

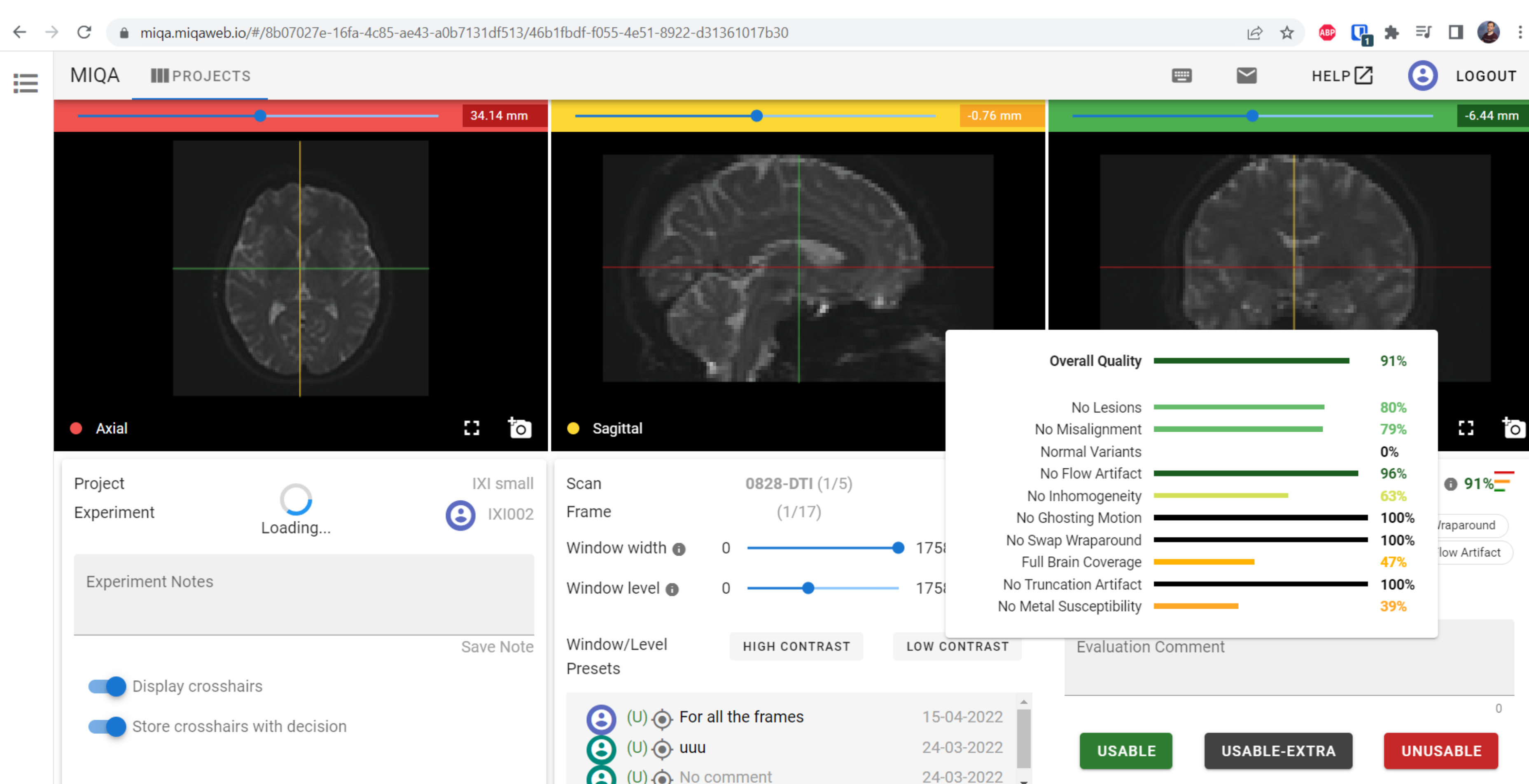
Medical Image Quality Assurance using Deep Learning

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Need: Large multi-center imaging studies -> New knowledge. **Important:** quality!

MIQA: client-server web app

- Data management
- Interactive visualization
- Multi-site support
- User roles
- Keyboard shortcuts
- AI quality results
- Handles 4D MRIs
- Many other features



Training data: PREDICT-HD study from 2014
5217 T₁ MRIs (392 lowQ), labeled with:
Overall quality + 10 binary indicators (artifacts)

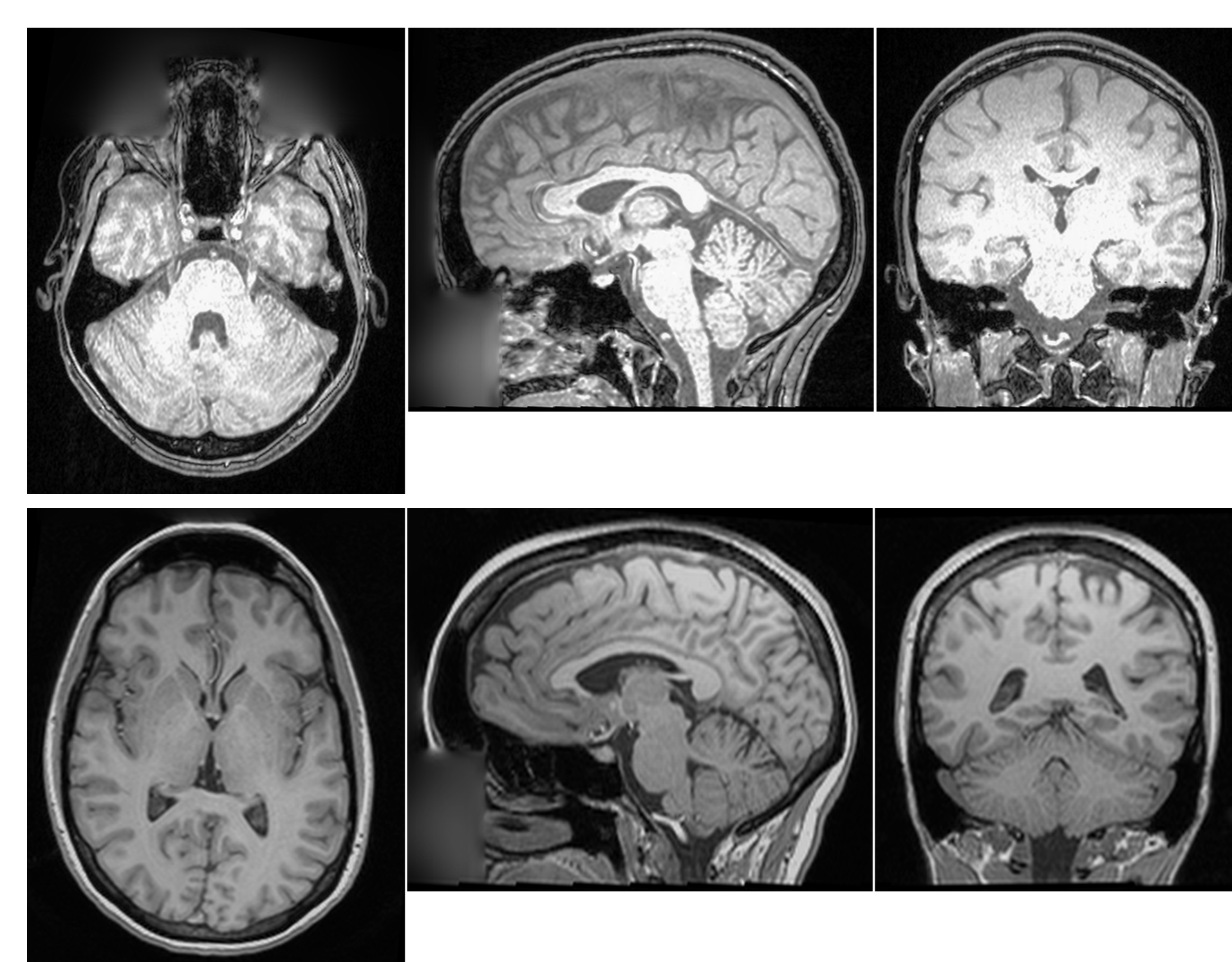
Neural network: Tiles 64³, 5 Conv. + 1FC layer
- Loss: regress to quality + focal loss for 10 ind.
- Quality class imbalance -> Augmentation!

Results: 5-fold cross validation

Validation R²: 0.33, 0.27, 0.33, 0.24 and 0.14

c Training R²: 0.65, 0.57, 0.64, 0.54 and 0.67

Low R² in training -> inconsistent ground truth



Top: overall 8, no artifacts

Bottom: overall 6 with flow, truncation and inhomogeneity

Source code: github.com/OpenImaging/miqa Demo: <https://miqa.miqaweb.io>

Funding sources: