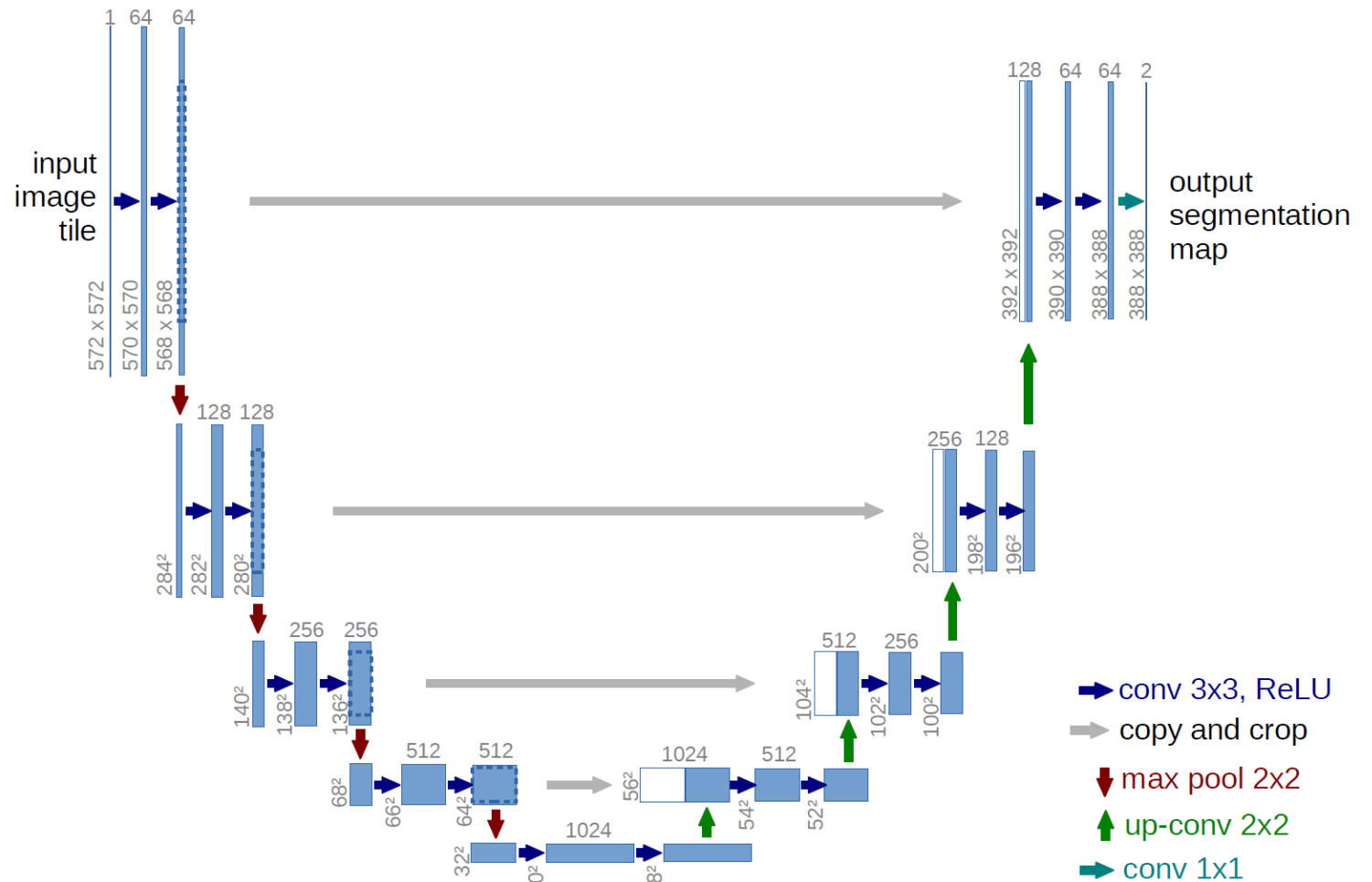


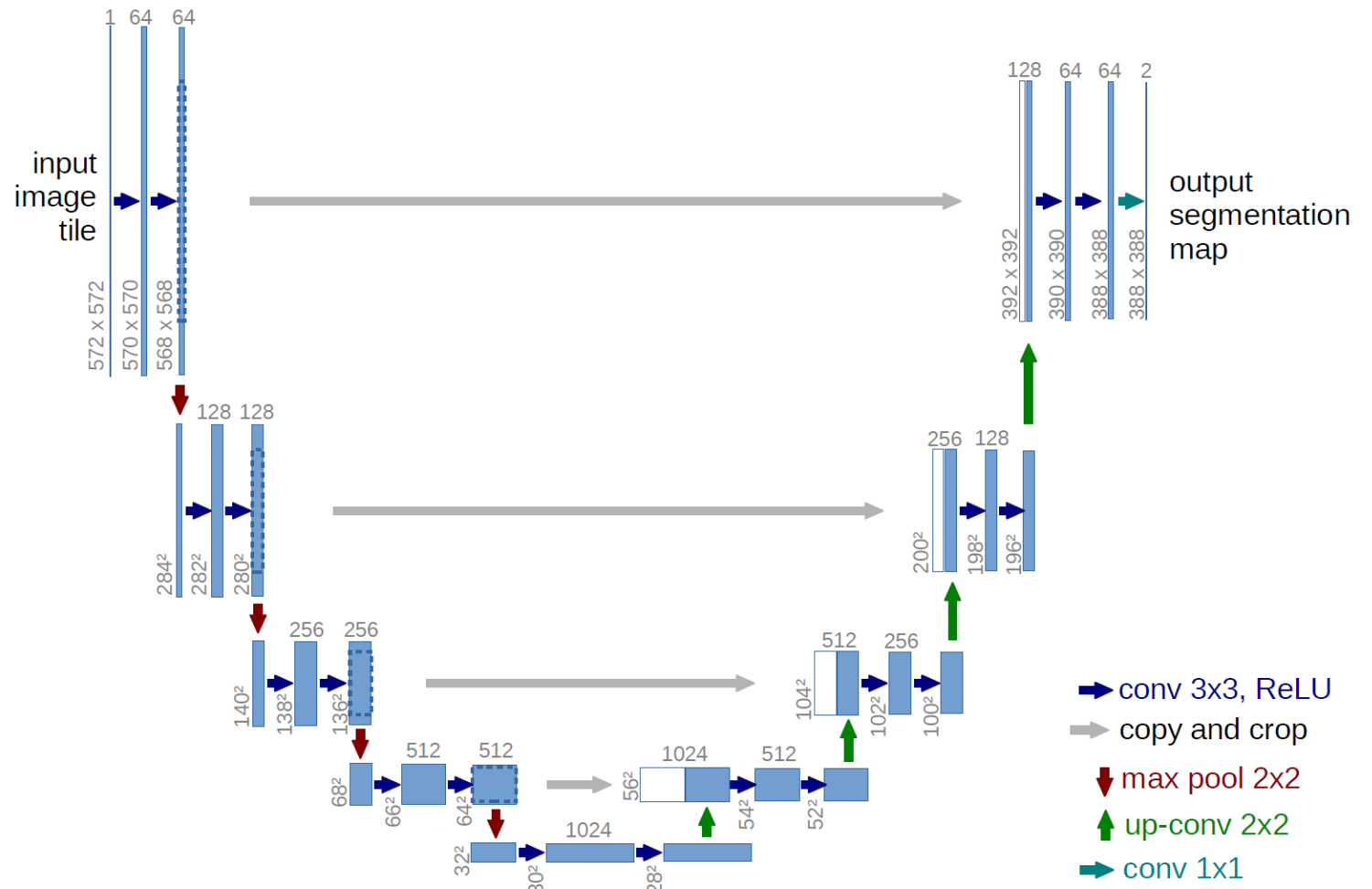
What is U-Net?

- U-Net is a fully convolutional network (FCN) that does image segmentation. Its goal is to predict each pixel's class.
- U-Net is modified from FCNs in a way where segmentation is more accurate, especially in medical imaging.



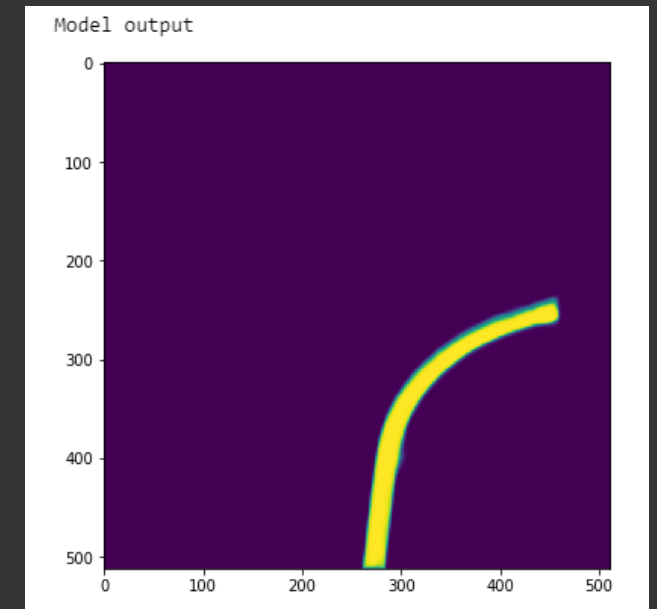
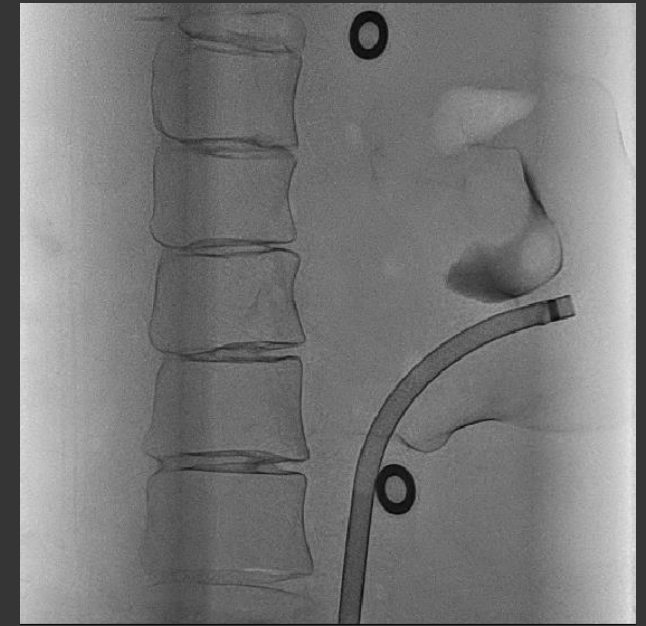
How does it work?

- 3 Components:
 - Downsampling
 - Bottleneck
 - Upsampling
- U-Net essentially doubles the feature channels during each convolution during downsampling, and upsamples back to a segmented image.
- The correlations from the feature channels are copied over to upsampling.



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Advantages of U-Net



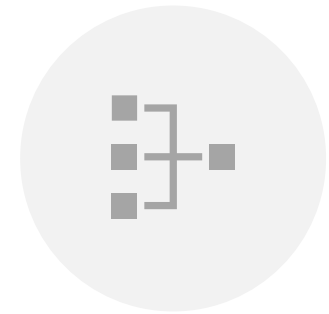
FACTORS CORRELATIONS BETWEEN
PIXELS, GIVING THE SEGMENTATION
PROCESS A SENSE OF LOCALIZATION &
CONTEXT.



PREFERRED METHOD FOR BIO-
MEDICAL APPLICATIONS

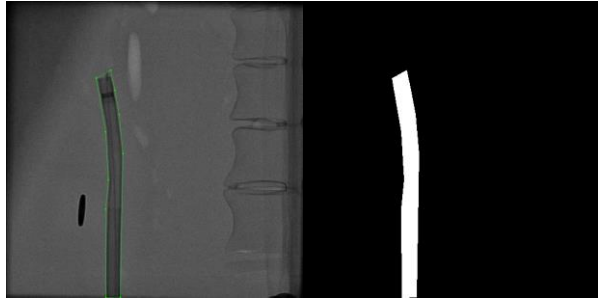


TRAINED END-TO-END

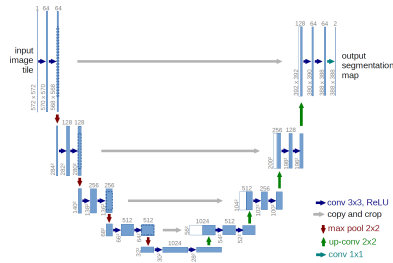


TRAINABLE WITH A SMALL DATASET

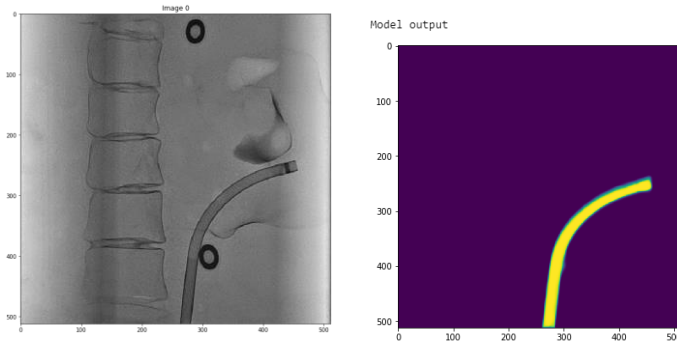
Methodology: Catheter Detection



- Label Dataset and Create Masks of Pictures



- Train Dataset on U-Net



- Model Output (visual and model file)

Uses of the Model File

- GUI that reads in videos detect catheters
- Sync positions of detected pixels to cartesian coordinates in AR applications