# Medical Image Quality Assurance using Deep Learning

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

MIQA: Medical Image Quality Assurance

- Client-server web app
- Data management
- Interactive visualization
- Multi-site support
- User roles
- Keyboard shortcuts
- AI quality results
- Handles 4D MRIs
- Many other features ...
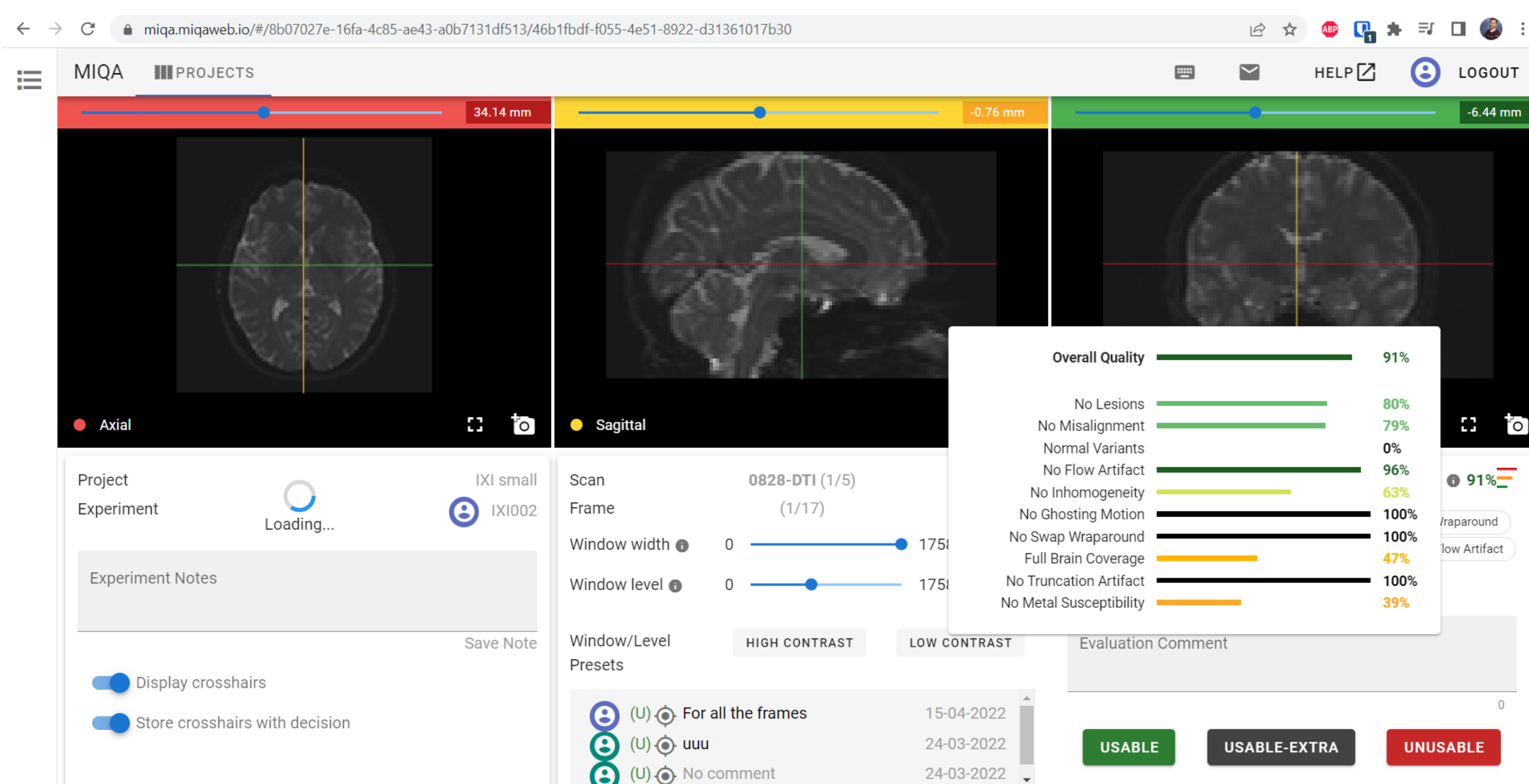
Training data: PREDICT-HD study from 2014
5217 T_1 MRIs (392 low overallQA), labeled with:
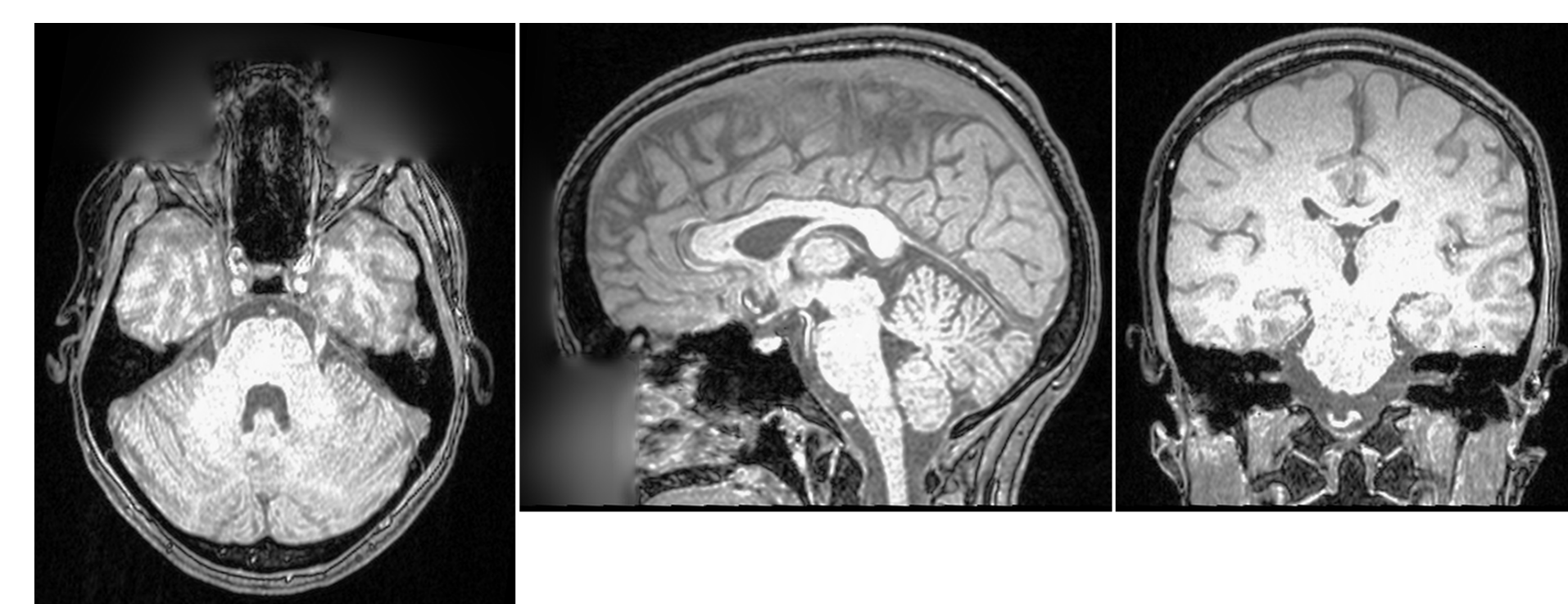Overall quality + 10 binary indicators (artifacts)

Neural network: Tiles 64^3, 5 Conv. + 1FC layer
- Loss: regress to quality + focal loss for 10 ind.
- Quality class imbalance -> Augmentation!

Results: 5-fold cross validation
Validation R^2: 0.33, 0.27, 0.33, 0.24 and 0.14
c Training R^2: 0.65, 0.57, 0.64, 0.54 and 0.67
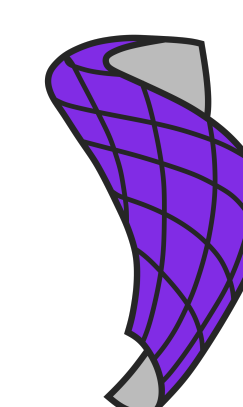Low R2 in training -> inconsistent ground truth

OveralQA: 8/10, no artifacts

OverallQA: 6/10 with flow,
truncation and inhomogeneity

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

Being used by: