AI-enabled imaging acquisition, image transformation, and dose reduction

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Radiology Value Chain

Scanner

Image Acquisition

Enhancement & Visualization

Analytics

Majority of cost of imaging

Can improve patient experience

Create new contrasts

Source of data for classification algorithms

Diagnosis

Treatment
Improved MRI

- **High SNR ASL**: 8 min
- **Low SNR ASL**: 2 min
- **T2 weighted**
- **Proton density**
- **Synthetic ASL**: 2 min

- **RSME 29%**: Error map vs High SNR
- **RSME 10%**

**4-fold time reduction**
**3-fold RSME improvement**

_Gong, Pauly, Zaharchuk/Stanford/Proc ISMRM 2017_
Amyloid Imaging for Alzheimer’s Disease

AI enables 100x radiation reduction

K Chen et al., Radiology 2018
Zero-dose FDG Imaging

T1+c  T2-FLAIR  ASL  FDG  Deep Learning

Ouyang, Zaharchuk/Stanford
Treatment-specific Biomarker Predictions

- Train models for separate treatments
- Apply each to new patient
- Response to treatment at individual level
- Select those most likely to respond?
- Not limited to stroke 😊
Value of Predicting Images with AI

• Lots of "hidden" information in current imaging
• Change to change assumptions
  – Cost, speed, dose, safety
• Models trained to predict future imaging can be used for personalized treatment