



AUTOMATIC MEDICAL ROBOT ARM IMAGES RETRIEVAL AND CLASSIFICATION

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URL for our dataset: <https://drive.google.com/open?id=1pVS4dt97Qay8zQ-9qKp9Ke7Z5qscUhwL>



Automatic Medical Robot Arm Images Retrieval and Classification

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I. PURPOSE

Our project is mainly focus on crawling pictures of specific medical machine arm, and we can classify them with retrieved information (e.g. the classes of arms, the bounding boxes of arms, and area of arms) and filter the pictures download from the Internet which contains the specific medical machine arm.

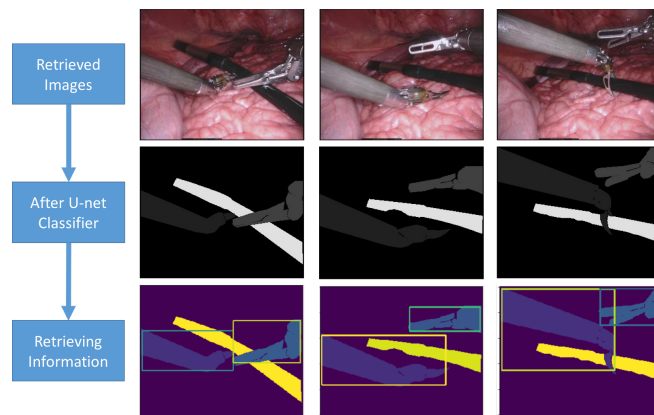


Fig. 1. The Schematic of workflow

II. USAGE

Basically, If you want to search specific medical machine arm on one website, you can just provide the address of the website, and provide a path to save the image you want. Our program will filter the pictures on the website and find those which contains the specific medical machine arm. Now, we can helps find machine arms for Bipolar_Forceps,

Prograsp_Forceps , Large_Needle_Driver, to Vessel_Sealer, Grasping_Retractor, Monopolar_Curved_Scissors and other. You can just write “python getres.py --url website” to start. Please refer the README file to have more details of usage instruction of this program.

III. ACHIEVEMENTS

1. We can crawl pictures online by providing specific website address
2. We can classify several medical machine arm and recognize them and locate them on the pictures, just like Figure 1.
3. We can filter the pictures download from the website and save related pictures to local directory

IV. STRENGTHS

Our project can help recognize the medical robot arm in the picture. It have much potential in the medical surgery area. Thinking about doctors manipulating the surgery, we can just recognize the location of the medical machine arm and analyze the correctness of the behaviors. Also in the field of education, If we want to search related medical machine arms, we can quickly find the picture of them and find out how they are used in the surgery.

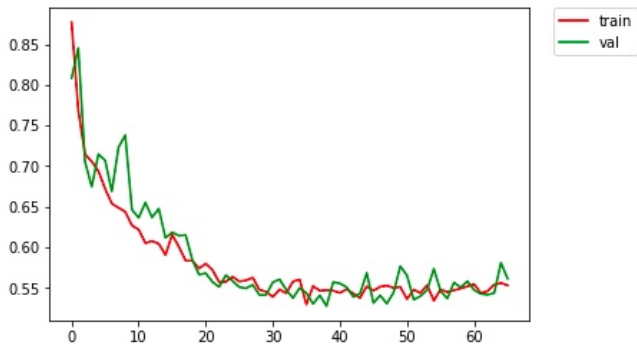


Fig. 2. The dice loss of training U-net

V. EVALUATION

In the process of recognition and locating, our project can precisely recognize every different medical robot arm in the picture and locate the bounding box of those arms just like in Fig. 1. After testing our program, our recognition accuracy is around 91% and the accuracy of locating precisely is around 85%. Fig. 2. shows the train and val loss of U-net in first 60 epoches.

VI. FUTURE WORK

There are some limitations of our program. At now, we can just locate the robot arm which only appear once. It may make mistakes when locating multiple same kind robot arm appear in one picture.