Electronic Supplementary Materials

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Deep learning-based signal processing for evaluating energy dispersal in bridge structures

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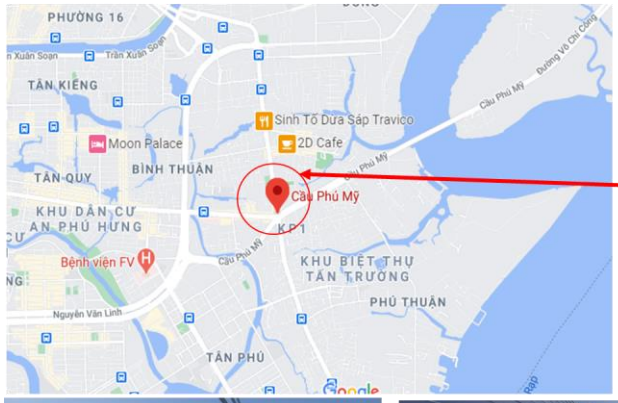
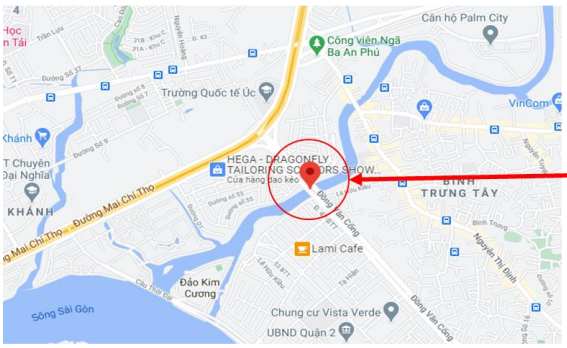
Fig. S1 Photos of Phu My cable-stayed bridge
Fig. S2 Photos of Giong Ong To 2 bridge
Fig. S3 Photos of Saigon bridge
Fig. S4 Photos of Cong Dap Rach Chiec bridge
Table S1 Predicted results from trained CNN for test scenarios



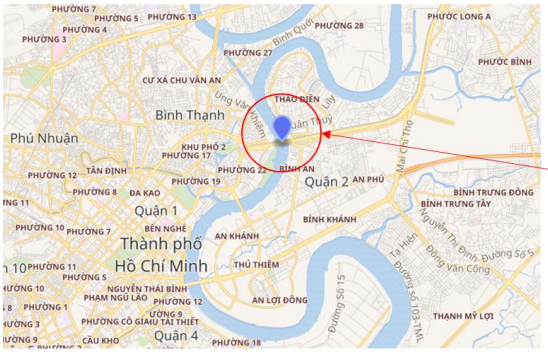
Phu My bridge, is one of the large and modern cable stayed bridges in Vietnam, crosses the Sai Gon river. It plays a very important role in the development of the southern area of Ho Chi Minh city. It was built in 2005 and opened in 2009.
Structural Bridge: Prestressed Concrete
Basic specifications of the bridge are as follows:
- The length of the bridge: 403.7 m
- Allowable payload: 30 tons
- The number of spans: 36 spans
- The number of piers: 35 piers
- Roadway width 22.7 m

Fig. S1 Photos of Phu My cable-stayed bridge



Built in 2000, opened in 2002
Structural Bridge: Prestressed Concrete
Basic specifications of the bridge are as follows:
- The length of the bridge: 403.7 m
- Allowable payload: 30 tons
- The number of spans: 16 spans
- The number of piers: 15 piers
- Beam I: 7 beams
- Roadway width 8m

Fig. S2 Photos of Giong Ong To 2 bridge



Built in 1958, opened in 1961, upgraded 2000
Structural Bridge: Prestressed Concrete
Basic specifications of the bridge are as follows:
- The length of the bridge: 986.12 m
- Allowable payload: HL-93
- The number of spans: 32 spans
- The number of piers: 31 piers
- Beam I: 21 beams
- Roadway width 24m

Fig. S3 Photos of Saigon bridge

Built in 1990, opened in 1990
Structural Bridge: Precast Concrete
Basic specifications of the bridge are as follows:
- The length of the bridge: 9m
- Allowable payload: 8 tons
- The number of spans: 3 spans
- The number of piers: 2 piers
- Beam T: 4 beams
- Roadway width 6m

Fig. S4 Photos of Cong Dap Rach Chiec bridge

Table S1 Predicted results from trained CNN for test scenarios

No	Sp*	St*	Re*	No	Sp*	St*	Re*
1	17 (1/2019)	PM* - class 1	1 (R*)	14	14 (9/2019)	GOT2 - class 2	2 (R)
2	17 (3/2019)	PM - class 1	1 (R)	15	15 (9/2019)	GOT2 - class 2	2 (R)
3	17 (5/2019)	PM - class 1	1 (R)	16	16 (9/2019)	GOT2 - class 2	2 (R)
4	17 (6/2019)	PM - class 1	1 (R)	17	12 (9/2019)	SG* - class 3	3 (R)
5	17 (7/2019)	PM - class 1	1 (R)	18	16 (9/2019)	SG - class 3	3 (R)
6	17 (9/2019)	PM - class 1	1 (R)	19	17 (9/2019)	SG - class 3	3 (R)
7	17 (11/2019)	PM - class 1	1 (R)	20	18 (9/2019)	SG - class 3	3 (R)
8	8 (9/2019)	GOT2* - class 2	1 (W*)	21	19 (9/2019)	SG - class 3	3 (R)
9	9 (9/2019)	GOT2 - class 2	4 (W)	22	26 (9/2019)	SG - class 3	3 (R)
10	10 (9/2019)	GOT2 - class 2	2 (R)	23	32 (9/2019)	SG - class 3	3 (R)
11	11 (9/2019)	GOT2 - class 2	2 (R)	24	1 (2018)	CD* - class 4	4 (R)
12	12 (9/2019)	GOT2 - class 2	2 (R)	25	2 (2018)	CD - class 4	4 (R)
13	13 (9/2019)	GOT2 - class 2	2 (R)	26	3 (2018)	CD - class 4	4 (R)

Sp*: Vibration signal measured in Span (Ex: 17 (1/2019) means a signal of the 17th span in 1/2019).
St*: Structural State (PM*: Phu My cable-stayed bridge, GOT2*: Giong Ong To 2 bridge, SG*: Sai Gon bridge and CD*: Cong Dap Rach Chiec bridge).
Re*: The predicted Results from CNN, R*: Right, and W*: Wrong.