

# Normalization of Prostate MRIs using Conditional Generative Adversarial Networks for Cancer Detection

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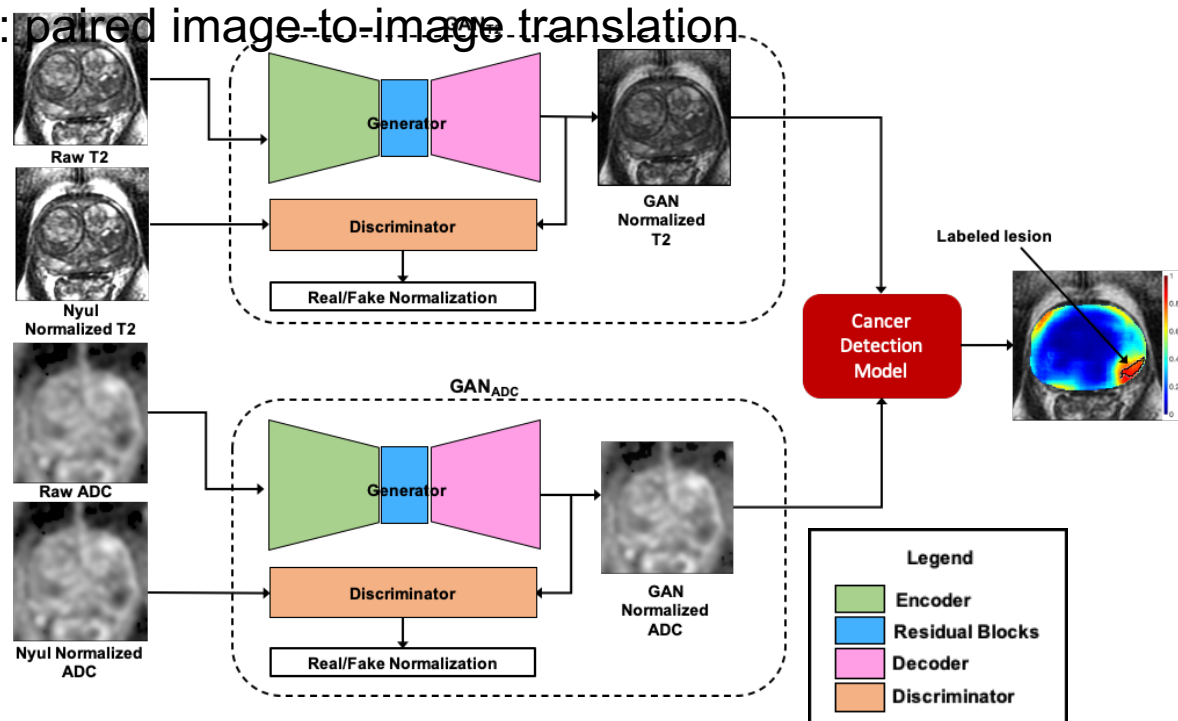


# Introduction and Significance

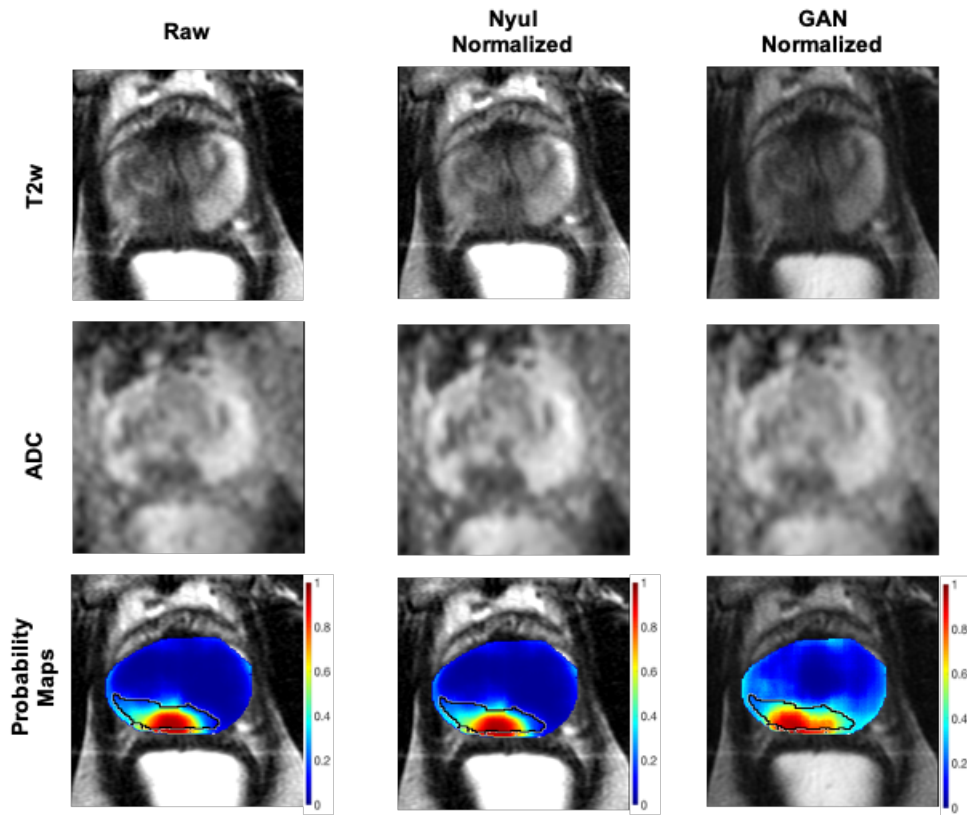
- **Problem:**
  - Non-uniformity of MRI intensity distribution challenging for computational tasks
  - Limitations of current statistical normalization approaches:
    - May require additional inputs
    - Multiple models needed for different institutions
- **Previous Work:**
  - GANs used to normalize intensities on MRI
- **Novel Contribution:**
  - We present a conditional GAN for MRI intensity normalization to aid deep learning detection of clinically significant cancer on prostate MRI

# Experimental Design

- Dataset:
  - Pre-operative mpMRI: T2 and Apparent Diffusion Coefficient (ADC)
  - Patients who underwent radical prostatectomy (n=102) or biopsy (n=338)
- Conditional GAN: paired image-to-image translation



# Results & Conclusions



Patient-level quantitative evaluation of the cancer detection model trained on T2w and ADC MRIs with no normalization, nyul normalization, and GAN normalization.

| HED Model           | AUC                               | Accuracy                          |
|---------------------|-----------------------------------|-----------------------------------|
| HED <sub>Raw</sub>  | $0.69 \pm 0.15$                   | $0.82 \pm 0.12$                   |
| HED <sub>Nyúl</sub> | <b><math>0.70 \pm 0.13</math></b> | $0.88 \pm 0.04$                   |
| HED <sub>GAN</sub>  | $0.68 \pm 0.13$                   | <b><math>0.89 \pm 0.06</math></b> |