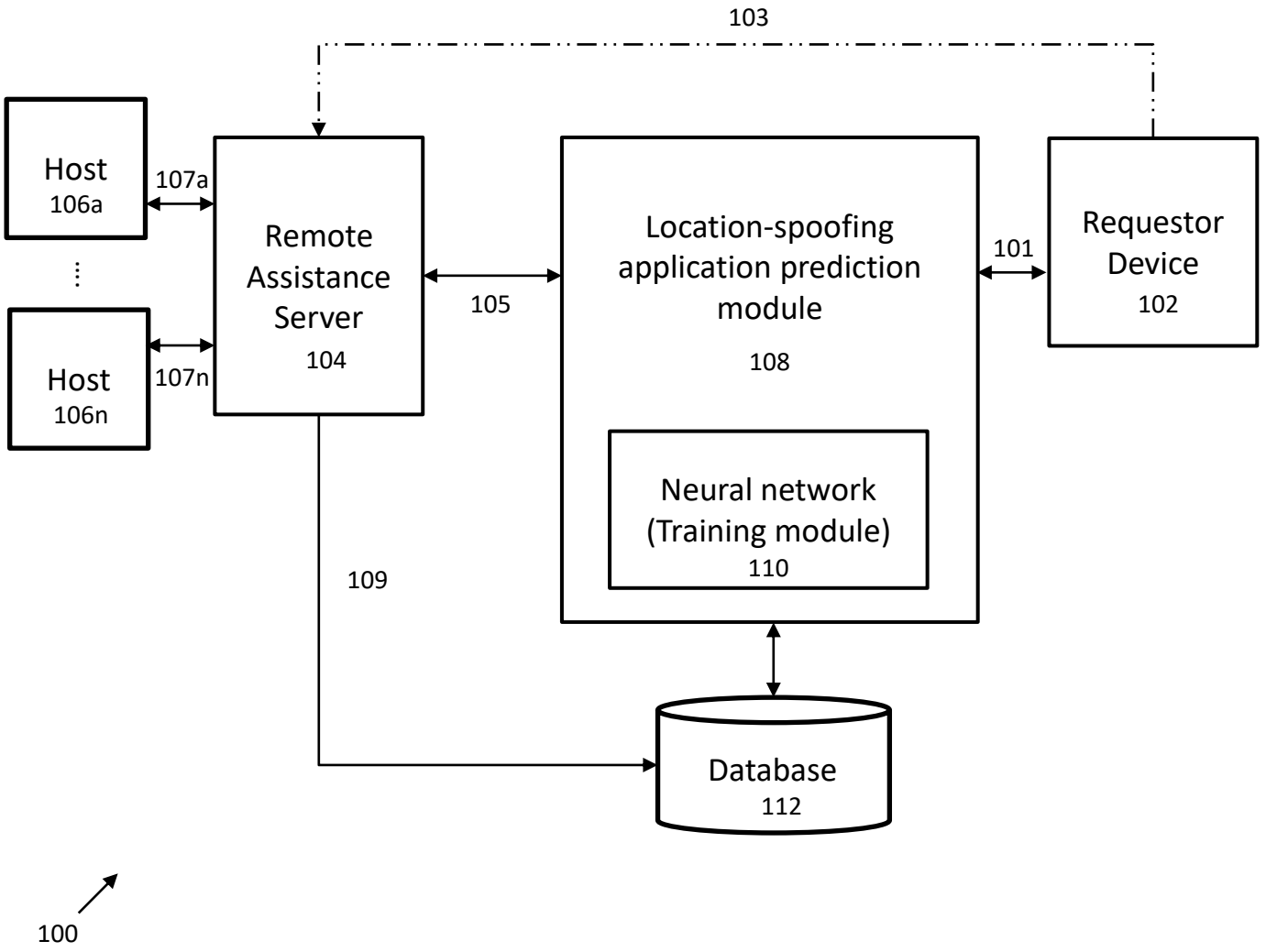

103
Host
106a
107a
Remote
Assistance
Server
104
105
Location-spoofing
application prediction
module
108
101
Requestor
Device
102
Host
106n
107n
Neural network
(Training module)
110
109
Database
112
100

Figure 1

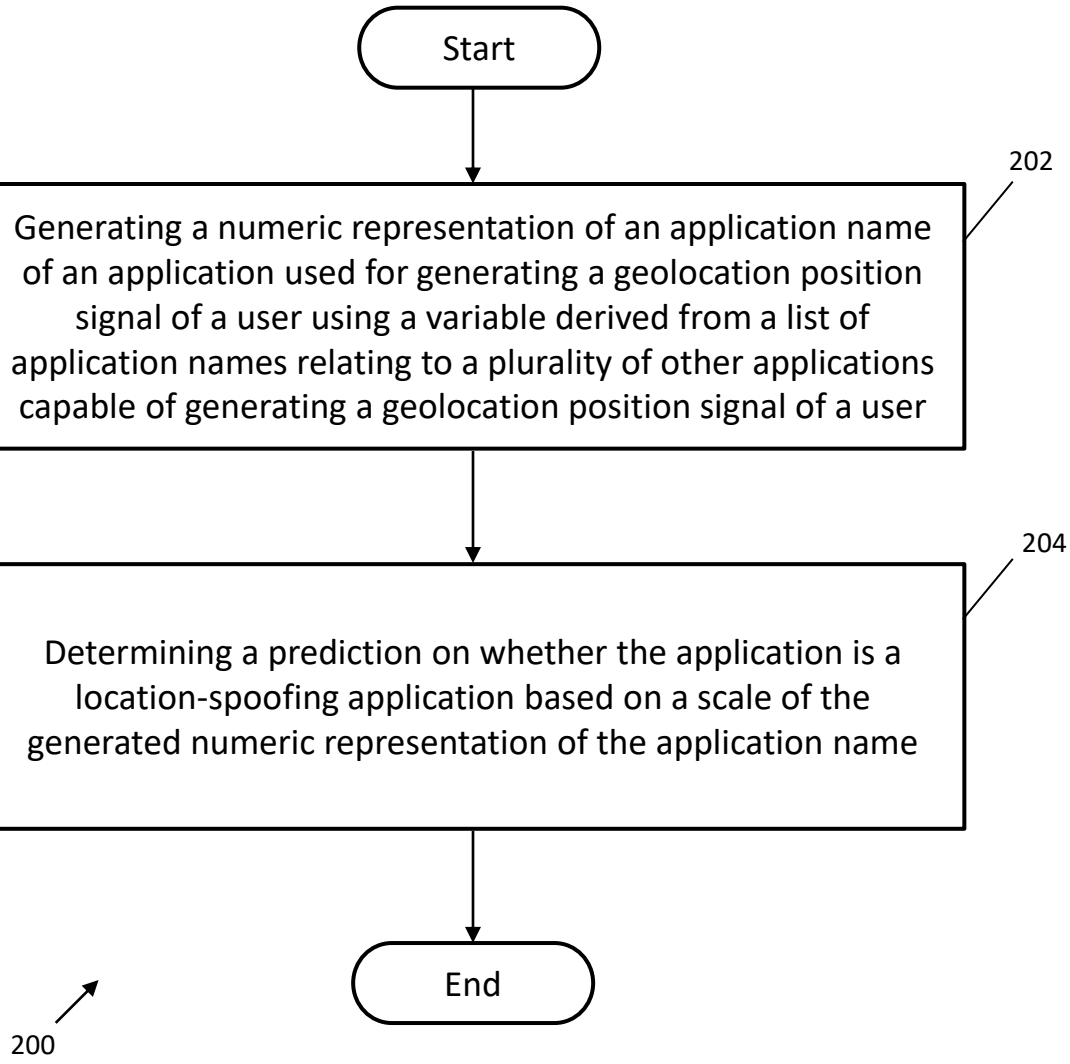

Start
202
Generating a numeric representation of an application name of an application used for generating a geolocation position signal of a user using a variable derived from a list of application names relating to a plurality of other applications capable of generating a geolocation position signal of a user
204
Determining a prediction on whether the application is a location-spoofing application based on a scale of the generated numeric representation of the application name
End
200

Figure 2

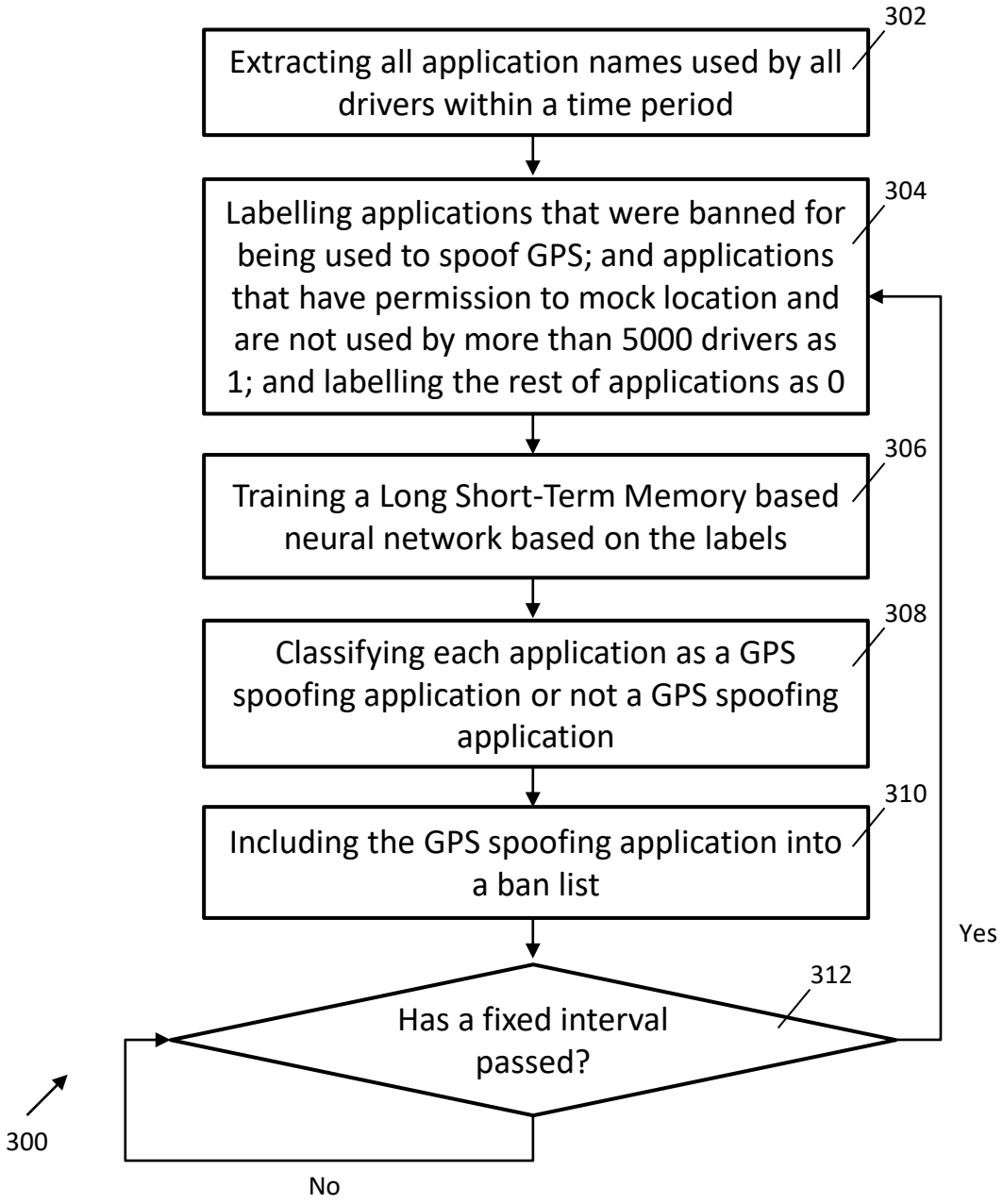

302
Extracting all application names used by all drivers within a time period
304
Labelling applications that were banned for being used to spoof GPS; and applications that have permission to mock location and are not used by more than 5000 drivers as 1; and labelling the rest of applications as 0
306
Training a Long Short-Term Memory based neural network based on the labels
308
Classifying each application as a GPS spoofing application or not a GPS spoofing application
310
Including the GPS spoofing application into a ban list
312
Has a fixed interval passed?
Yes
No
300

Figure 3

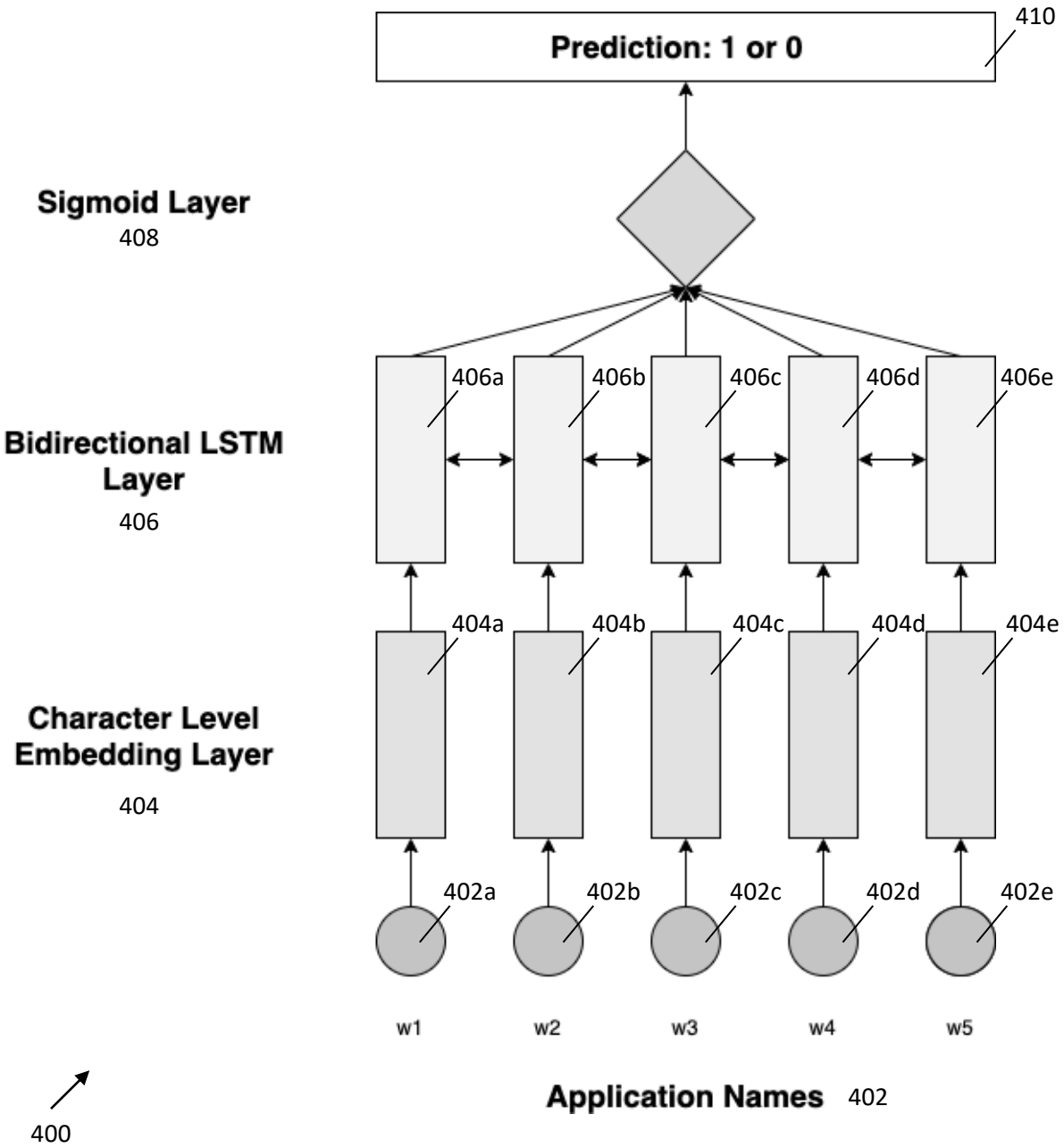

Prediction: 1 or 0
410
Sigmoid Layer
408
Bidirectional LSTM Layer
406
406a
406b
406c
406d
406e
Character Level Embedding Layer
404
404a
404b
404c
404d
404e
402a
402b
402c
402d
402e
w1
w2
w3
w4
w5
Application Names
402
400

Figure 4

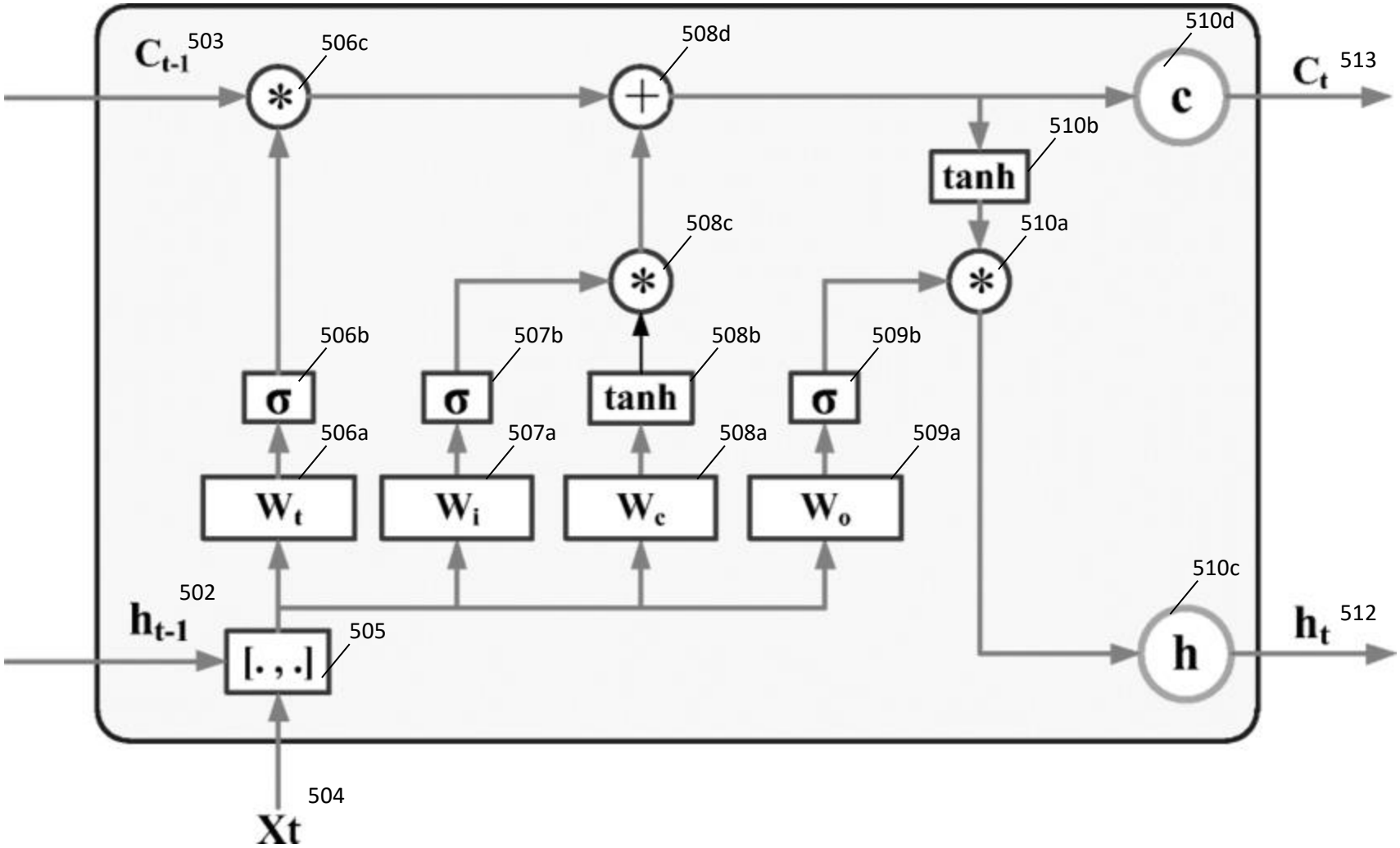

C_{t-1}
503
506c
508d
510d
C_t
513
c
tanh
510b
508c
510a
506b
507b
508b
509b
σ
σ
tanh
σ
506a
507a
508a
509a
W_t
W_i
W_c
W_o
502
h_{t-1}
505
[. , .]
510c
h_t
512
h
504
Xt

Figure 5