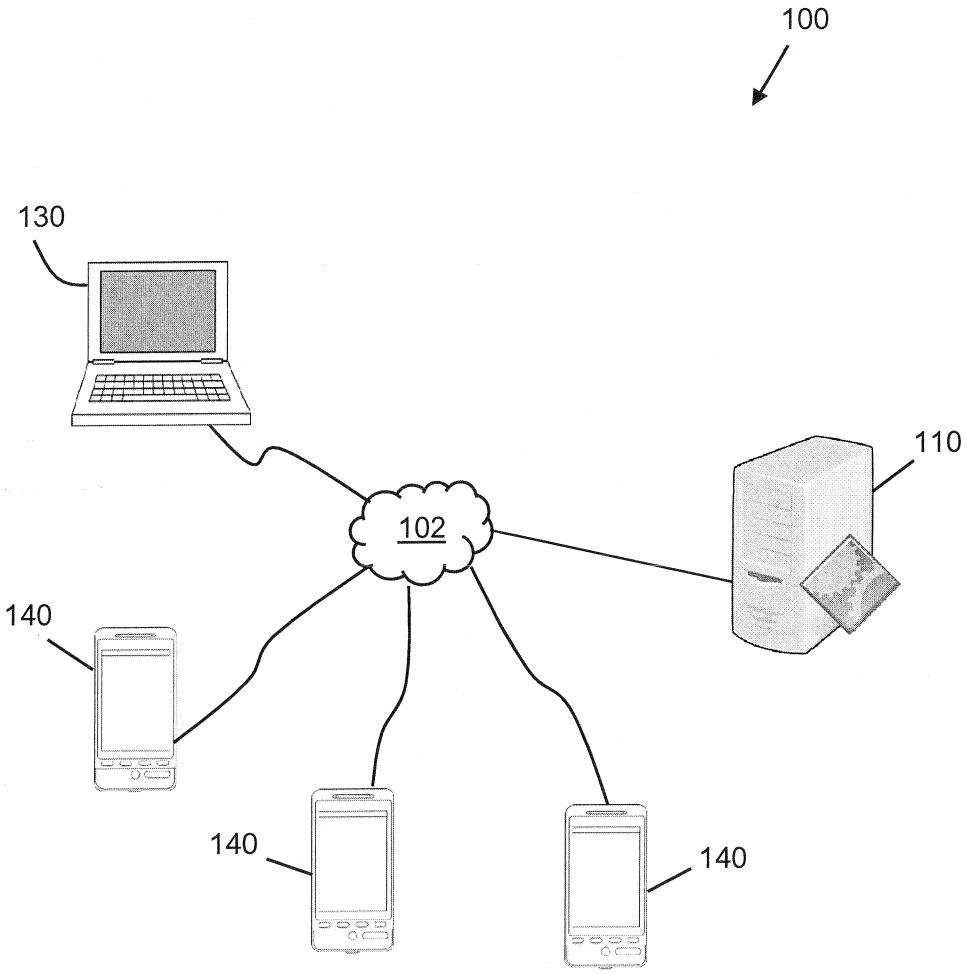

100
130
110
102
140
140
140

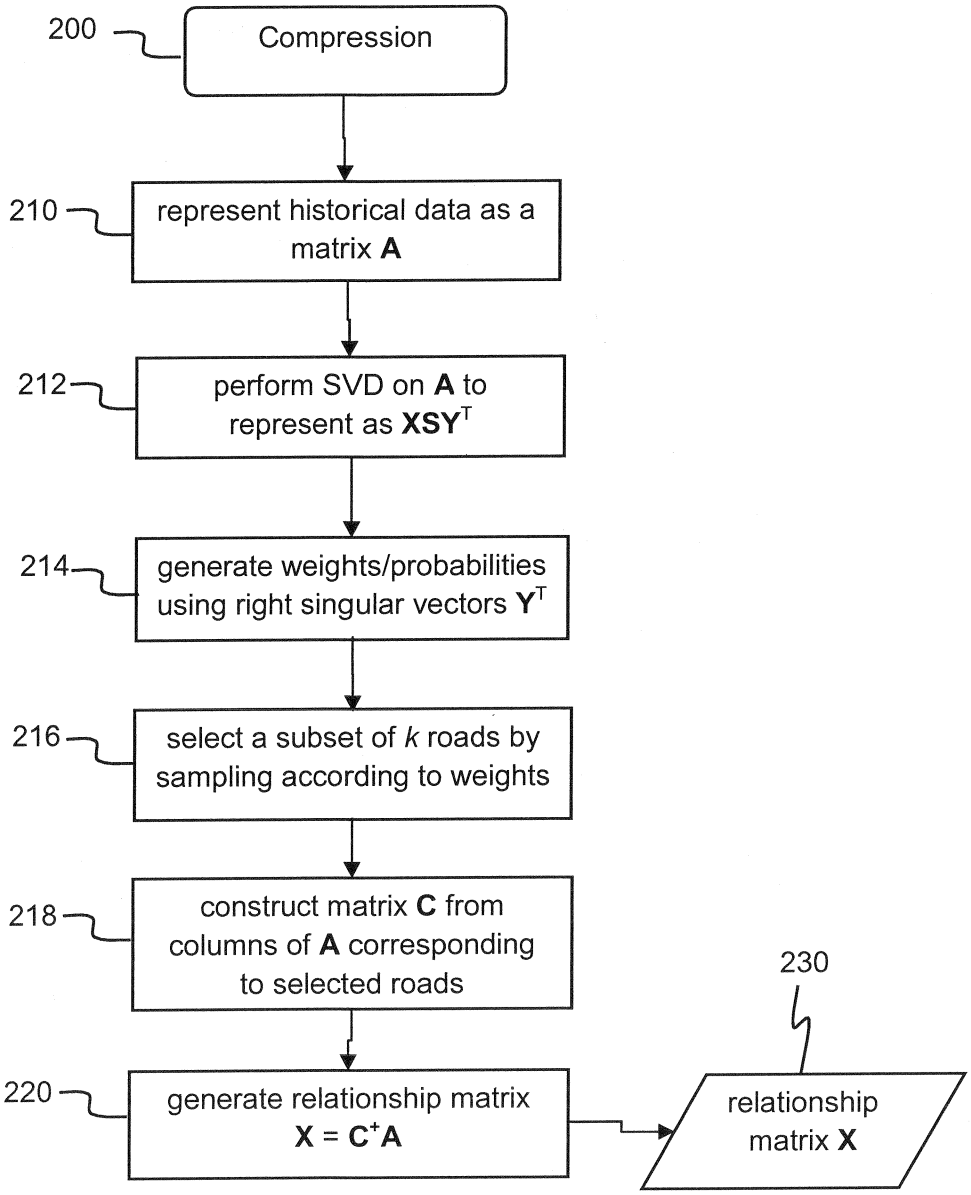

200
Compression
210
represent historical data as a matrix **A**
212
perform SVD on **A** to represent as $\mathbf{XSY}^T$
214
generate weights/probabilities using right singular vectors $\mathbf{Y}^T$
216
select a subset of *k* roads by sampling according to weights
218
construct matrix **C** from columns of **A** corresponding to selected roads
220
generate relationship matrix $\mathbf{X} = \mathbf{C}^+\mathbf{A}$
230
relationship matrix **X**

FIG. 2

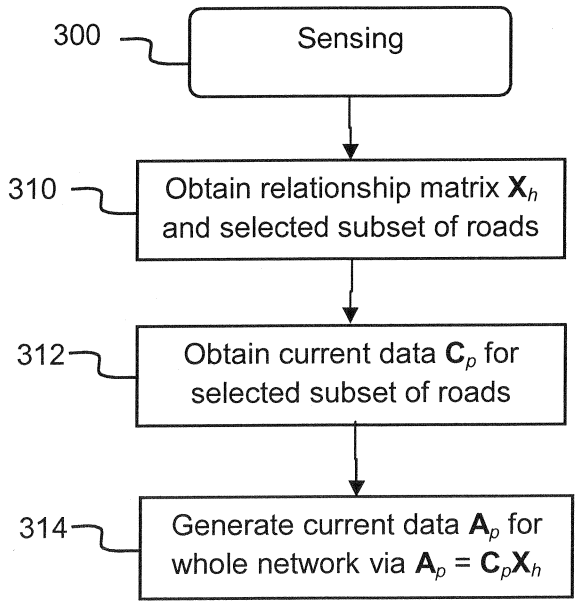

300
Sensing
310
Obtain relationship matrix $\mathbf{X}_h$ and selected subset of roads
312
Obtain current data $\mathbf{C}_p$ for selected subset of roads
314
Generate current data $\mathbf{A}_p$ for whole network via $\mathbf{A}_p = \mathbf{C}_p\mathbf{X}_h$

FIG. 3

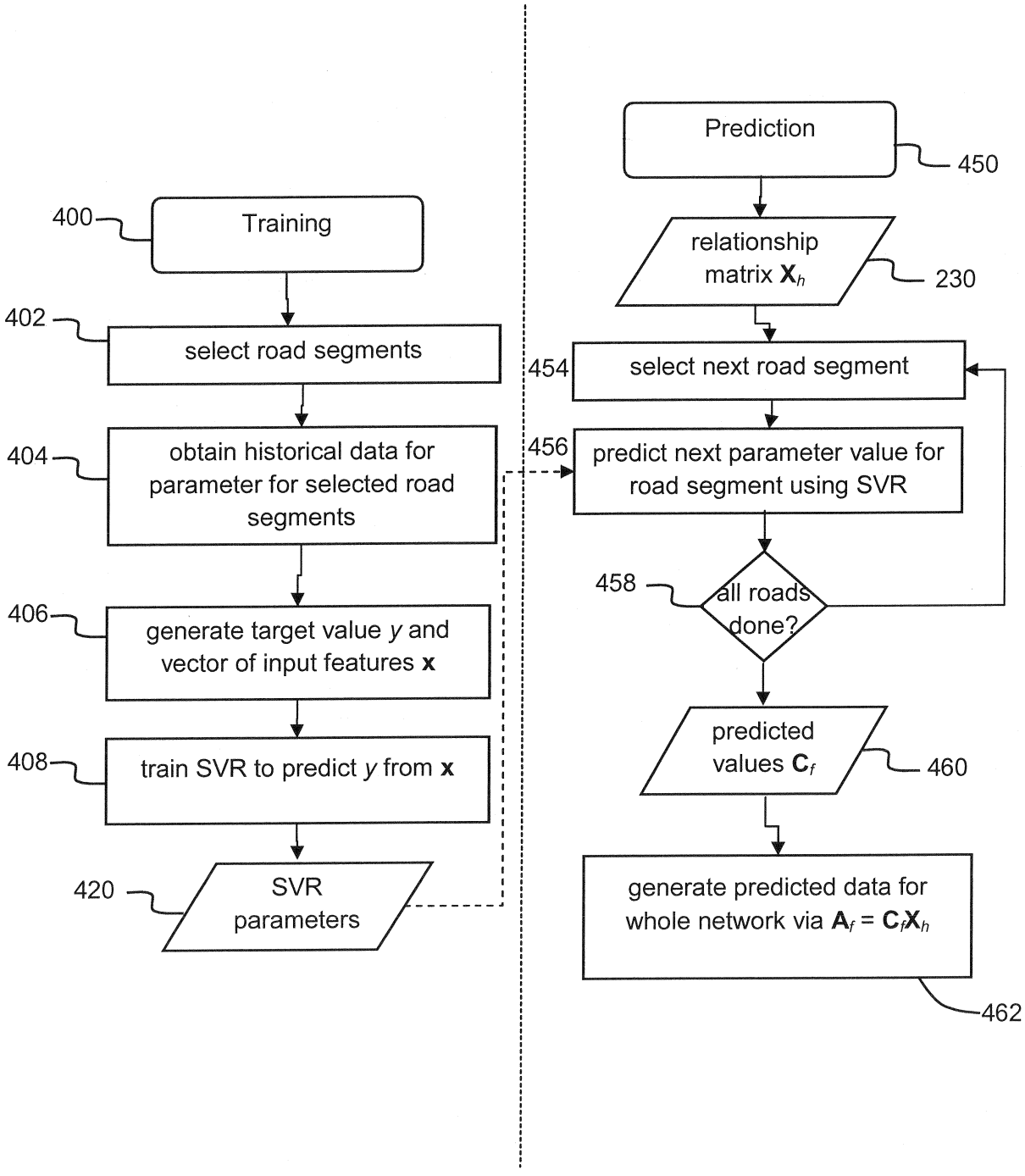

Training
400
select road segments
402
obtain historical data for parameter for selected road segments
404
generate target value y and vector of input features x
406
train SVR to predict y from x
408
SVR parameters
420
Prediction
450
relationship matrix X_h
230
select next road segment
454
predict next parameter value for road segment using SVR
456
all roads done?
458
predicted values C_f
460
generate predicted data for whole network via $A_f = C_f X_h$
462

FIG. 4

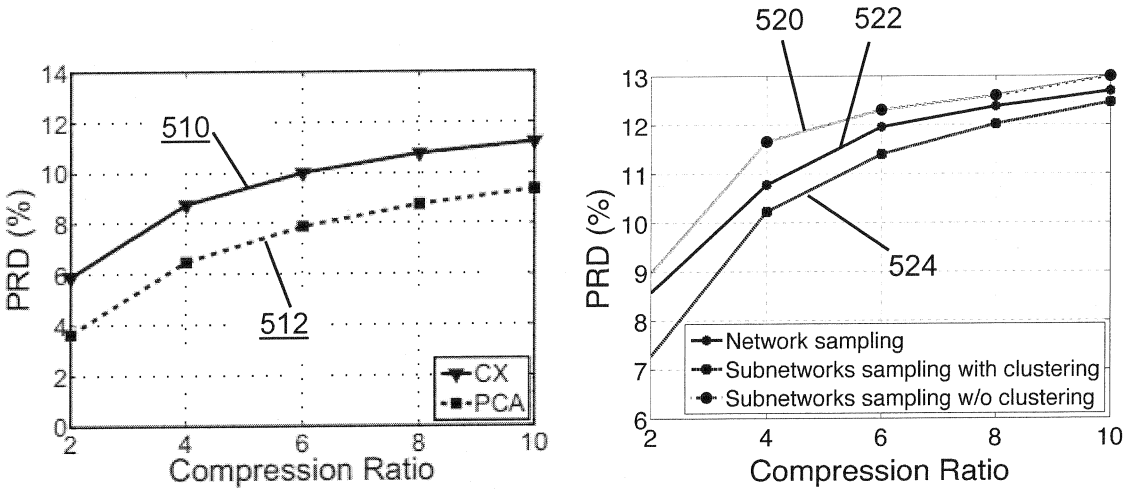
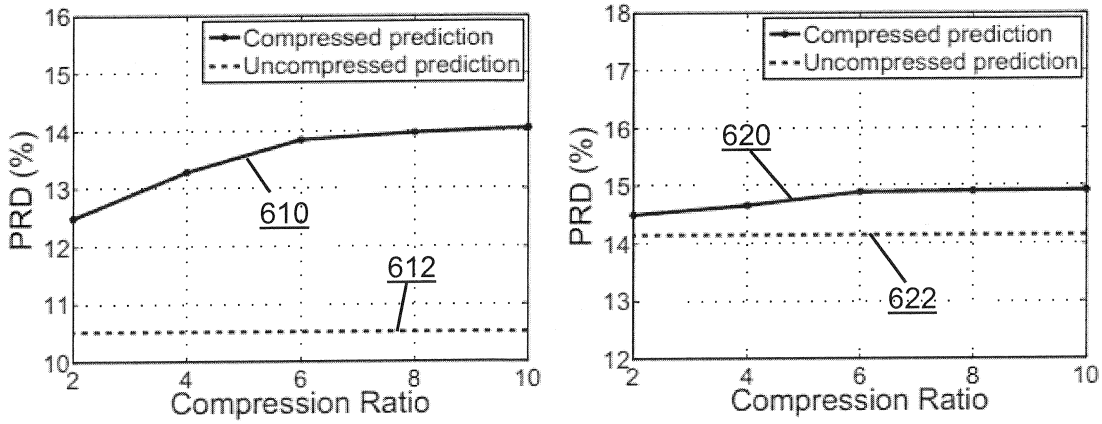


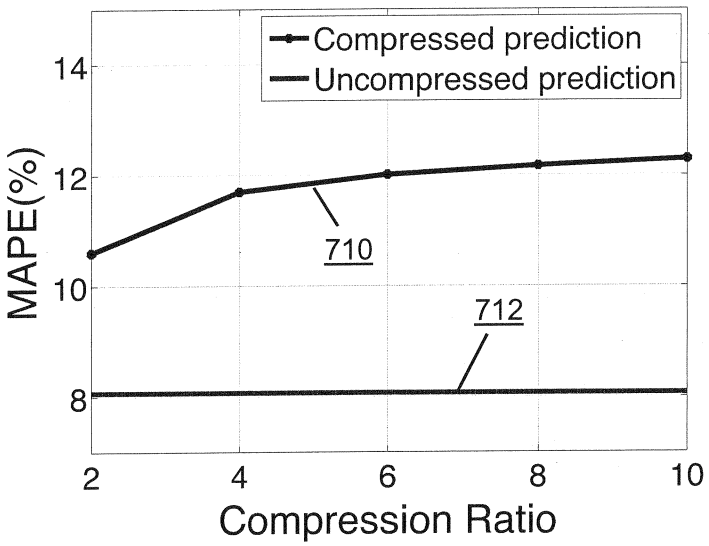
FIG. 5



(a) 5 min prediction horizon (b) 30 min prediction horizon

FIG. 6

(a)


Compressed prediction
Uncompressed prediction
MAPE(%)
14
12
10
8
710
712
2
4
6
8
10
Compression Ratio

(b)

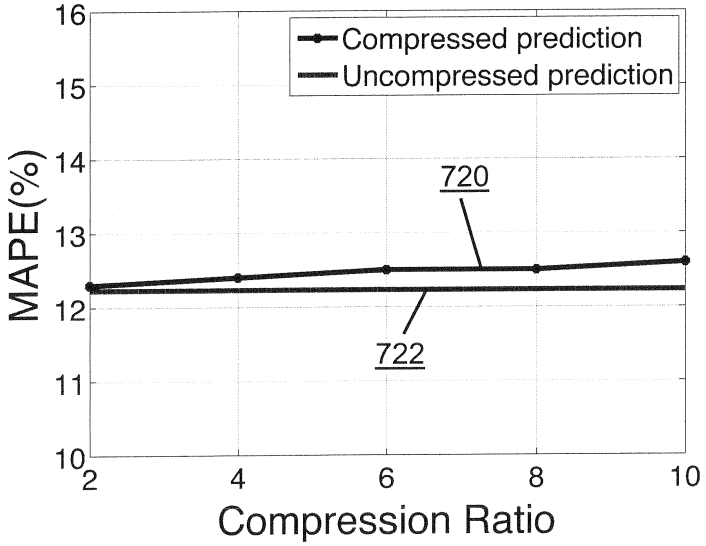

Compressed prediction
Uncompressed prediction
MAPE(%)
16
15
14
13
12
11
10
720
722
2
4
6
8
10
Compression Ratio

FIG. 7