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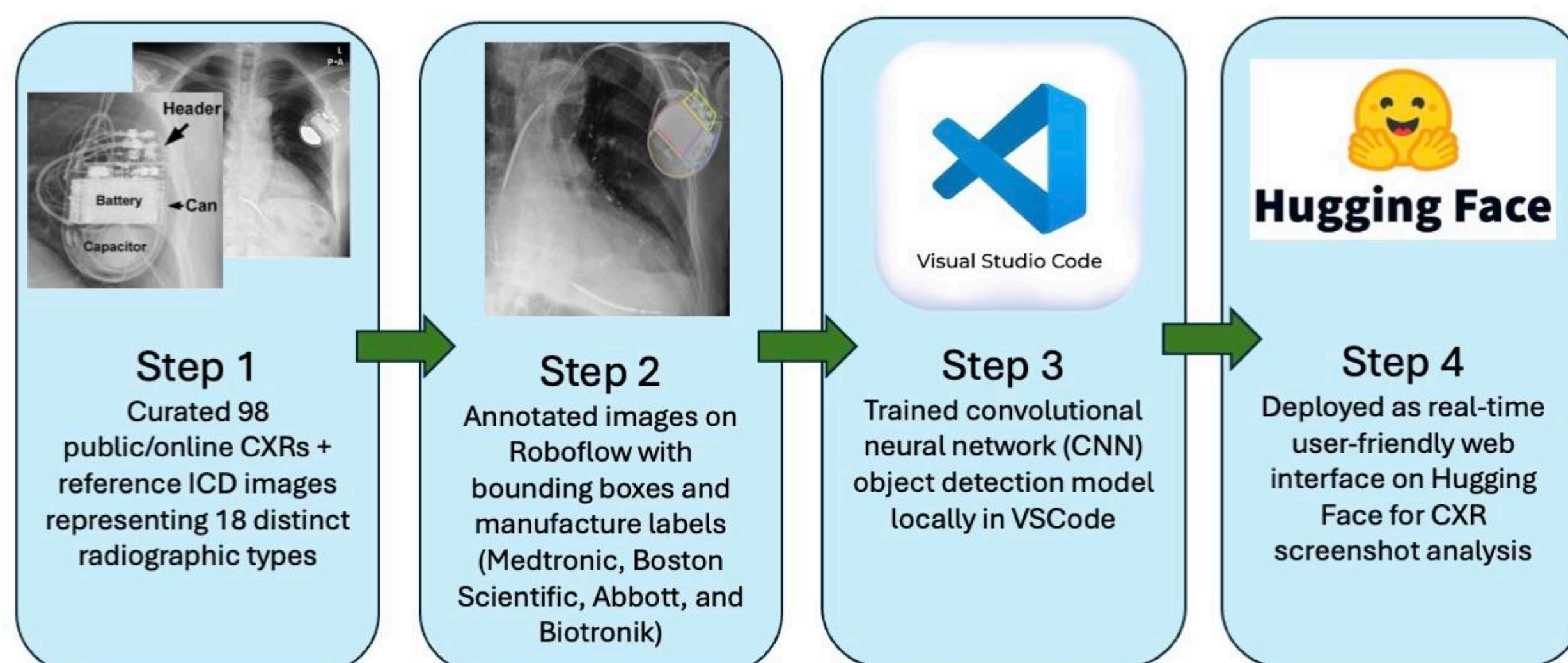
Background

- Pre-MRI safety screening in ICD patients requires accurate manufacturer identification due to varying MRI compatibility.
- Manual chest X-ray (CXR) review is time-consuming and error-prone.
- Developed a publicly accessible AI web application for automated ICD detection and manufacturer classification (Medtronic, Boston Scientific, Abbott, Biotronik) from routine CXRs or screenshots.
- Lays the foundation for direct device-specific MRI-conditional guidance from manufacturer resources

Methods

A convolutional neural network (CNN) object detection model was developed and deployed as a user-friendly web application for automated ICD detection and manufacturer classification from routine chest X-rays or screenshots. The development process is summarized in the pipeline below:

Figure 1. Methods Pipeline



Conclusion

This proof-of-concept AI web application provides rapid and accurate ICD manufacturer classification directly from routine chest X-rays or screenshots. It effectively addresses a critical pre-MRI safety bottleneck by reducing reliance on time-consuming manual review, potentially decreasing errors and delays for radiologists and MRI technologists.

Future work

- Expand the dataset with more device variants
- Add automated MRI-conditional safety summaries with direct manufacturer links
- Perform multi-institutional validation
- Enable PACS system integration

The tool is publicly available now at: <https://huggingface.co/spaces/keola1001/ICD-Detector>

Results

- On a held-out test set of 20 additional online-sourced CXRs (representing all four manufacturers and not used in training), the model achieved 82–95%+ correct manufacturer classification with high confidence scores ($\geq 94\%$).
- Excellent discrimination against pacemakers (low confidence 33–65% or “No ICD detected”).
- Inference time: 5-10 seconds per image on the live Hugging Face web app.
- Results demonstrate strong robustness on a curated, limited dataset of key radiographic variants.

Figure 2. Annotated CXR Examples - AI Model Output

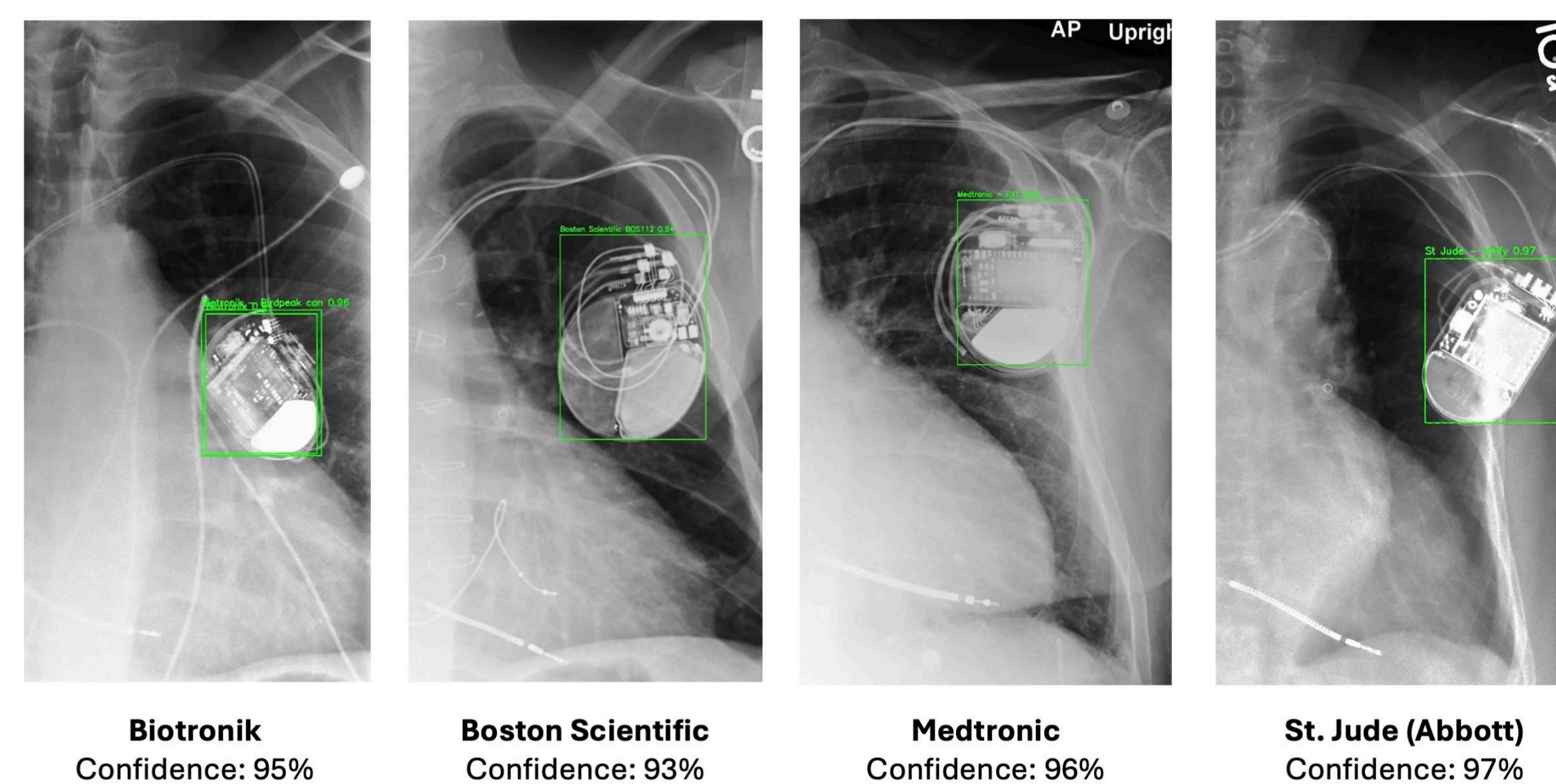


Figure 4. Web App Screenshots

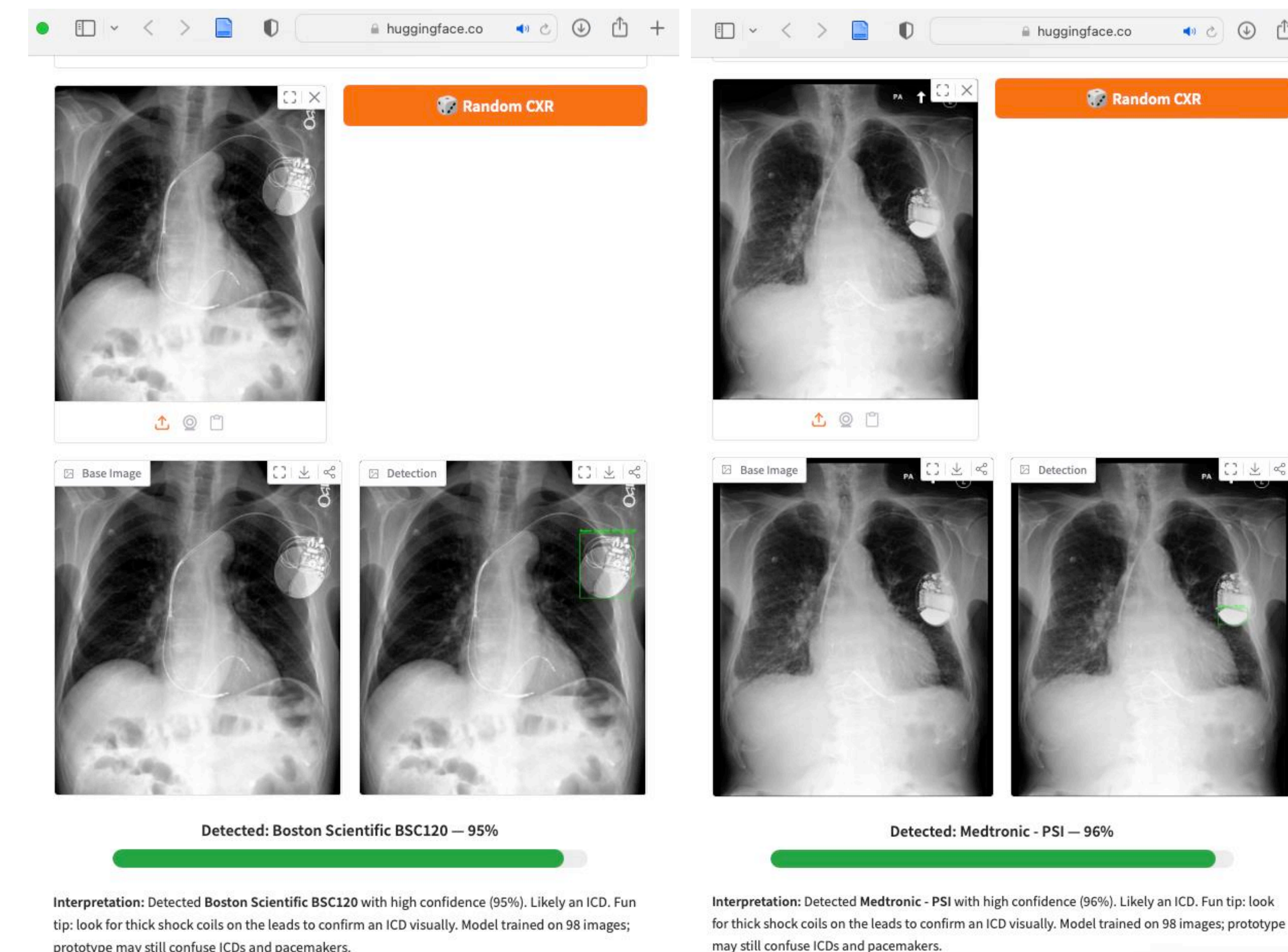


Figure 3. Visual Differentiation of ICD Models

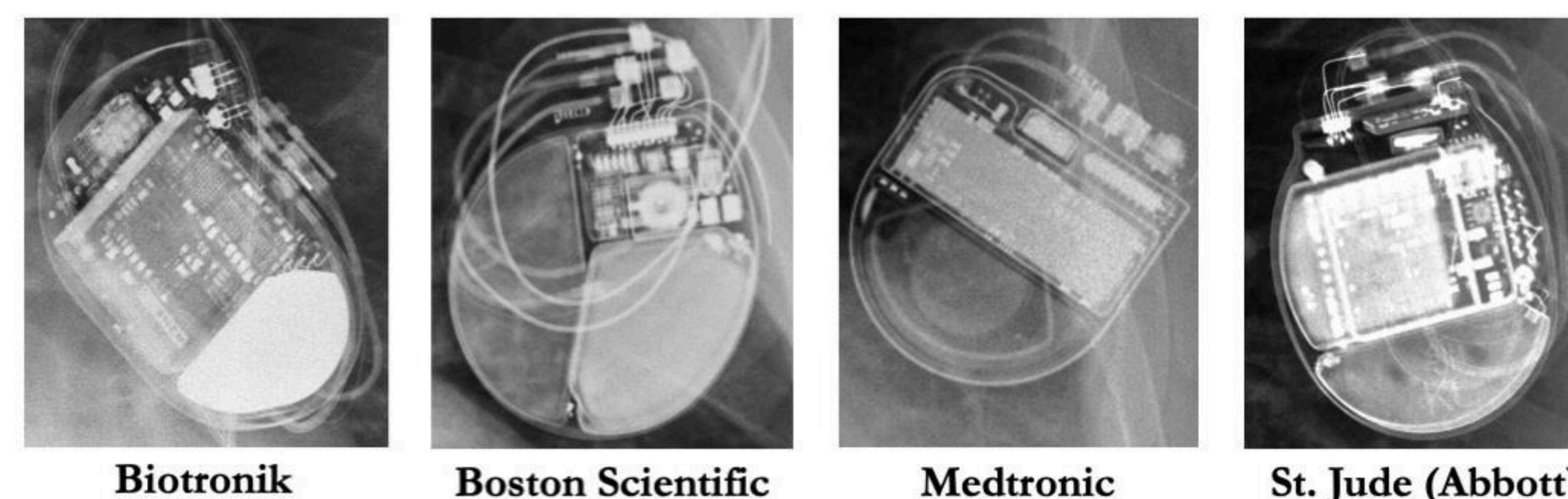


Figure 5. Model Performance Metrics

