## Haberman's Survival prediction

Please read the dataset description to understand the background and dataset.

## **Dataset**

3 features, see the dataset description.

1 output: 1 = the patient survived 5 years or longer (negative class)

2 = the patient died within 5 year (positive class)

Training data: first 85%: row 1 to row 260

Testing data: row 260 to row 306

## Task:

- 1. Using Maximum Likelihood Estimation with gradient ascent for training. Report true positive, false positive, false negative, true negative, precision, recall, and F1 score for the testing data.
- 2. Normalize the feature, report the results again. Any improvement?
- 1. We run plagiarism check for submitted code. Please don't look for solutions online.
- 2. You will not receive any credit if you directly use off-the-shelf machine learning tools. Mathematic computation tools such as Numpy and other basic tools, e.g., matplotlib are allowed to use.
- 3. Submit your code (.py file) and your report (no more than 2 pages, no format requirement, .pdf file). Not following the submission requirement, e.g., code in txt/pdf file, exceeding report page limit, etc. will receive a credit penalty.