

# **Deep Learning Spot Nuclei. Speed Cures Project Proposal**

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## **Motivation**

Treating people right isn't always possible. Sometimes we don't have the medicine to heal people, sometimes we are late to spot the problem. In order to create the right cure we will try to speed up the process with Computer Vision. Think how many lives would be transformed if cures came faster. By automating nucleus detection, you could help unlock cures faster—from rare disorders to the common cold.

## **1. Work plan**

### **1.1. Modeling**

We will explore different segmentation algorithms starting with Fast R-CNN and other basic algorithms. Then we will apply more modern algorithms for biomedical imaging like U-net. And finally we will use recently created algorithms and try to modernize them in order to achieve best result.

### **1.2. Dataset**

The dataset will be taken from the Kaggle website. It consists of nucleus images with mask on them, so we don't have to preprocess images by ourselves. Also, I will try to contact the creator of the dataset and Faculté de Médecine de l'université de Paris in order to get more examples

### **1.3. Experiments**

First, we will try to analyze the concepts of segmentation and how it differs from medical segmentation. Then we will try to implement standard segmentation and try to improve the performance by adding some medical imaging concepts.

Finally, we will implement lastly published medical imaging and segmentation models and algorithms, try to merge them, and achieve the greatest performance.

## **2. Work assignment**

### **Theoretical work**

Reading papers and understanding state-of-the-art techniques.

### **Modeling work**

Then importing of the modern algorithms and comparison with the previous ones. And finally, use cutting-edge models and merge concepts to create a new model.

## **References**

- [1] Deep Learning for Computer Vision by Rajalingappaa Shanmugamani
- [2] Computational Vision and Medical Image Processing João Manuel R. S. Tavares, R. M. Natal Jorge