



Track patient recovery in real-time by processing streaming data

BIOMEDICAL DATA DESIGN

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Haobin Zhou
Yimeng Xu
Emma Cardenas

The slide features a white background with a black border. In the corners, there are decorative blue circles: a large one in the top-left, a medium one in the top-right, and a small one in the bottom-left.

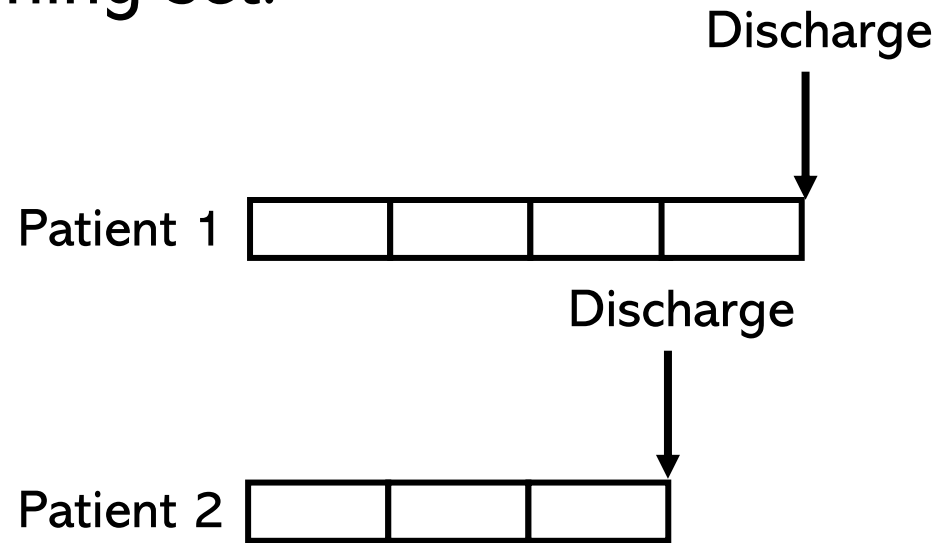
01

‘Real-time’ Prediction

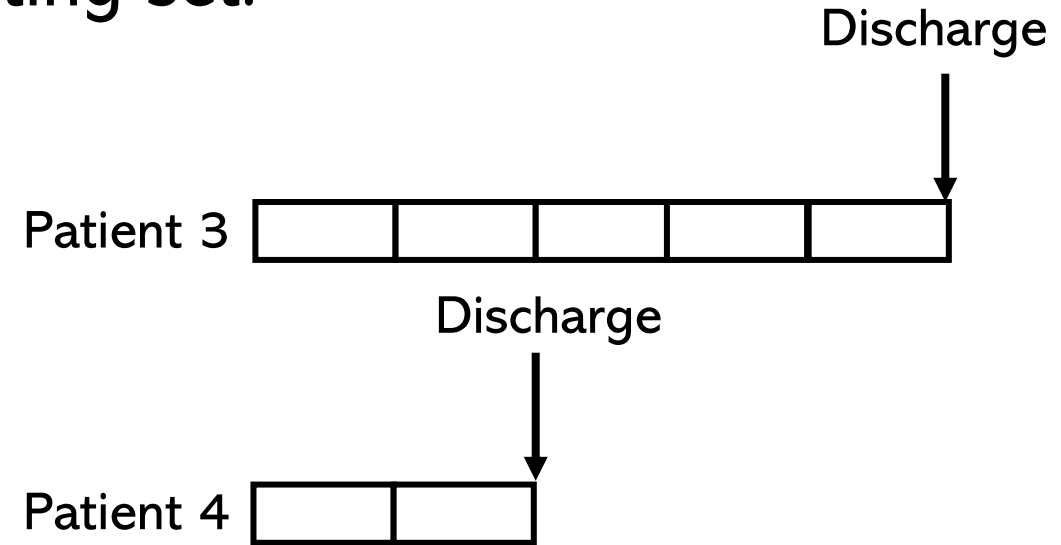
01 'Real-time' Prediction

Last Week:

Training set:



Testing set:



01 'Real-time' Prediction

Repeat for five times:

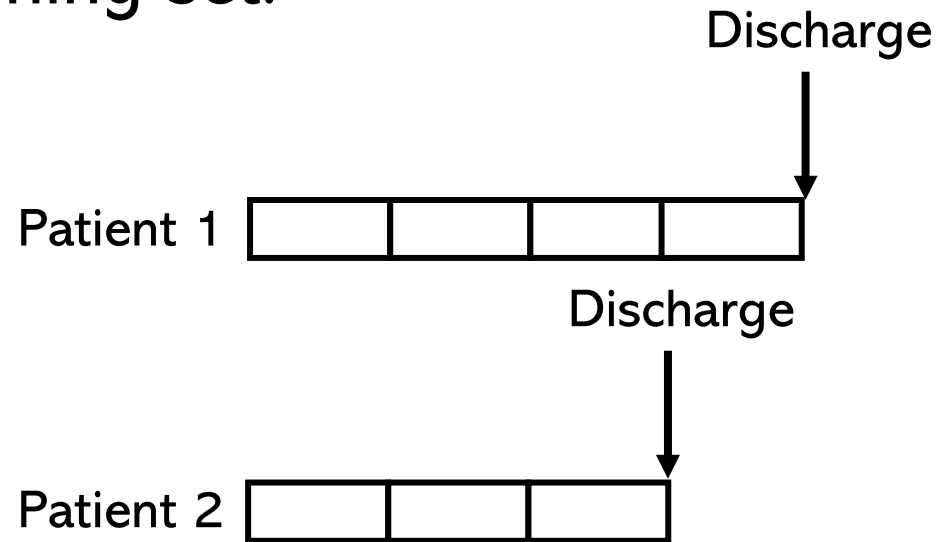
```
Epoch 8/20, Loss: 0.10321918874979019
Epoch 9/20, Loss: 0.0093935402110219
Epoch 10/20, Loss: 0.07064346969127655
Epoch 11/20, Loss: 0.09824777394533157
Epoch 12/20, Loss: 0.09720230847597122
Epoch 13/20, Loss: 0.023129863664507866
Epoch 14/20, Loss: 0.07097922265529633
Epoch 15/20, Loss: 0.5772714018821716
Epoch 16/20, Loss: 1.3697293996810913
Epoch 17/20, Loss: 0.0018030975479632616
Epoch 18/20, Loss: 0.28388893604278564
Epoch 19/20, Loss: 0.38625386357307434
Epoch 20/20, Loss: 0.011136839166283607
Accuracy: 0.9139784946236559
Precision: 0.8926553672316384
Recall: 0.9239766081871345
...
[ 13 169]]
Accuracy: [0.9139784946236559, 0.8924731182795699, 0.9274193548387096, 0.8978494623655914, 0.9327956989247311]
avg_Acc:0.9129032258064516
Time taken: 31197.8478 seconds
```

Accuracy: 91.3%

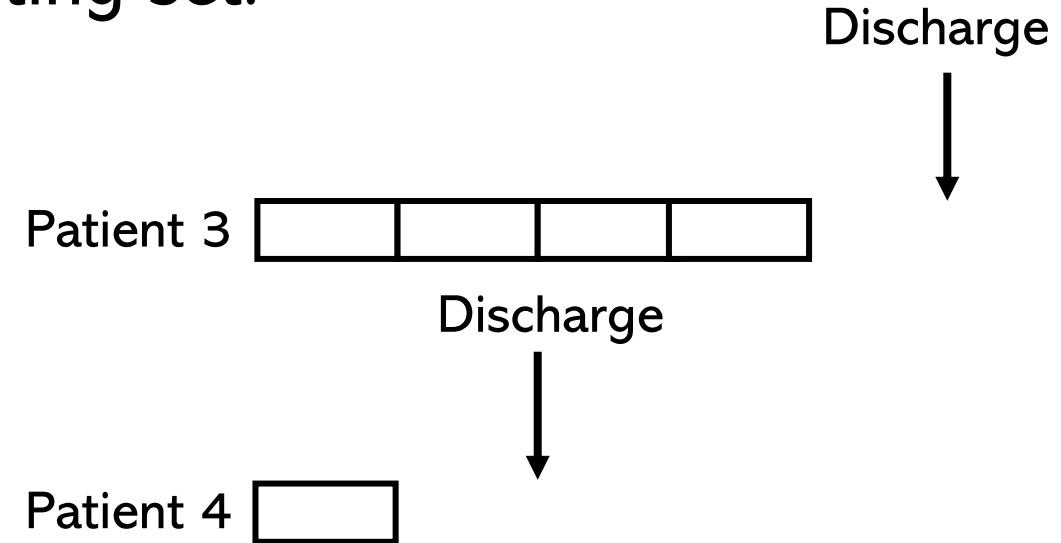
01 'Real-time' Prediction

This Week:

Training set:



Testing set:



For the testing part, we **don't give the last hour** to predict the final mortality

01 'Real-time' Prediction

Repeat for
four times:

Accuracy: 0.8579088471849866
Precision: 0.8520710059171598
Recall: 0.8372093023255814
F1 Score: 0.844574780058651
Confusion Matrix:
[[176 25]
[28 144]]

Epoch 10/20, Loss: 0.31515413522720337
Epoch 11/20, Loss: 1.2940282821655273
Epoch 12/20, Loss: 0.6931993365287781
Epoch 13/20, Loss: 0.31462329626083374
Epoch 14/20, Loss: 0.3369888663291931
Epoch 15/20, Loss: 0.31822213530540466
Epoch 16/20, Loss: 0.3157409131526947
Epoch 17/20, Loss: 0.6965146064758301
Epoch 18/20, Loss: 0.6935627460479736
Epoch 19/20, Loss: 0.3151668310165405
Epoch 20/20, Loss: 0.6933030486106873
Accuracy: 0.806970509383378
Precision: 0.9243697478991597
Recall: 0.6358381502890174
F1 Score: 0.7534246575342467
Confusion Matrix:
[[191 9]
[63 110]]


Epoch 10/20, Loss: 0.6934880018234253
Epoch 11/20, Loss: 0.6932013630867004
Epoch 12/20, Loss: 0.6931668519973755
Epoch 13/20, Loss: 0.6941850781440735
Epoch 14/20, Loss: 0.31728488206863403
Epoch 15/20, Loss: 0.6931740045547485
Epoch 16/20, Loss: 0.693154513835907
Epoch 17/20, Loss: 0.6931524872779846
Epoch 18/20, Loss: 1.3090211153030396
Epoch 19/20, Loss: 0.6931576132774353
Epoch 20/20, Loss: 0.3151927590370178
Accuracy: 0.848404255319149
Precision: 0.8155339805825242
Recall: 0.8983957219251337
F1 Score: 0.8549618320610687
Confusion Matrix:
[[151 38]
[19 168]]

Epoch 10/20, Loss: 0.3345186114311218
Epoch 11/20, Loss: 0.6931914687156677
Epoch 12/20, Loss: 0.31854328513145447
Epoch 13/20, Loss: 1.0125386714935303
Epoch 14/20, Loss: 0.4884851574897766
Epoch 15/20, Loss: 0.3698061406612396
Epoch 16/20, Loss: 0.8132229447364807
Epoch 17/20, Loss: 0.31506800651550293
Epoch 18/20, Loss: 0.3157444894313812
Epoch 19/20, Loss: 0.695896565914154
Epoch 20/20, Loss: 0.3164122700691223
Accuracy: 0.8679245283018868
Precision: 0.8315217391304348
Recall: 0.8947368421052632
F1 Score: 0.8619718309859156
Confusion Matrix:
[[169 31]
[18 153]]

Accuracy: 84.5%

Recall: 84.3%

A significant drop
from 91.3%

The slide features a white background with a black border. Three large blue circles are positioned in the corners: one in the top-left, one in the top-right, and one in the bottom-left. The text '02' is centered in a large, black, sans-serif font.

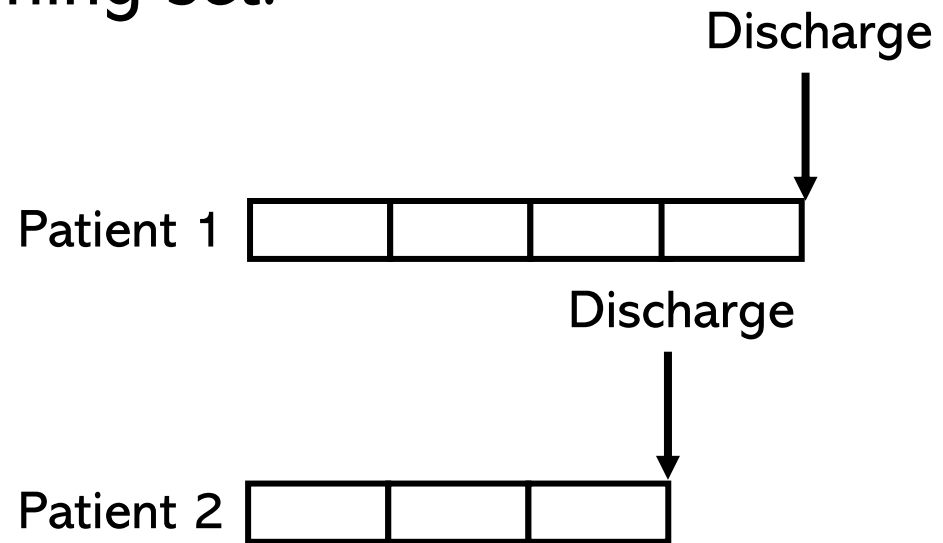
02

Next Step

02 Change the training set

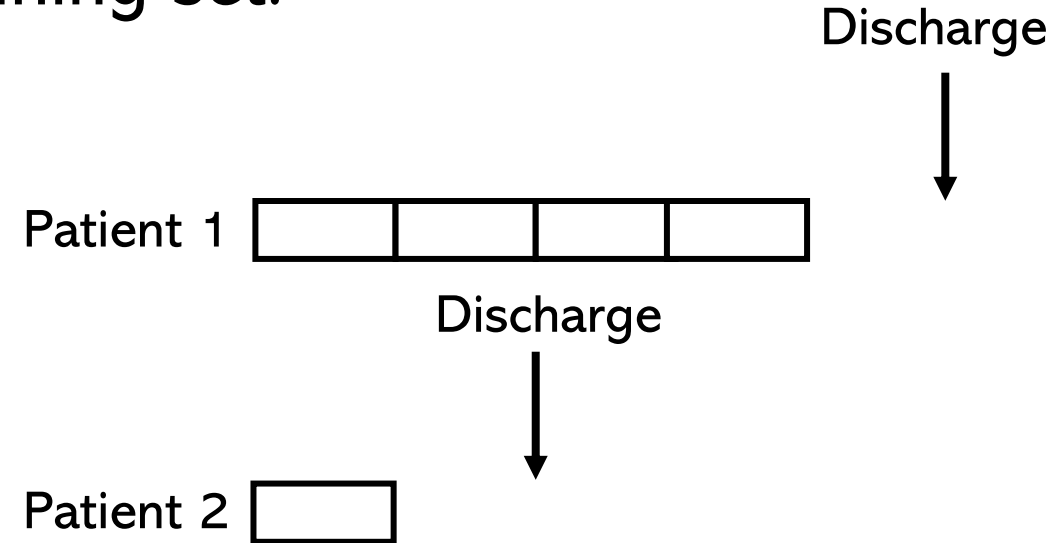
Now:

Training set:



Changes:

Training set:



02 Change the parameters

Learning rate

Loss

Drop out

histogram

Posterior

...

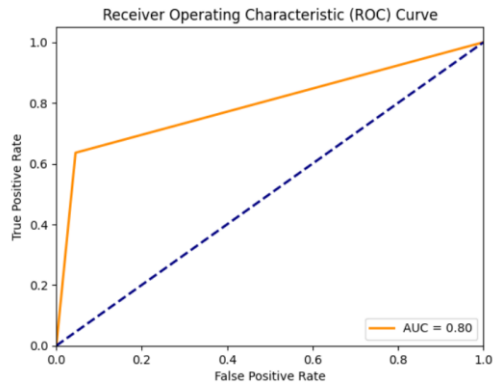
The slide features a white background enclosed by a thick black rectangular border. Three large, solid blue circles are positioned at the corners: one in the top-left, one in the bottom-left, and one on the right side. The text "Thank you" is centered in the white area.

Thank you

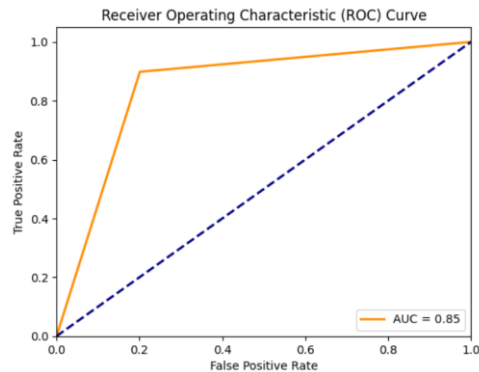
01 'Real-time' Prediction

Repeat for
four times:

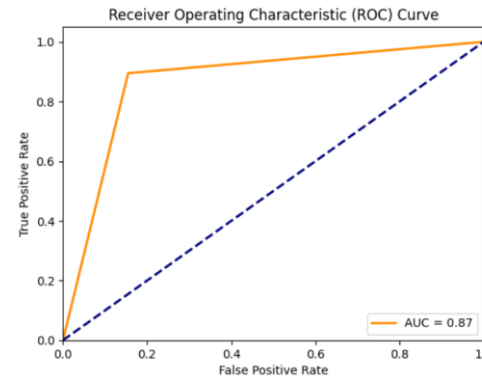
Accuracy: 0.8579088471849866
Precision: 0.8520710059171598
Recall: 0.8372093023255814
F1 Score: 0.844574780058651
Confusion Matrix:
[[176 25]
 [28 144]]



Accuracy: 0.806970509383378
Precision: 0.9243697478991597
Recall: 0.6358381502890174
F1 Score: 0.7534246575342467
Confusion Matrix:
[[191 9]
 [63 110]]



Accuracy: 0.848404255319149
Precision: 0.8155339805825242
Recall: 0.8983957219251337
F1 Score: 0.8549618320610687
Confusion Matrix:
[[151 38]
 [19 168]]



Accuracy: 0.8679245283018868
Precision: 0.8315217391304348
Recall: 0.8947368421052632
F1 Score: 0.8619718309859156
Confusion Matrix:
[[169 31]
 [18 153]]

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A significant drop
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01 'Real-time' Prediction

Last Week:

RNN model deal with time series of **different lengths**

