EVALUATION OF A DE-IDENTIFICATION PROCESS FOR OCULAR IMAGING

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ABSTRACT

Medical privacy of NASA astronauts requires an organized and comprehensive approach when data are being made available outside NASA systems. A combination of factors, including the uniquely small patient population, the extensive medical testing done on these individuals, and the relative cultural popularity of the astronauts puts them at a far greater risk to potential exposure of personal information than the general public. Therefore, care must be taken to ensure that the astronauts' identities are concealed.

Magnetic Resonance Imaging (MRI) medical data is a recent source of interest to researchers concerned with the development of Visual Impairment due to Intracranial Pressure (VIIP) in the astronaut population. Each vision MRI scan of an astronaut includes 176 separate sagittal images that are saved as an "image series" for clinical use. In addition to the medical information these image sets provide, they also inherently contain a substantial amount of non-medical personally identifiable information (PII) such as-name, date of birth, and date of exam. We have shown that an image set of this type can be rendered, using free software, to give an accurate representation of the patient's face. This currently restricts NASA from dispensing MRI data to researchers in a de-identified format.

Automated software programs, such as the *Brain Extraction Tool*, are available to researchers who wish to de-identify MRI sagittal brain images by "erasing" identifying characteristics such as the nose and jaw on the image sets [1]. However, this software is not useful to NASA for vision research because it removes the portion of the images around the eye orbits, which is the main area of interest to researchers studying the VIIP syndrome.

The Lifetime Surveillance of Astronaut Health program has resolved this issue by developing a protocol to de-identify MRI sagittal brain images using *Showcase Premier*, a DICOM (Digital Imaging and Communications in Medicine) software package. The software allows manual editing of one image from a patient's image set to be automatically applied to the entire image series. This new approach would allow a new level of access to untapped medical imaging data relating to VIIP that can be utilized by researchers while protecting the privacy of the astronauts. In the next step toward finalizing this technique, NASA clinical radiology consultants will test the images to verify removal of all metadata and PII.

REFERENCES

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