



HEALTHCARE CASE STUDY

BigRio Success Stories

BIGRIO
EMPOWERING DATA

**Digitizing archived X-Ray films
and developing AI Computer
Vision technology for study by the
scientific and research community.**

CLIENT OVERVIEW

A US Government Department in the Healthcare Industry segment.

THE CHALLENGE

The agency has archived thousands of X-ray films it wishes to make available online for scientific research by the public. To enable access, films need to be digitized, custom applications need to be created, and AI Computer Vision technology needs to be applied to remove PII (Personally Identifiable Information) from the digital images.

The custom web application has a public-facing portion from which researchers can get sample size information, but not the actual image or patient data. Another private portion is used only inside secure facilities for processing user requests, and designing of a research material packet.



THE SOLUTION

BigRio used industry standard quality X-ray digitization process to create DICOM (Digital Imaging and Communications in Medicine) images from archived films while meeting stringent NARA (National Archives and Records Administration) quality standards and maintaining high confidentiality requirements. Also, BigRio created a process by which scholars can qualify the image sample size and request access to them in a study proposal. We had three key steps included in our approach.

1. SECURE SCANNING FACILITY

Regulatory compliance is key in how the protected information is handled. The film scanning needs to occur in a secure facility, monitored around the clock. The digital scanner is FDA, ISO 13485:2016, and ESD S20.20-2014 certified to meet quality requirements set by the American College of Radiology and National Archive and Records Administration. All computer equipment has its internet connectivity cut off during operations. Even the server unit running the AI software is standalone.

2. COMPUTER VISION AI FOR PII REMOVAL

To achieve the maximum level of privacy protection, the client requested that we use the latest computer vision technology to automatically detect and mask textual information on the X-ray images that are considered confidential. These include case ID, study date, etc. We are applying a two-step process that first detects textual regions on each image, then categorizes the text information and only applies masking to the protected category. Markings such as L and R, which indicates the side of the body are to remain.

3. PUBLIC AND PRIVATE FACING APPLICATIONS

The software application, although seemingly a simple database retrieval function, has an unusual requirement that stored information can change in its metadata. This is due to the fact there are potentially an extremely large number of patient attributes that will be opened up to the research community, and the decision to release them can fluctuate unexpectedly. We designed a process where the client can implement database schema changes by themselves post-deployment.

IMPACT AND BENEFITS



A STREAMLINED PROCESS FOR RELEASING A TREASURE TROVE OF RESEARCH MATERIAL WHILE MAINTAINING MAXIMUM PATIENT PRIVACY.

The Department collected a large volume of patient data including X-ray films, diagnostic reports, patient attributes, and survey records, that represent a valuable source of information for population studies. These data cannot be used to their maximum potential without an effective means of dissemination. Patient privacy concerns remain a significant bottleneck in providing efficient access. Without a guaranteed method for delivering the data in a secure manner while maintaining the highest image quality, these valuable resources provide no benefit to the research community.

With the film scanning, application workflow, and AI automation, we demonstrated that we have a production process that can, over many project phases, slowly release the entire archive of research material, maintaining high quality, operational flexibility, and remaining strictly compliant with privacy regulations. The AI-driven PII removal from the X-ray images also allows the agency to more freely make them available to interested researchers.

To learn more about how BigRio can help you drive health investment decisions and unlock value, visit www.bigr.io