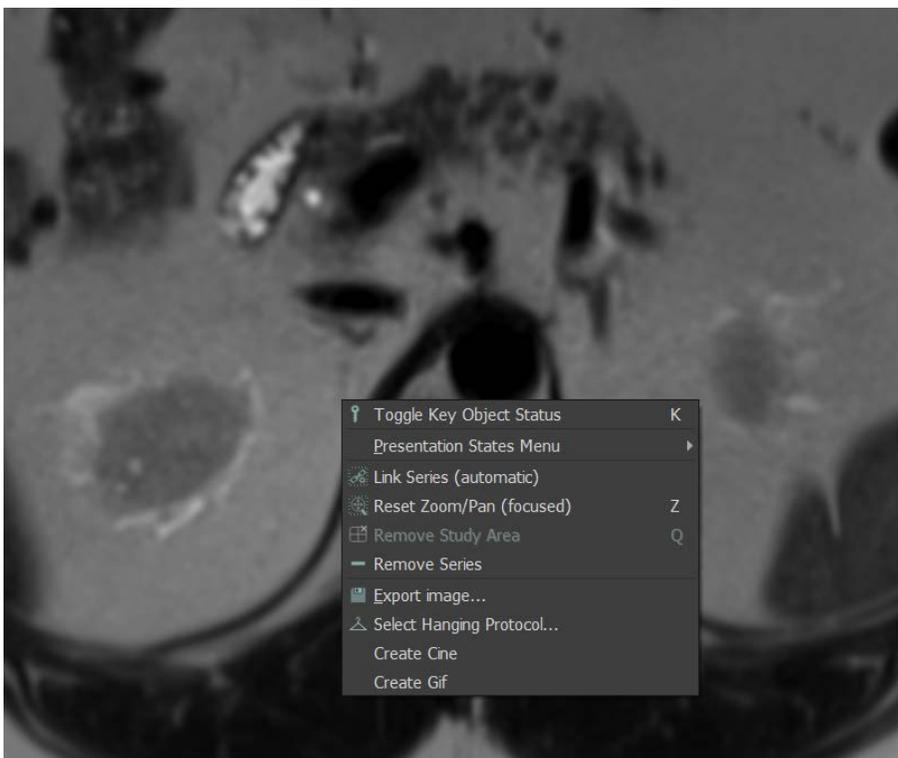
Figure 1: Right click context menu allows creation of a cine or gif from any study in PACS.

Pertinent context information such as user, study type, and Service Object Pair (SOP) Unique Identifier (UID) is posted to our operational server for processing. We then use the dcm4che (dcm4che.org) toolkit to find and retrieve the study from our DICOM archive. For 2D+ stacked imaging such as computed tomography (CT) the series of interest is filtered, for ultrasound the pertinent image including cine frames is selected, and for multi-phase exams such as multi-parametric magnetic resonance imaging (MRI), the acquisition phase of interest is acquired. Paperwork, secondary captures, and images with atypical burned in annotations are excluded. For each image in the series, cine, or acquisition the pixel data is extracted again using the dcm4che toolkit. Ultrasound images are cropped using the ImageMagick library based on coordinates contained in the Sequence of Ultrasound Regions [0018,6011] DICOM tag to exclude burned in patient information. Finally images are compiled into mp4 or gif format using the avconv library and emailed internally to the requesting user for a final check to ensure PHI is excluded before presentation or sharing.

Outcome
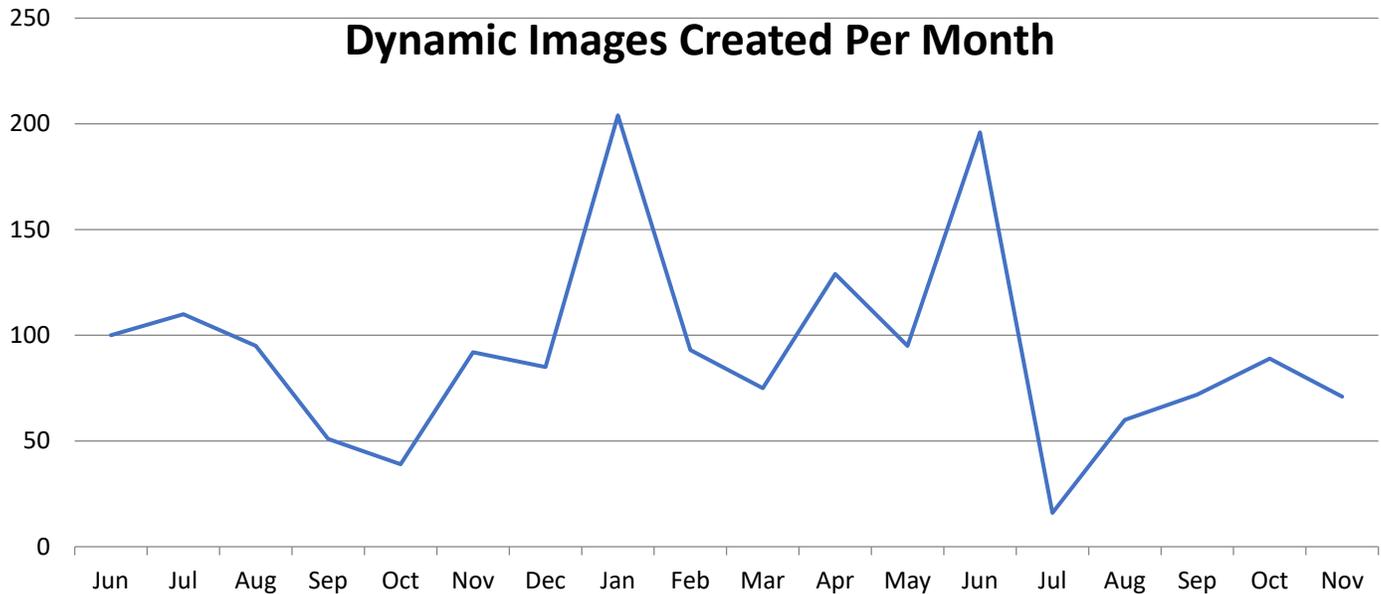Since June, 2017, 47 users have created 1675 dynamic images (range 1-396) from 579 exams (Figure 2).

Figure 2: Number of cines or gifs created per month since June, 2017.

As expected, many of the images are created from cross-sectional imaging but most come from angiography largely because these are used for the weekly section conference (Figure 3). Our usage data have also proven an excellent source of interesting cases of which a select few will be presented.
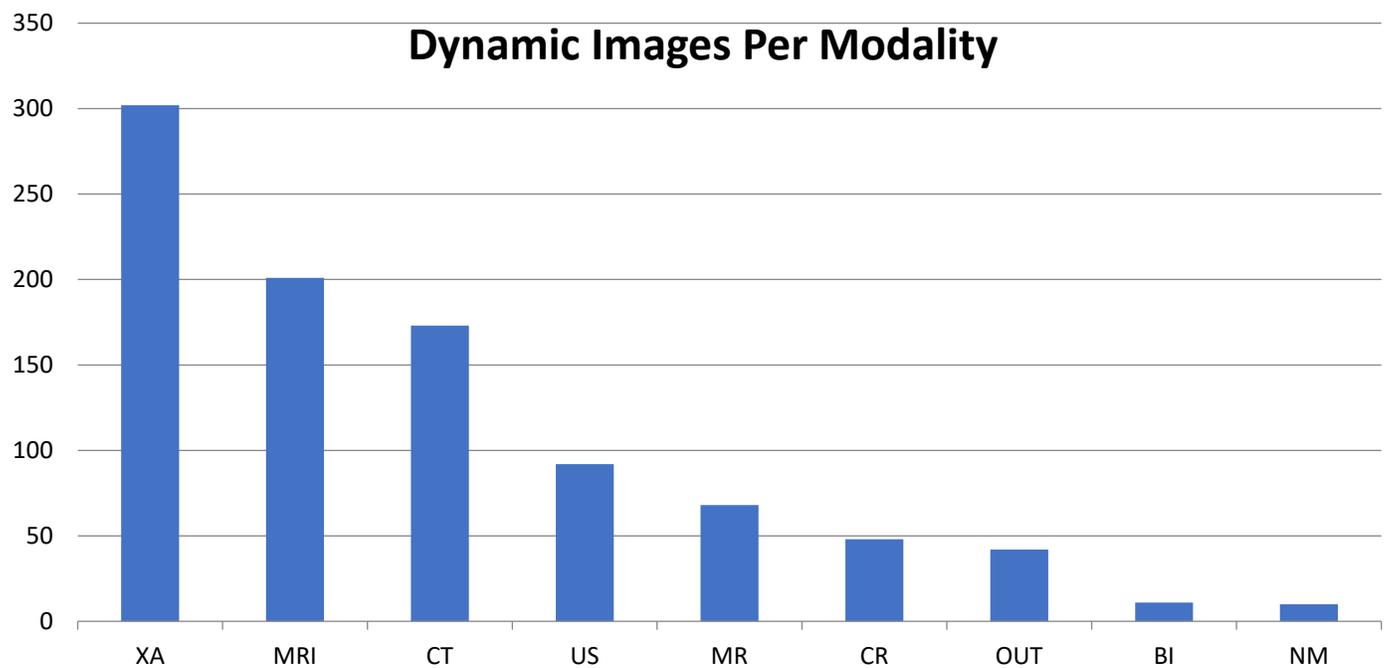
Dynamic Images Per Modality

Figure 3: Number of cines or gifs created in each modality.

Conclusion

We have built a simple, easy-to-use, but robust mechanism to create dynamic images suitable for presentation, teaching, and sharing. This tool has been enthusiastically received at our institution and has facilitated teaching and case presentation both for internal and external purposes.

Statement of Impact

Cinebot has substantially lowered the barrier to creating dynamic images within our institution and has catalyzed teaching, presentation, and sharing of interesting cases.

Keywords

education, presentation, movie, gif, cine