HAI 21.03

HAI 21.03 includes three CSV files as training datasets and five CSV files as testing datasets. The time-series data in each CSV file satisfies time continuity, and includes 84 columns. The first column represents the observed time as "yyyy-MM-dd hh:mm:ss," while the next 78 columns provide the recorded SCADA data points. The last four columns provide data labels for whether an attack occurred

or not, where the attack column was applicable to all process and the other three columns were for the corresponding control processes.

NORMAL OPERATION

An HMI operation task scheduler periodically sets the SPs and HIL simulator variables to predefined values within the normal range to simulate a benign scenario. The benign scenarios are given below.

Set points

No

P1 B2004

P1 B3004

P1 B3005

Start Time

P1 B4002

P4_ST_PS

P4_HT_PS

(Pressure SP)

(Level SP)

(Flowrate SP)

(Temperature SP)

(Scheduled Power)

(Scheduled Power)

1

0.1 (+0.002)

440 (+9)

1,100 (+22)

32 (+0)

0 (+0)

0 (+0)

03:00 (+10)

2

0.03 (+0.001)

400 (+8)

1,100 (+22)

32 (+0)

0 (+0)

0 (+0)

04:30 (+10)

3

0.1 (+0.002)

400 (+8)

1,100 (+22)

32 (+1)

0 (+0)

0 (+0)

06:00 (+10)

4

0.1 (+0.002)

400 (+8)

900 (+18)

32 (+0)

0 (+0)

0 (+0)

08:30 (+10)

5

0.1 (+0.002)

380 (+8)

1,100 (+22)

32 (+0)

0 (+0)

0 (+0)

10:00 (+10)

6

0.06 (+0.001)

420 (+8)

1,000 (+20)

32 (+0)

0 (+0)

0 (+0)

12:00 (+0)

7

0.1 (+0.002)

400 (+40)

1,100 (+22)

32 (+0)

0 (+0)

0 (+0)

14:30 (+10)

8

0.1 (+0.002)

400 (+8)

1,000 (+60)

33 (+1)

0 (+0)

0 (+0)

17:00 (+10)

9

0.1 (+0.002)

400 (+8)

1,100 (+22)

32 (+1)

0 (+0)

0 (+0)

19:30 (+10)

10

0.1 (+0.002)

400 (+8)

1,100 (+22)

32 (+1)

50 (+0)

10 (+0)

22:00 (+10)

ATTACK OPERATION

The 50 attacks were conducted, including 25 attack primitives and 25 combinations of attacks designed to simultaneously perform two attack primitives. The attack scenarios are given below.

Attack

No

Duration

ID

Start Time

Scenario

Target Controller

Target Point(s)

(sec)

1

A101

AP01

P1-PC-SP1

P1 B2016

15:35

192

-

2

A102

AP06

P1-FC-SP1

P1B3005

17:28

98

3

A103

Jul. 7,

AP13

P1-LC-CO1

P1_LCV01D

18:59

190

2020

4

A104

AP18

P2-SC-CO1

P2_SCO

20:21

60

5

A105

AP16

P2-SC-SP1

P2_AutoSD

21:03

89

6

A201

AP22

P2-TC-SP2

P2_VTR02

15:47

83

Jul. 9,

7

A202

AP02

P1-PC-SP1PV1

P1_B2016, P1_PIT01

17:38

422

2020

8

A203

AP15

P1-LC-CO1-ST7

P1_LCV01D

18:59

17

36