# 论文大纲实例

**Research paper**

**Title(provide 2 titles)**：

DAEC: Denoising Auto-Encoder and Classifier for Lung Cancer detection

Improved DAE with Auxiliary-CNN for Lung Cancer detection

1. **Introduction**

Research:

A multi-function model is expected to be built for lung cancer detection using lung CT images. The AE model can first denoise the raw CT image and then generate latent code and denoised image. Both latent code and denoised image are used for cancer detection, by fully connected model and CNN model respectively.

Research background (Basic definition of the subject and general background about it):

Because excessive radiation is harmful to health, reducing radiation dose has been regarded as an effective solution. However, dose reduction will increase the noise level of medical images, which will lead to the loss of some information. So there exists urgent need for a model can both do the image denoising and cancer analyzing tasks. The model introduced by this paper can both handle these two problems with improved AE model and CNN model. As training a deep CNN can be time-consuming, transfer learning is implemented to achieve better performance within limited time.

Research gap (What did others do? What are their limitations?):

GANs for denoising.

Limitation: 1. High training cost. 2. Model collapse.

Research objective (What did you do to solve others’ limitations?):

AE is comparably easy to train and adjust parameters. And classifier using latent code incorporated with CNN using denoised image make the detection result more persuasive.

1. **Methods**

Research:

Dataset used in the study (Where did you get your dataset? What does the dataset contain?):

Where: Kaggle Data Science Bowl 2017 (but the dataset is not available now)

Content: Lung cancer

Dataset preprocessing (What’s your data preprocessing process? Augmentation, normalization…):

Model/Algorithm (How do you design the model/algorithm? What does each module do? And what are the advantages of this model/algorithm?):

Implementation detail (Provide some information about detailed parameters e.g. learning rate, batch size, optimizer, loss function etc.)

1. **Results and Discussion**

Research:

Results (What kind of results did you get?):

Discussion (Why does this happen? Is the result reasonable?):

1. **Conclusion**

Conclusion of your key findings:

Research significance:

Limitations:

Future studies: