Exploratory Data Analysis

Stage 0

Raw Data

- 25 Hz RT Logs
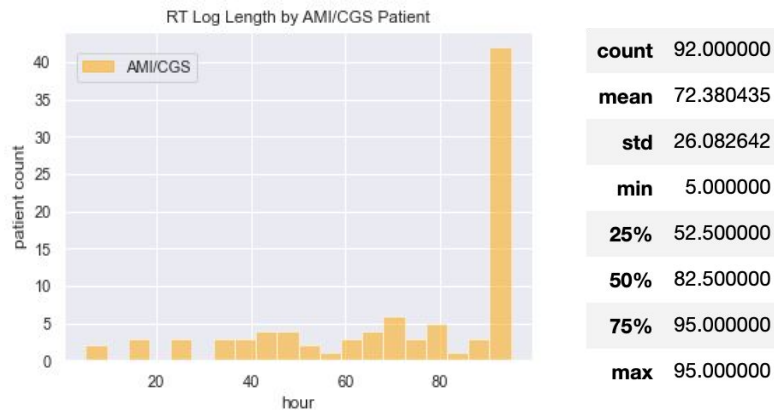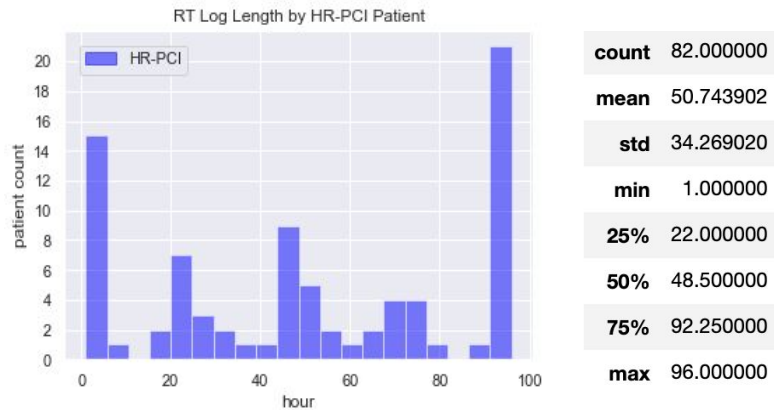
	HR-PCI	AMI/CGS
Cases	83 (82*)	92 (91**)
Total (min)	251,982	401,780

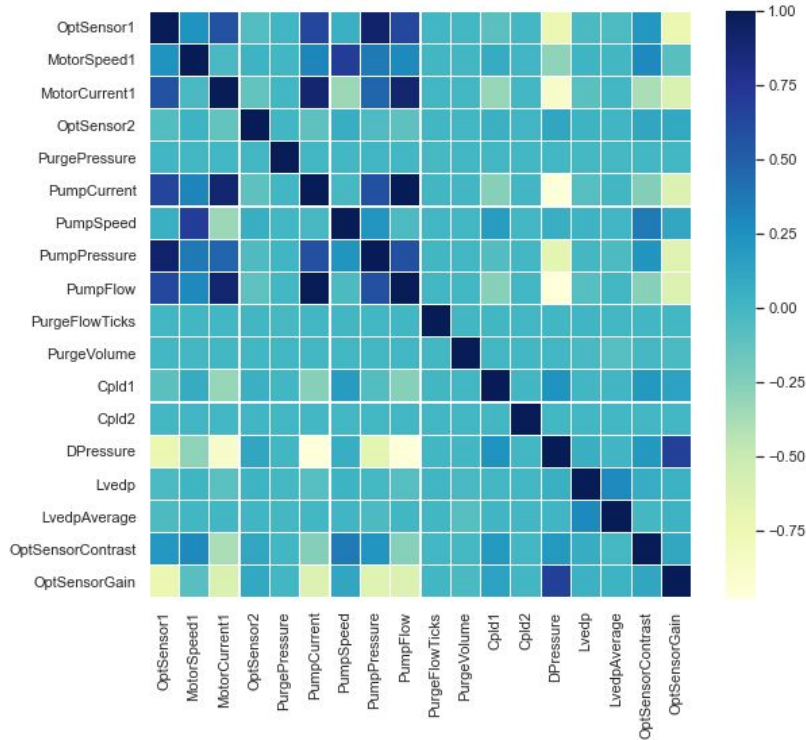*HR-PCI 1991507: empty folder.

**AMI/CGS 2006428: blob not found in csv.

- Case description

- Distribution of RT Log Length

RT Log Length by HR-PCI Patient

count	82.000000
mean	50.743902
std	34.269020
min	1.000000
25%	22.000000
50%	48.500000
75%	92.250000
max	96.000000

RT Log Length by AMI/CGS Patient

count	92.000000
mean	72.380435
std	26.082642
min	5.000000
25%	52.500000
50%	82.500000
75%	95.000000
max	95.000000

Variables & Features

- ## 44 Cols → 18 Variables (Corr)

- ## 9 Features

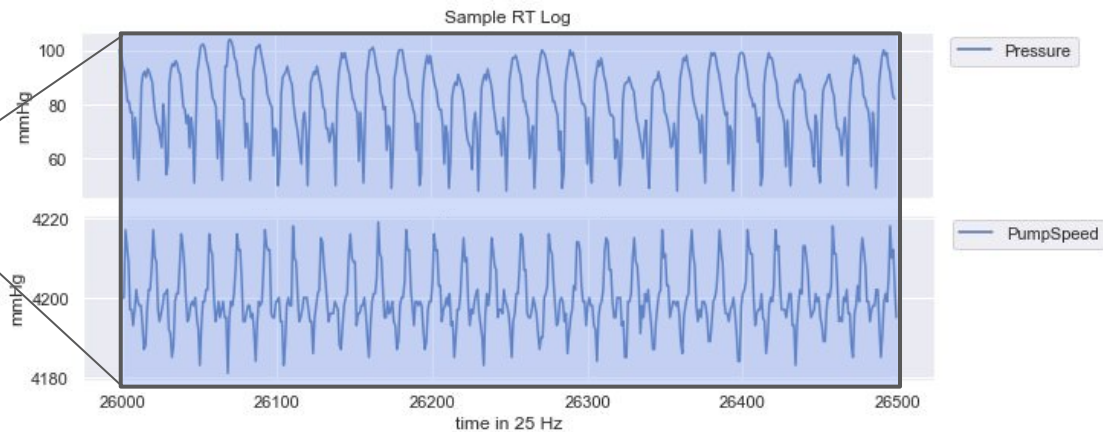| Previously	Now
AoP = dP + LVP	Pump Pressure, dP
Motor Current, Motor Speed	Pump Current, Pump Speed, Pump Flow
	Purge Pressure, Purge Flow
	EventSet, EventClr

Sample RT Logs
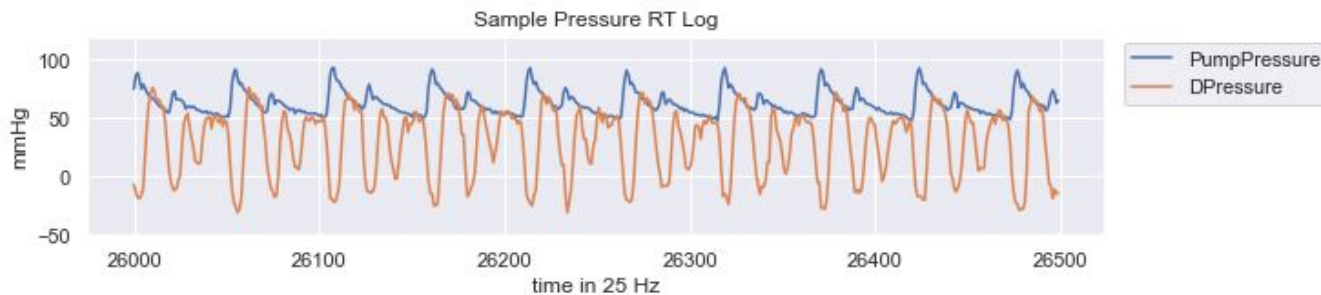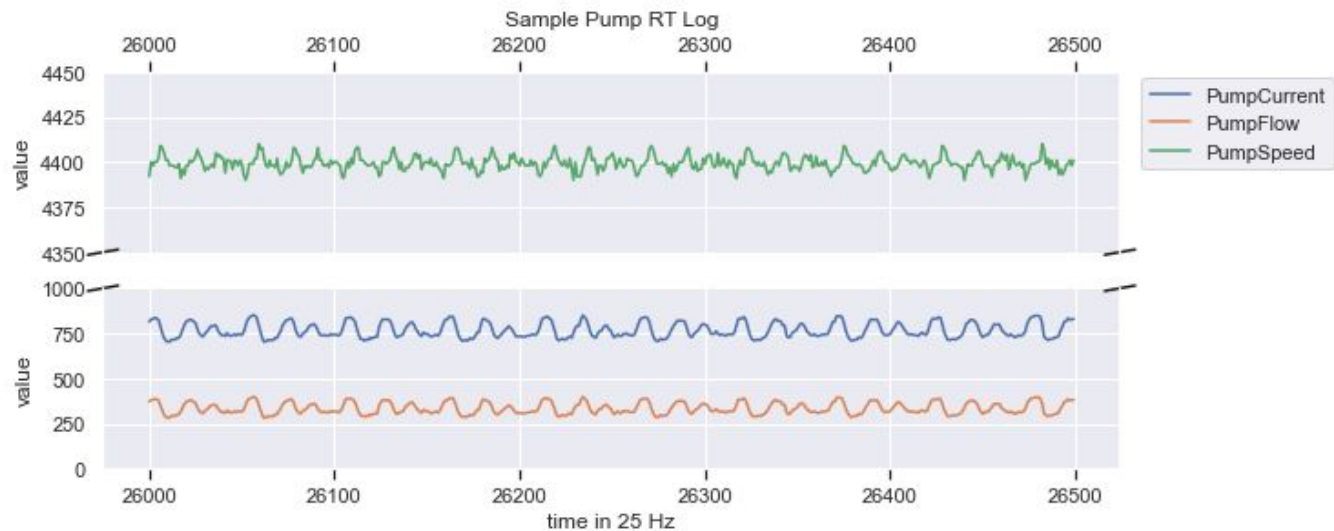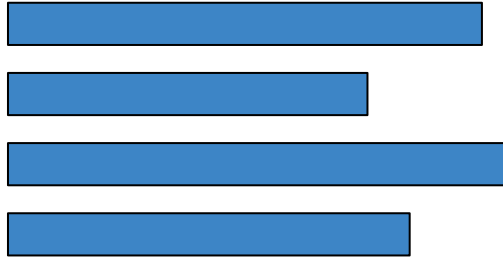
Preprocess

Stage 0

HR-PCI RT Logs

Patient 1

Sample RT Log

Patient 2

...

Patient 82

HR-PCI RT Logs
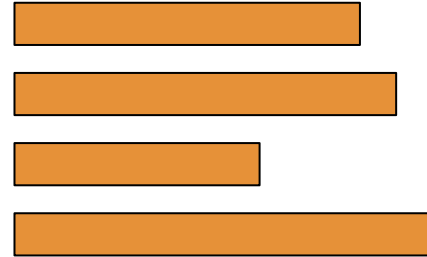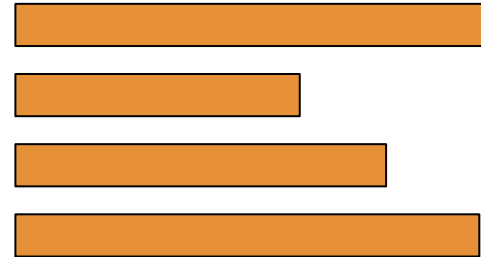
Patient 1

Patient 2

...

Patient 82

AMI/CGS RT Logs

Patient 1

Patient 2

...

Patient 91

Step 1: Concat Consecutive RT Logs

Patient 1

Patient 2

⇧

* Non-consecutive due to missing file ⇒ Treat as 2 logs.

...

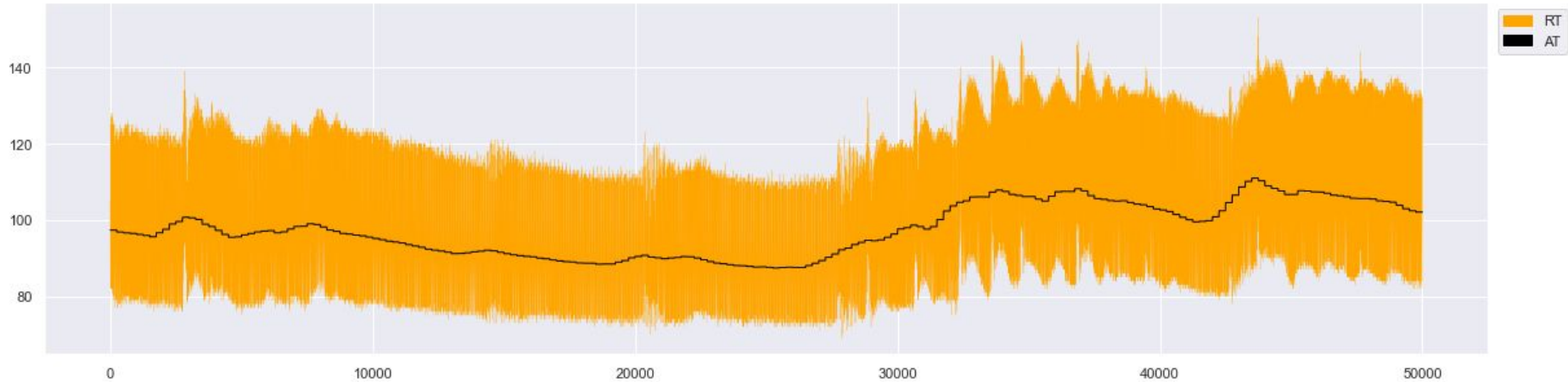Patient 91

Step 2: Remove Invalid Data

Patient 1

Patient 2

* Non-consecutive due to removed alarm (event), out of range data ([20, 200] mmHg) ⇒ Treat as 2 logs.

...

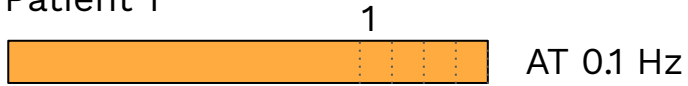Patient 91

Step 3: Convert RT Logs to AT Logs

Patient 1

RT 25 Hz

* Average every 250 data points. Then rolling mean (smoothing) every 5 resulting data points.
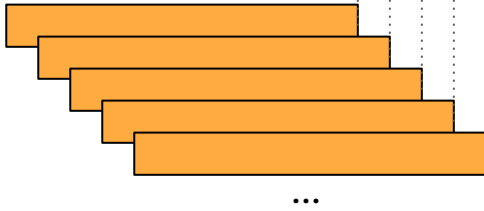
AT 0.1 Hz

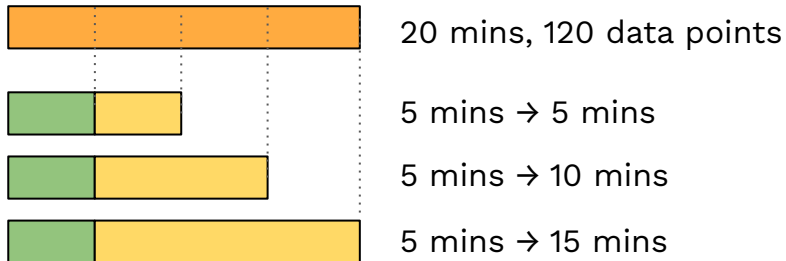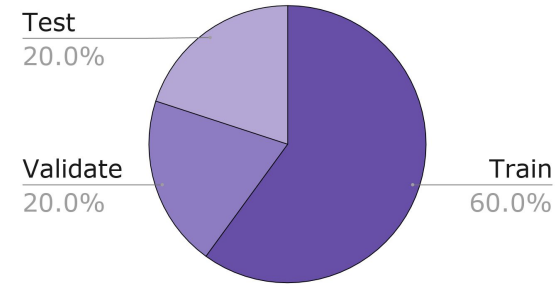# Step 4: Sliding Window Generation of Samples

Patient 1

1

AT 0.1 Hz

* Samples of length 20 minutes.

...

* Train : Validate : Test = 3 : 1 : 1

Test
20.0%

Validate
20.0%

Train
60.0%

* Different forecasting horizons.

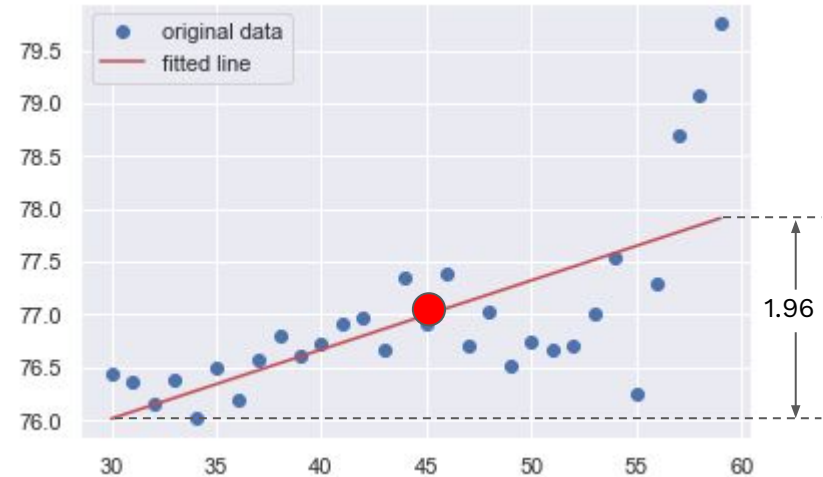20 mins, 120 data points
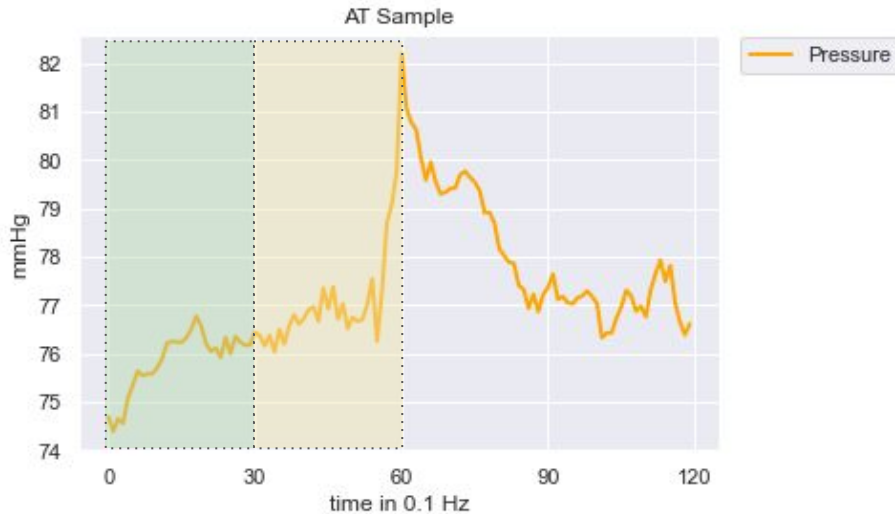
5 mins → 5 mins

5 mins → 10 mins

5 mins → 15 mins

Step 5: Trend Classification

* Different forecasting horizons.

20 mins, 120 data points

5 mins → 5 mins

5 mins → 10 mins

5 mins → 15 mins

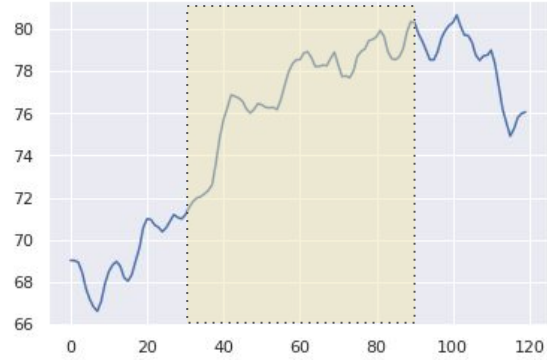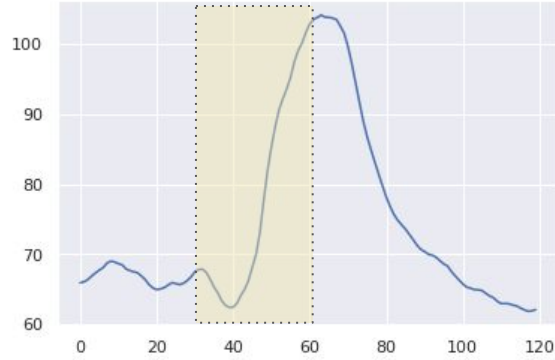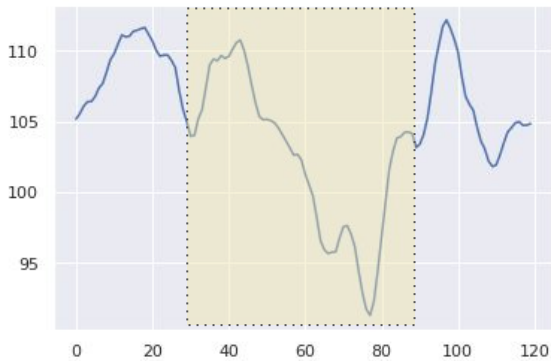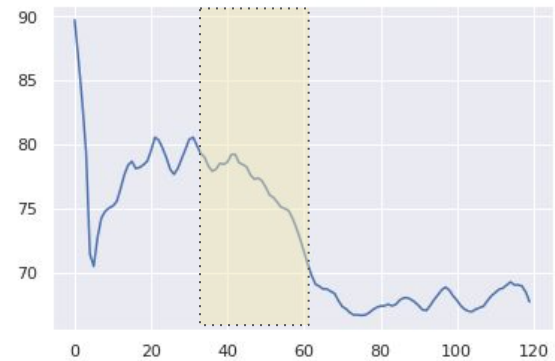| Current MAP (mmHg)	Significant Change
< 60 (critical)	5 mmHg
60 - 80 (managed)	5 mmHg
> 80 (normal)	10 mmHg

Example Trends

I
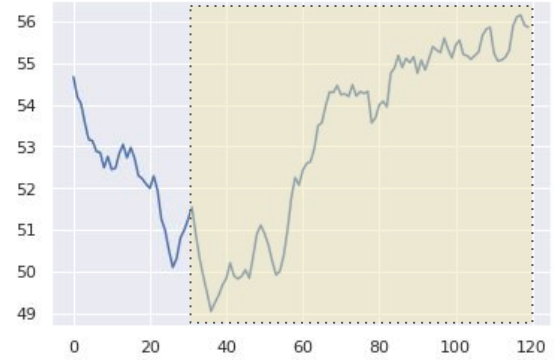
D

Linear Fit Baseline

- Slope-based benchmark analysis to the result previously reported.
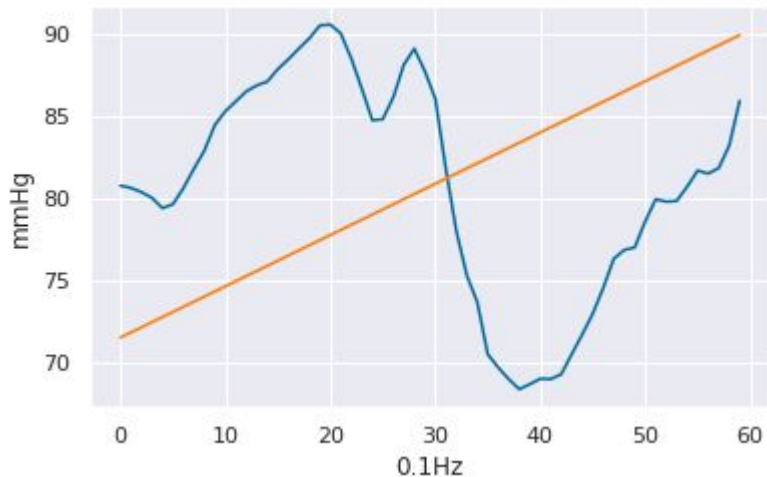
	RMSE (mmHg)		RMSE (mmHg)
IDS	9.089	I	12.272
ID	12.614	D	12.728
IS	7.208	S	2.014
DS	7.446		

* I = increasing, D = decreasing, S = stationary.