INTRODUCTION AND MOTIVATION
- Medical segmentation is used to automatically isolate a region of interest in a scan.
- Deep learning (DL) can be used in healthcare settings to more efficiently and accurately analyze magnetic resonance imaging (MRI) through medical segmentation.
- Objective: Use a DL algorithm to segment pelvic MRIs and generate 3D models of bones to better visualize the human body and aid radiologists.

METHODS
- Given an MRI scan of pelvic area, we trained a DL model to automatically assign each pixel of the scan to one of the 5 classes.

RESULTS: SEMANTIC SEGMENTATION
- DeepLabV3 achieves higher dice score for femur, spine, and sacrum segmentations. U-Net trains faster.

RESULTS: WEB APP
- Developed a website where the user can input a 3D pelvic MRI scan and choose a bone. The developed machine learning algorithm segments the specified bone and outputs a 3D interactive model.
- The loading time, including the inference and 3D model, is about 20-30 seconds.

RESULTS: 3D MODELING AND VISUALIZATION
- The semantic segmentation outputs multiple slices of 2D segmented masks for each slice of the scan.
- The goal of 3D modeling is to turn this stack of 2D masks into a volumetric 3D bone model. The Marching Cubes algorithm was used.

CONCLUSION AND FUTURE RESEARCH
- Developed a website that performs segmentation and 3D modeling to output an interactive 3D bone model given a 3D pelvic MRI scan.
- For semantic segmentation, several 2D deep learning models are applied. For 3D modeling, marching cubes algorithm is applied.
- The 3D model is outputted to the website using the Plotly package.
- Future Plans: Continue developing both the frontend and the backend of the website with a goal of deploying it to the public.

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- Scan the QR code on the right to access the references page.