1145-68-2375   **Giulia Isabella Pintea*** (`pintea@simmons.edu`), 54 Pilgrim Road, Boston, MA 02215, and **Daniel J Olszewski**, **Zhijian Yang** and **Chujun He**. *Using Quality-of-Life Scores to Guide Prostate Radiation Therapy Dosing.*

Since prostate cancer patients have high survival rates, an important factor in treatment is to avoid degradation in quality-of-life during and after treatment. The connection between the radiation a patient receives and his reported side effects has not been quantitatively analyzed. We use deep learning algorithms and statistical models to explore this relationship. We use interpolation methods to generate more data in order to leverage transfer learning. Using augmented data, we train a convolutional autoencoder network to obtain near-optimal starting points for weights of our final convolutional neural network (CNN). Our CNN analyzes the relationship between patient-reported quality-of-life and radiation dosage in the bladder and rectum. We also use analysis of variance and logistic regression to explore organ sensitivity to radiation and develop dosage thresholds for each organ region. Our findings show a connection between rectal radiation dosage and changes in quality-of-life. We identify regions of both the bladder and rectum that are highly correlated with changes in individual patient symptoms. Finally, we estimate radiation therapy dosage thresholds for the rectum to determine how high radiation therapy dosage needs to be in order to trigger collateral symptoms. (Received September 25, 2018)

1