Virtual Reality - Final Project Proposal Template

Lung nodule segmentation and cancer prediction based on CT Image

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1 Member List

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2 Problem Statement

We will develop a computer-aided detection and diagnosis system to implement lung nodule segmentation and cancer prediction based on CT images. We will probably train a deep neural network with CT images as the input to tell if patiants have some benign and malignant nodules and segment the malignant parts out.

3 Problem Description

With the depletionl of the demographic bonus, China is facing the threats of deficit of labor force, including medical care. To counter the deficiency of the doctors, computer-aided diagnosis system may help. Thus, we aim to design a lung nodule segmentation and cancer prediction model based on CT images using deep learning, which may also be helpful for other image based diagnosis system. We will collect data and training our network referring to some state-of-art techniques and network. We hope we can achieve higher accuracy or higher efficiency.

4 Project Goals and Objectives/Deliverables

We will refer to the state-of-art networks in image processing, like vgg, and some networks designed for medical use. We will take advantage of each one and combine them into one to achieve higher accuracy or higher efficiency.

5 Project Scope

We will focus on optimizing the structure and the paraments of the model to achieve a higher performance. We will not improve the performance on hardware layer, like developing our model on some exclusive hardware platform or developing a pipeline technique.

6 Success Factors and Benefits

In the application layer, this project will slightly develop the efficiency of the process of diagnosis of lung nodule segmentation and cancer prediction, which relieve the burden of doctors. In the technique

layer, this project will introduce a framework for image based medical analysis for the future development.

7 Timeline

March	collect the training data
April	make the framework of the net
May	improve the accuacy of the detection
June	improve the segmentation anf overall performance

8 Assumptions

8.1 Data Scale

The number of labeled data collected may be restricted. We may probably to enlarge our dataset by some techniques like mirror, noise or some other methods. Still, we can label it manually.

8.2 Hardware

Some deep learning network relies on the performance of powerful GPU. If so, we may run our network on some server.

9 Limitations/Restrictions

TODO