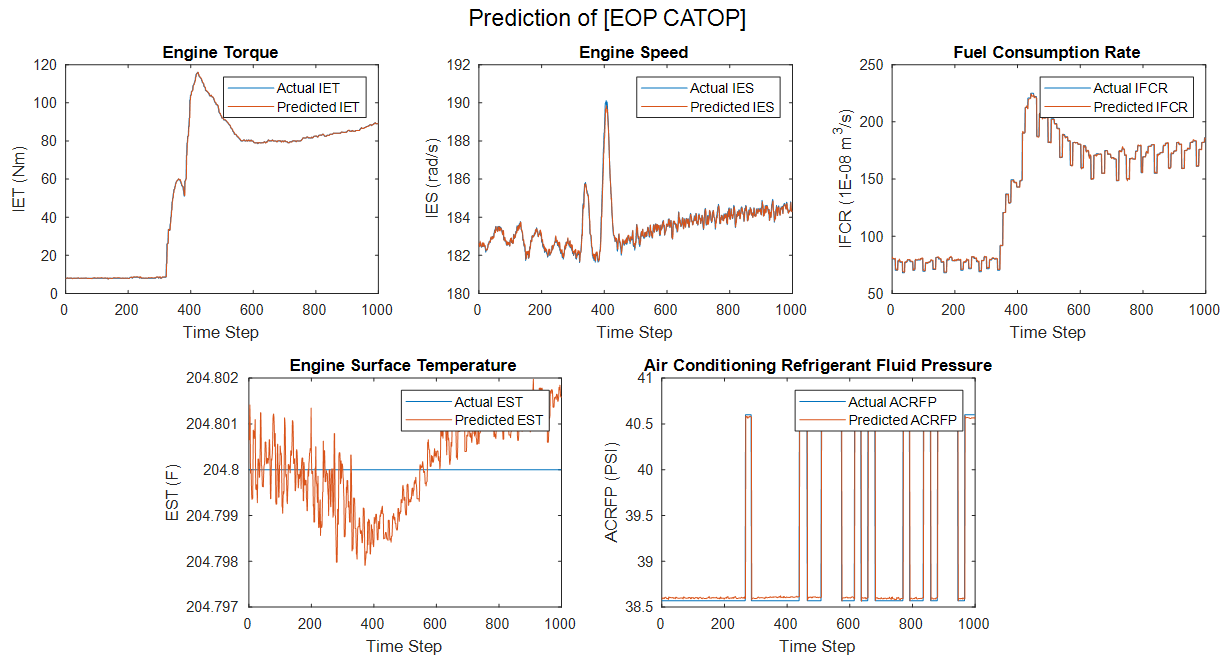
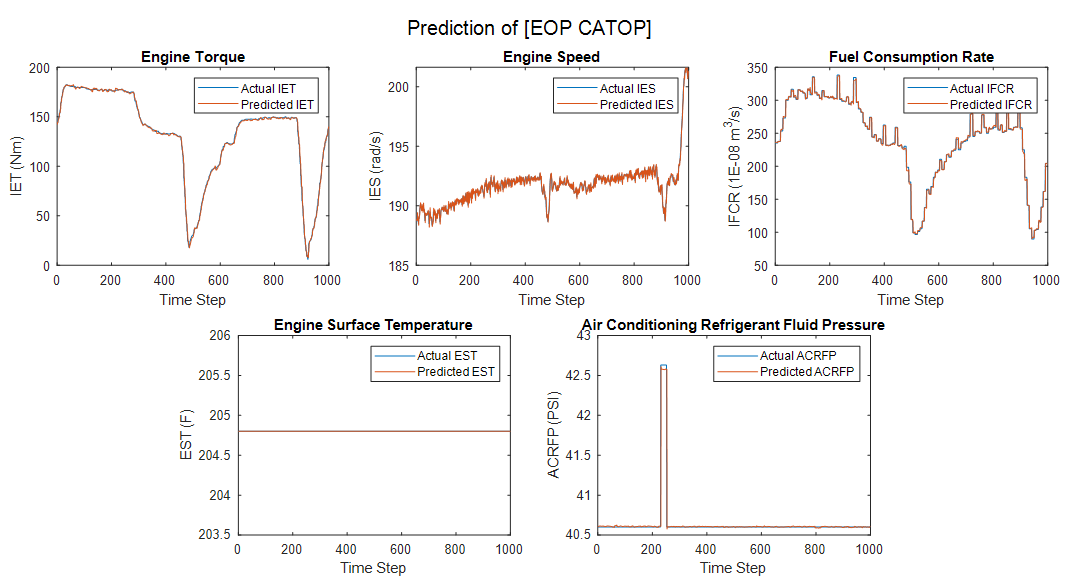
**Intelligent Vehicle Drive Mode Which Predicts the Driver Behaviour Vector to augment   
Engine Performance in Real-time**  
  
**Srikanth Kolachalama\*, Hafiz Malik**

Electrical and Computer Engineering, University of Michigan, Dearborn 48128, USA  
Corresponding author: [skola@umich.edu](mailto:skola@umich.edu); Co-author: [hafiz@umich.edu](mailto:hafiz@umich.edu)

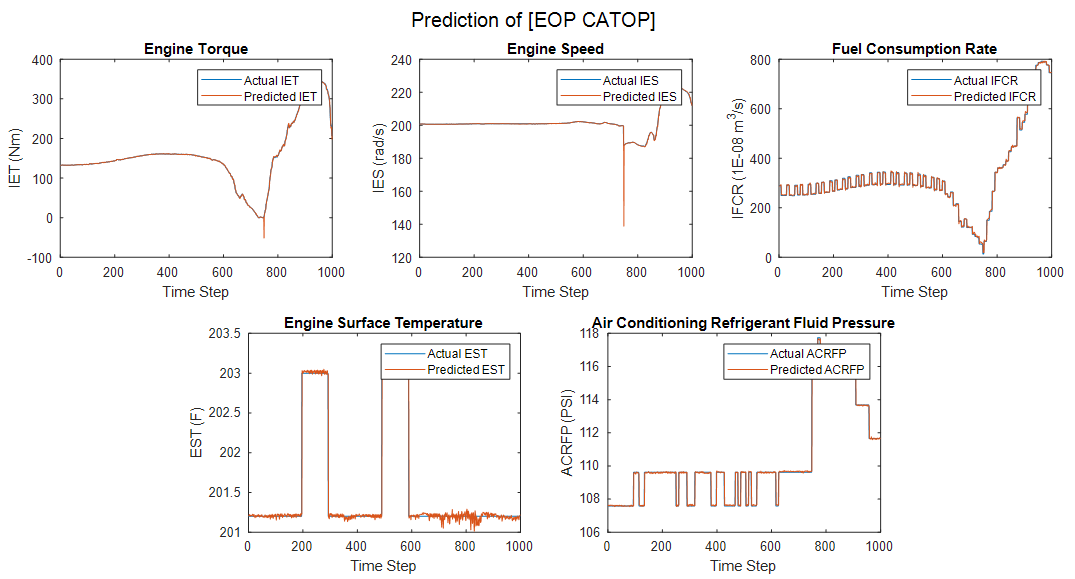
**Supplementary Material - Figures**

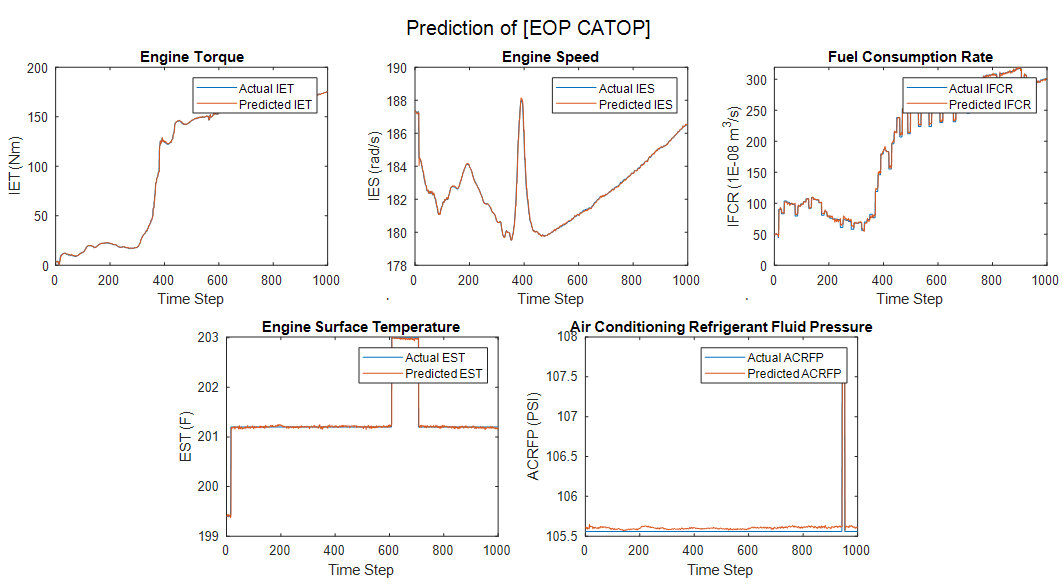
1. **Prediction of [EOP, CATOP] - NARX and LSTM methods**

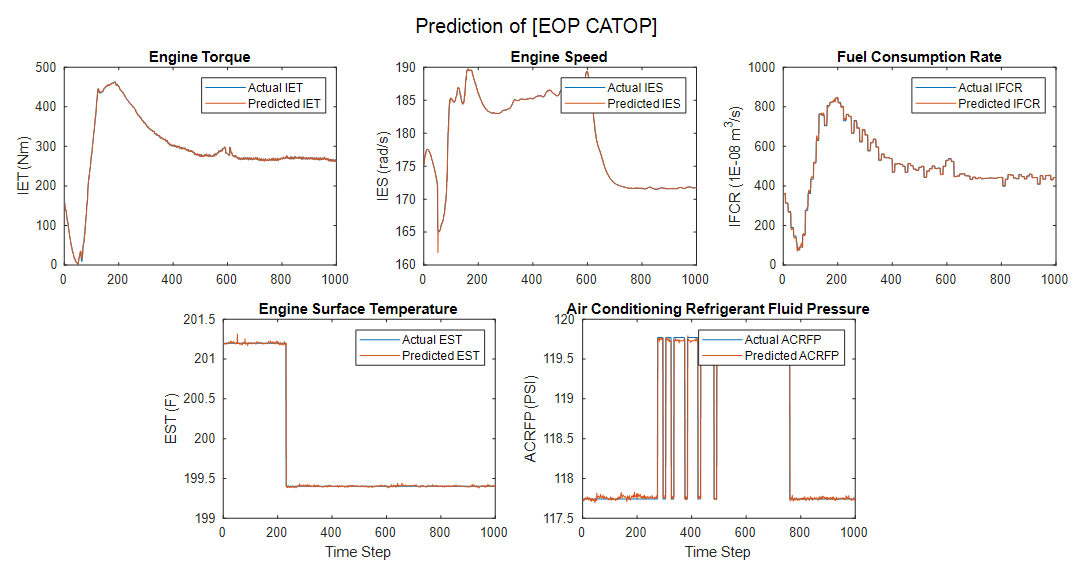
  
**Figure S1**: NARX Prediction of EOP and CATOP - Cadillac XT6, Dataset 1

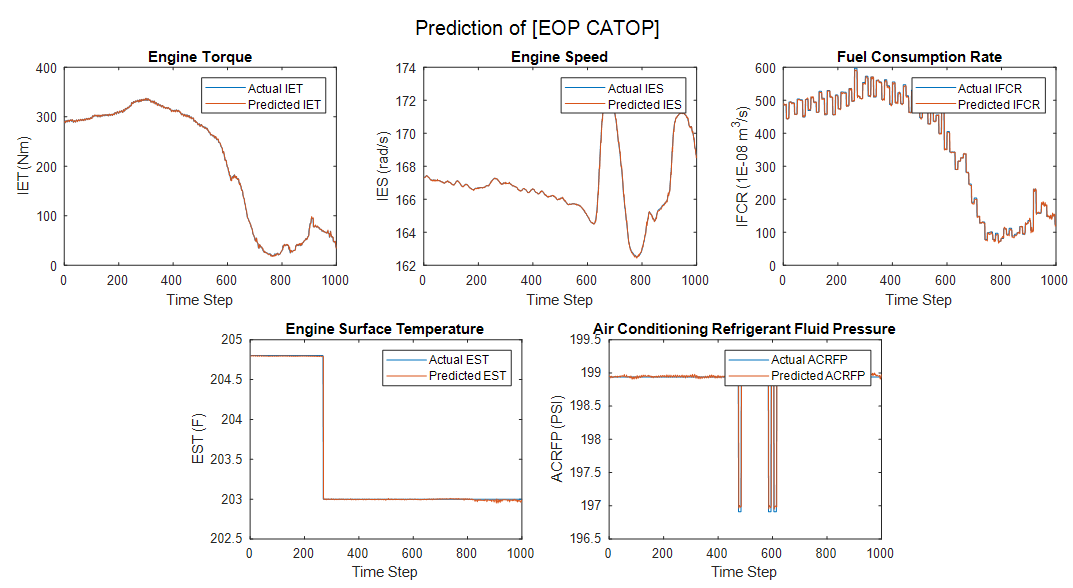
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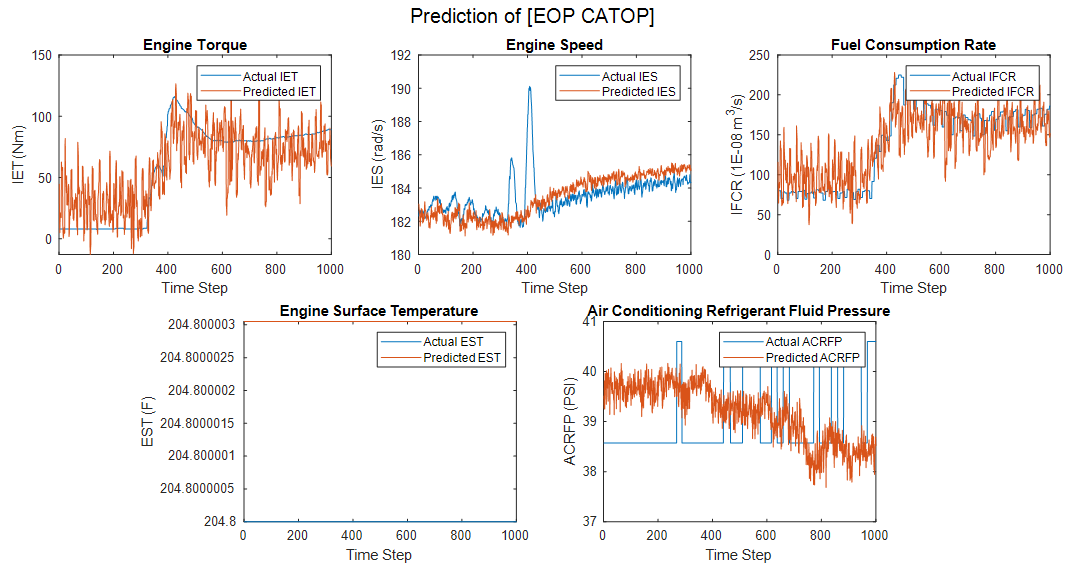
**Figure S2**: NARX Prediction of EOP and CATOP - Cadillac XT6, Dataset 2

**Figure S3**: NARX Prediction of EOP and CATOP - Cadillac CT4, Dataset 1

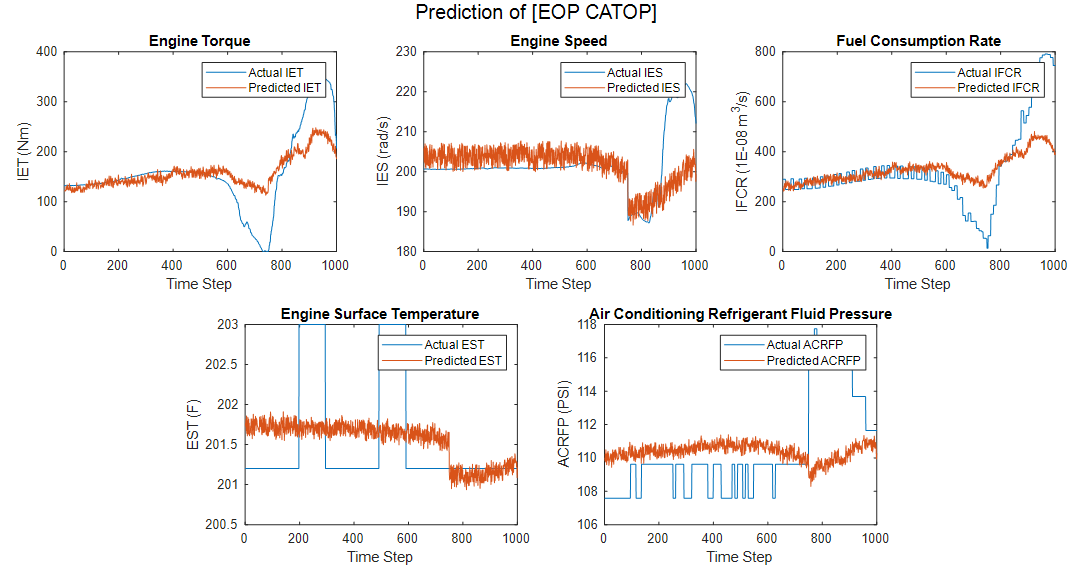
**Figure S4**: NARX Prediction of EOP and CATOP - Cadillac CT4, Dataset 2

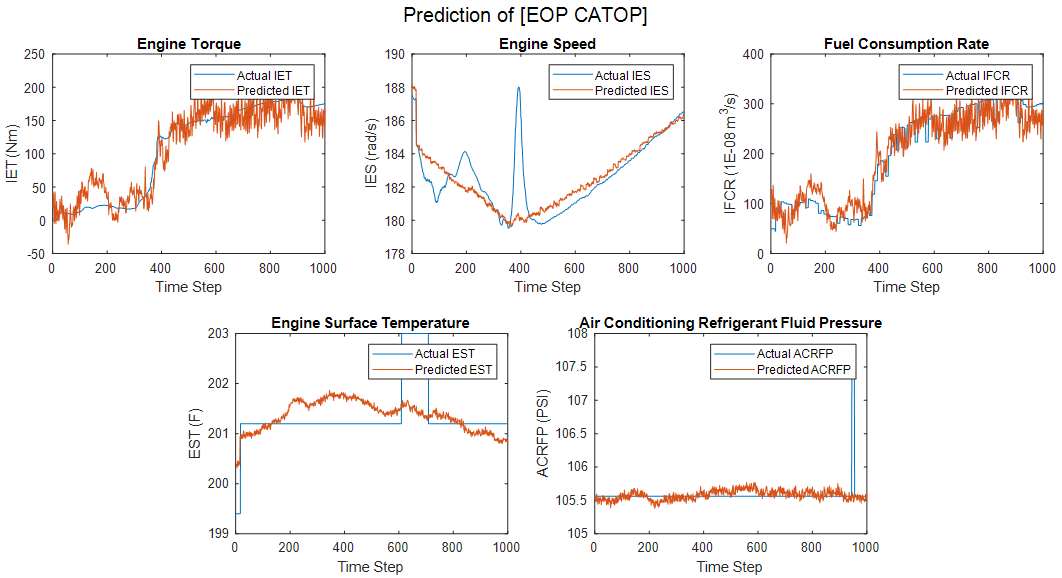
 **Figure S5**: NARX Prediction of EOP and CATOP - Cadillac Escalade ESV, Dataset 1

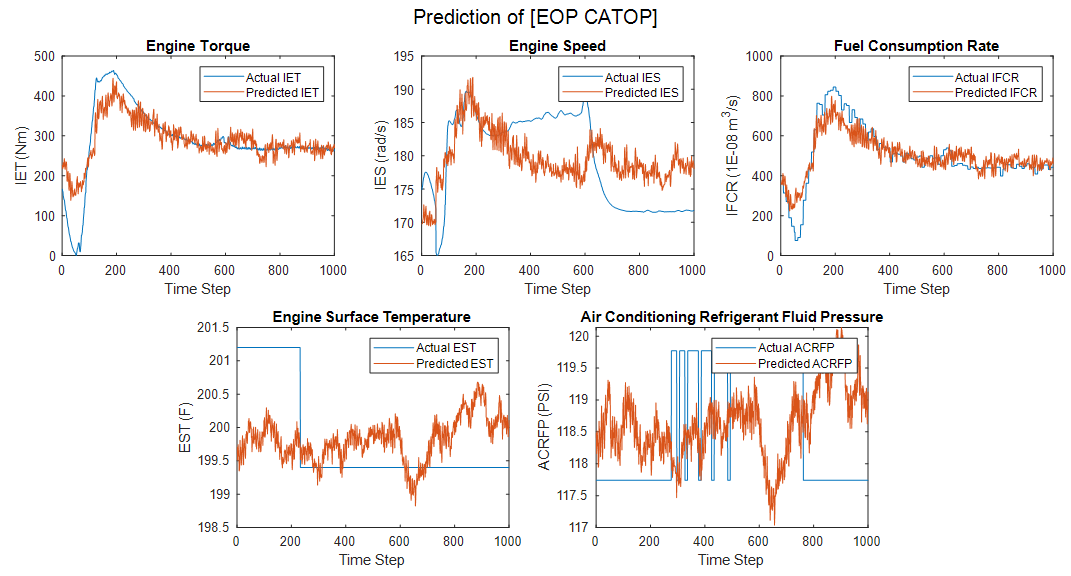
**Figure S6**: NARX Prediction of EOP and CATOP - Cadillac Escalade AWD ESV, Dataset 2

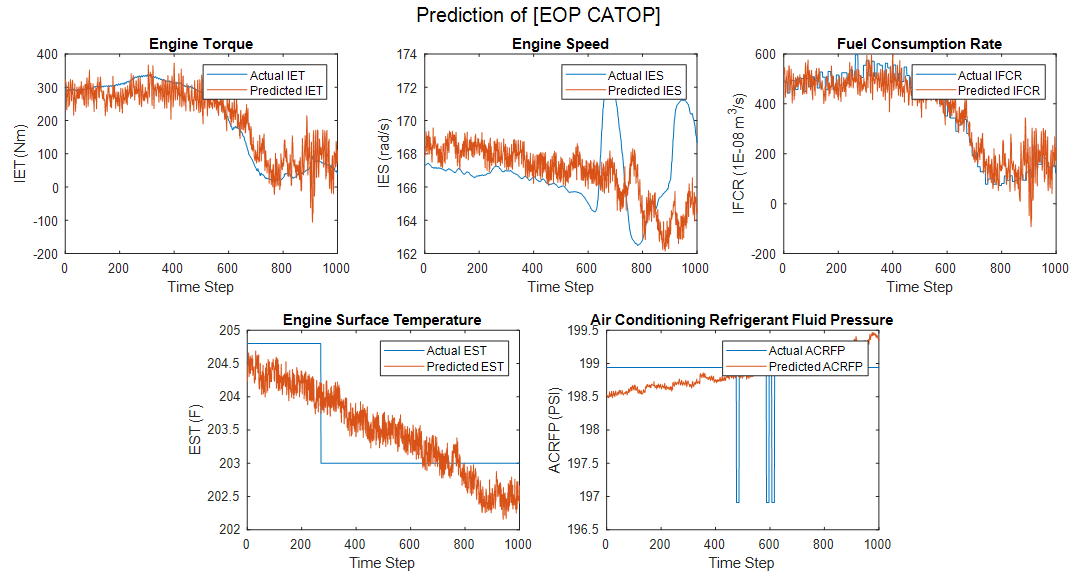
**Figure S7**: LSTM Prediction of EOP and CATOP - Cadillac XT6, Dataset 1

**Figure S8**: LSTM Prediction of EOP and CATOP - Cadillac XT6, Dataset 2

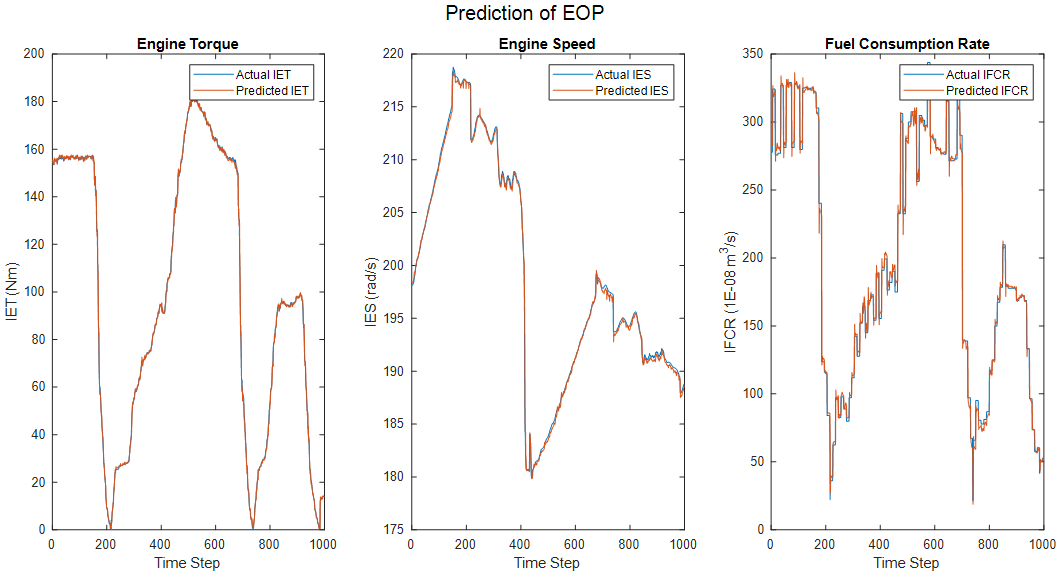
**Figure S9**: LSTM Prediction of EOP and CATOP - Cadillac CT4, Dataset 1

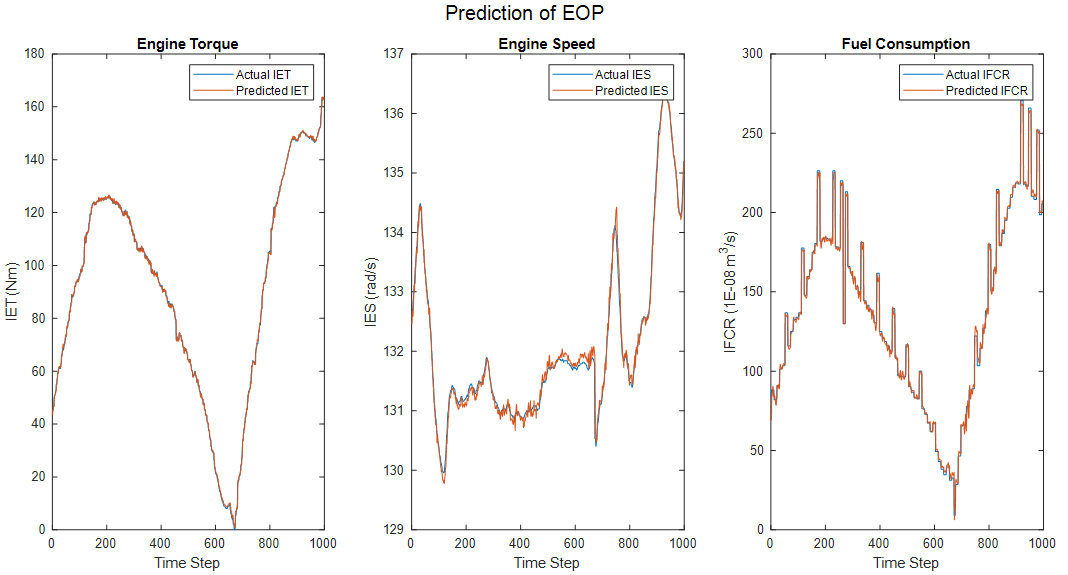
**Figure S10**: LSTM Prediction of EOP and CATOP - Cadillac CT4, Dataset 2

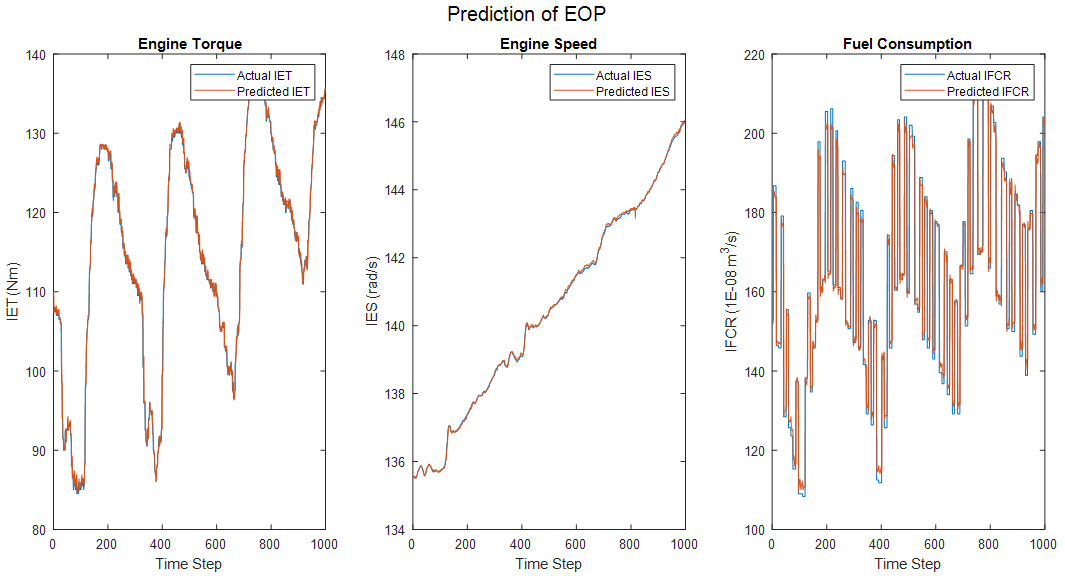
**Figure S11**: LSTM Prediction of EOP and CATOP - Cadillac Escalade ESV, Dataset 1

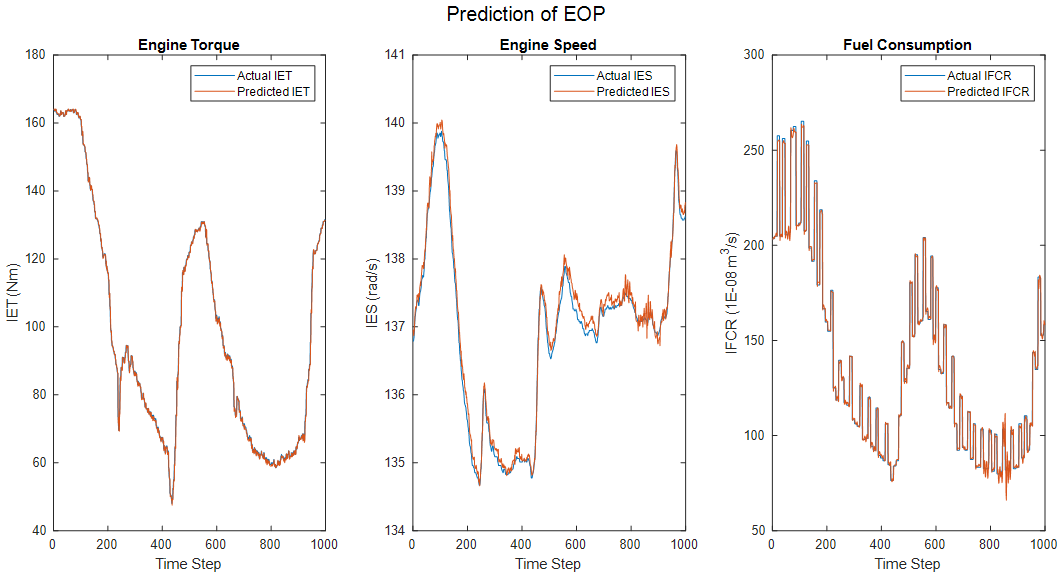
**Figure S12**: LSTM Prediction of EOP and CATOP - Cadillac Escalade AWD, Dataset 2

1. **Prediction of EOP - 2020 Cadillac CT5**

**Figure S13**: EOP-ACCSSP = 30 MPH

**Figure S14**: EOP-ACCSSP = 40 MPH

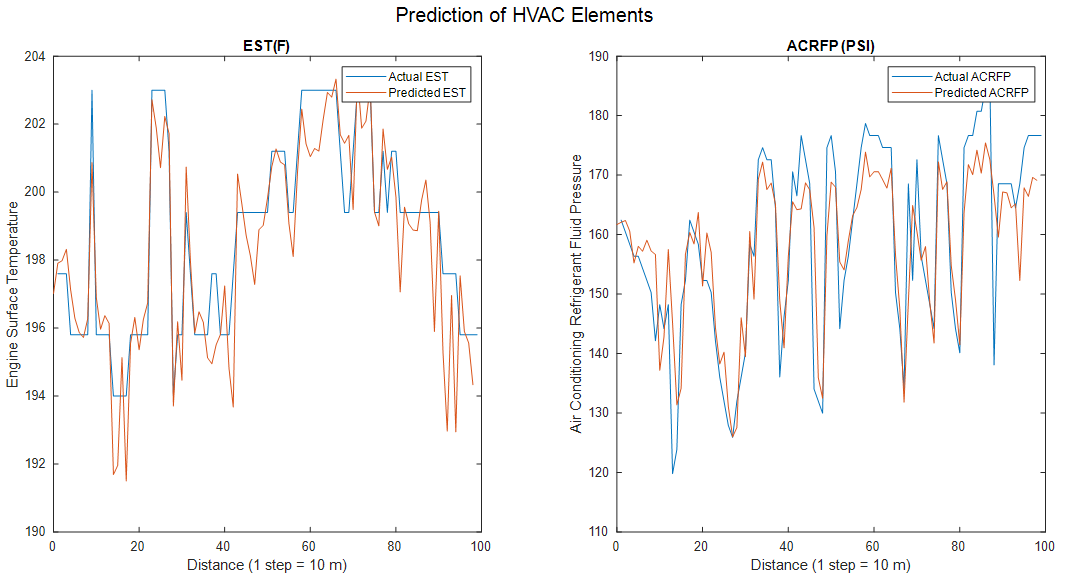
**Figure S15**: EOP-ACCSSP = 50 MPH

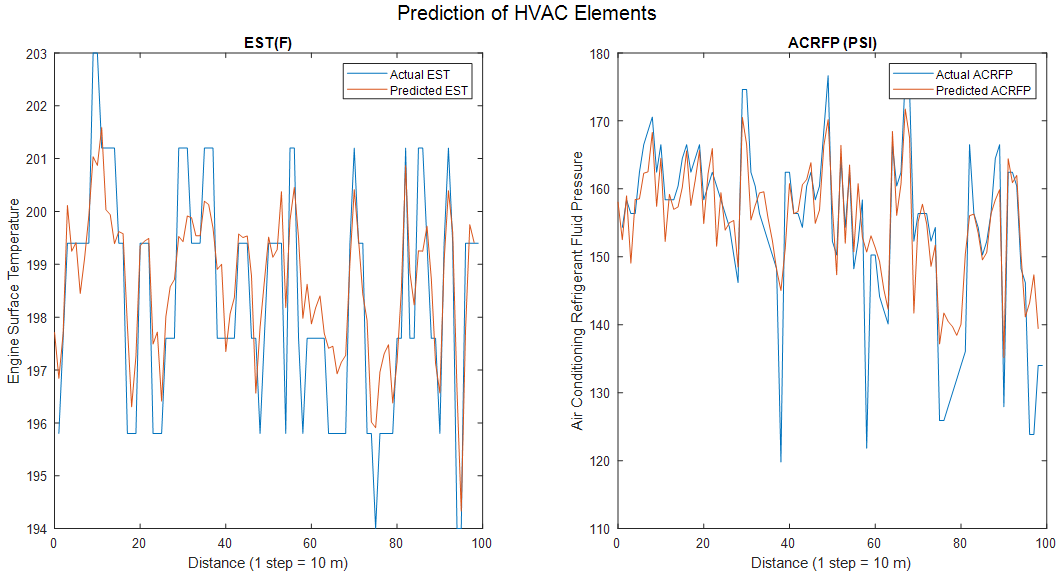
**Figure S16**: EOP-ACCSSP = 60 MPH

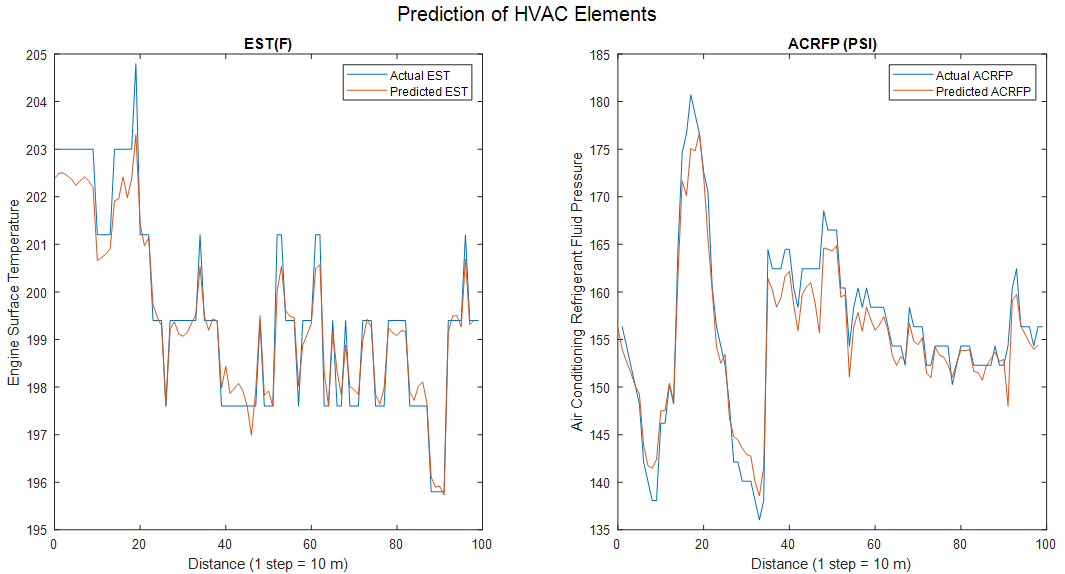


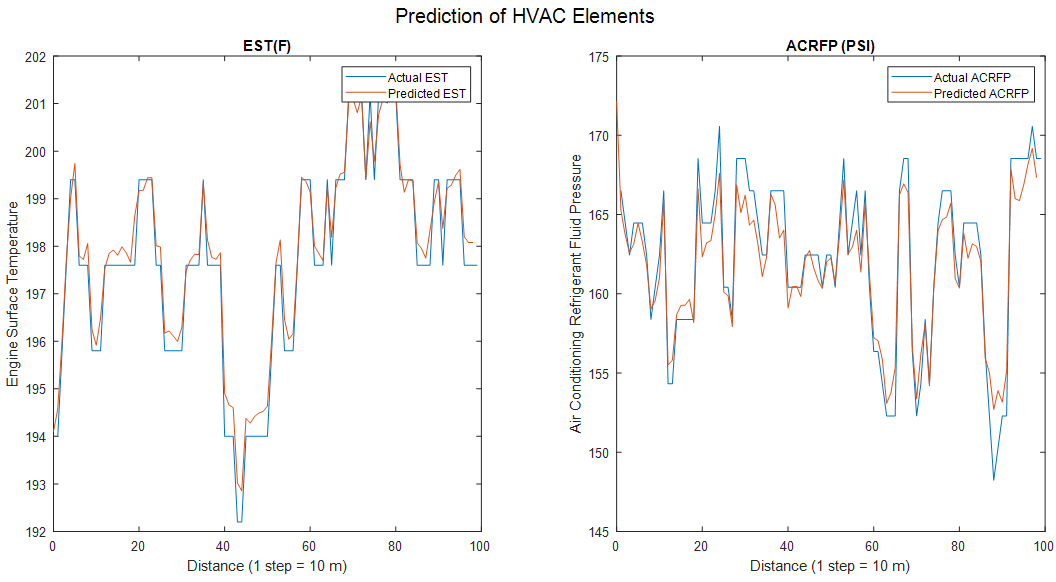
**Figure S17**: EOP-ACCSSP = 70 MPH

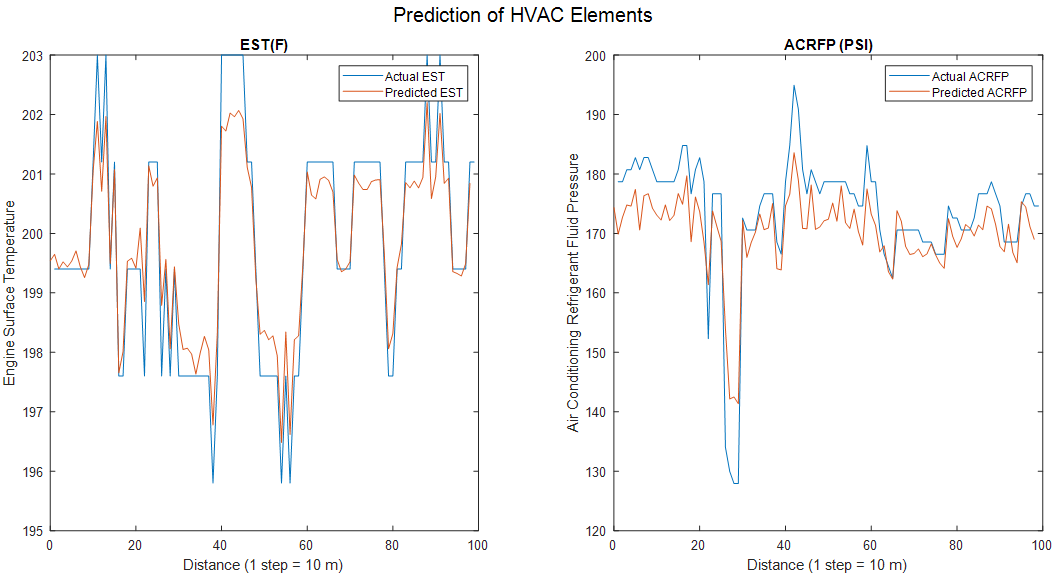
1. **Prediction of CATOP - 2020 Cadillac CT5 (EAT > 65** ℉**)**

**Figure S18**: ACCSSP = 35 MPH, CAT=67 ℉, EAT=83.3℉

**Figure S19**: ACCSSP = 45 MPH, CAT=65 ℉, EAT=80.3℉

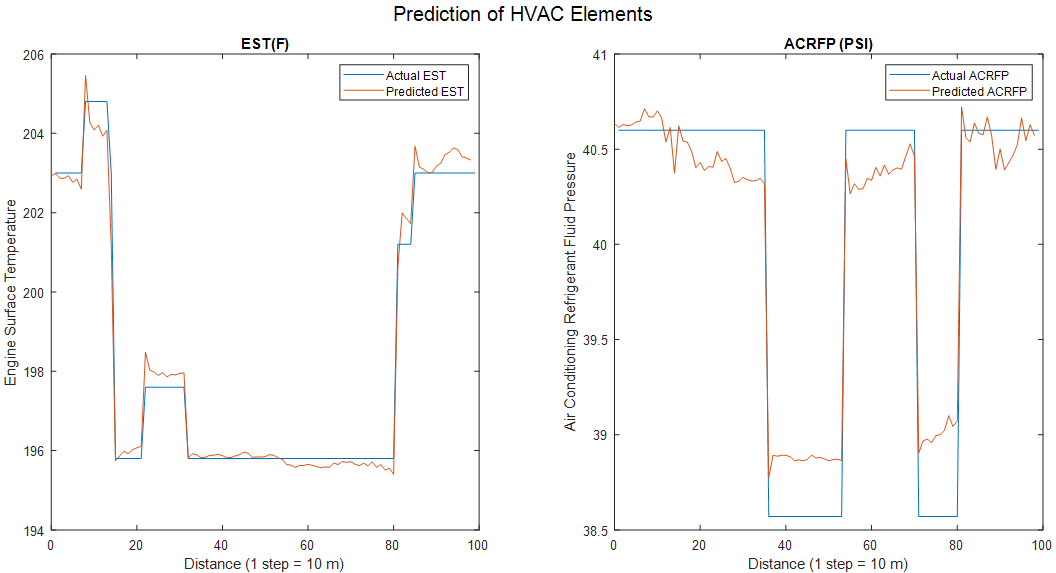
**Figure S20**: - ACCSSP = 55 MPH, CAT=66 ℉, EAT=70.2℉

**Figure S21**: ACCSSP = 65 MPH, CAT=68 ℉, EAT=80.9℉

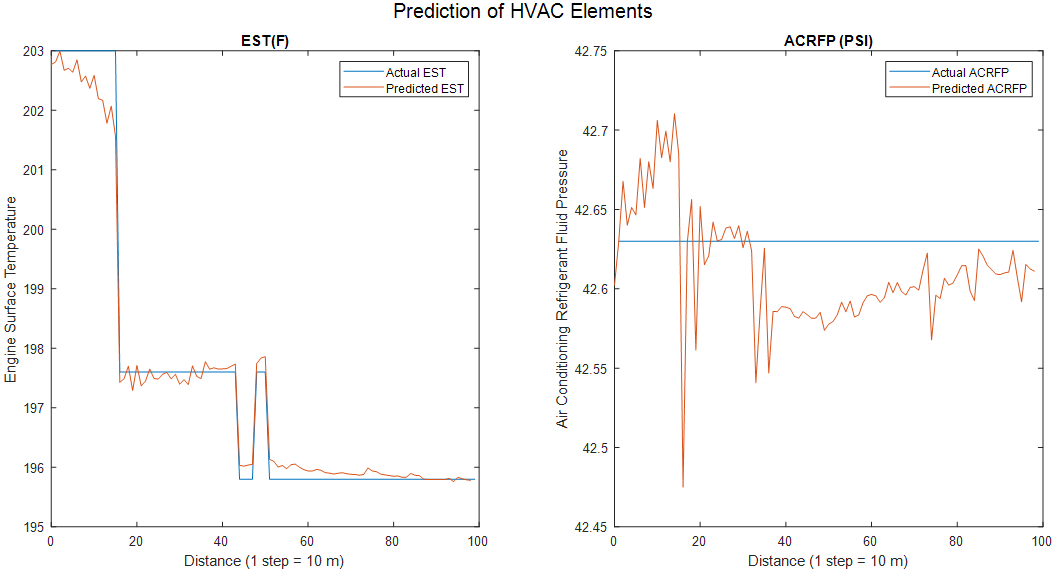


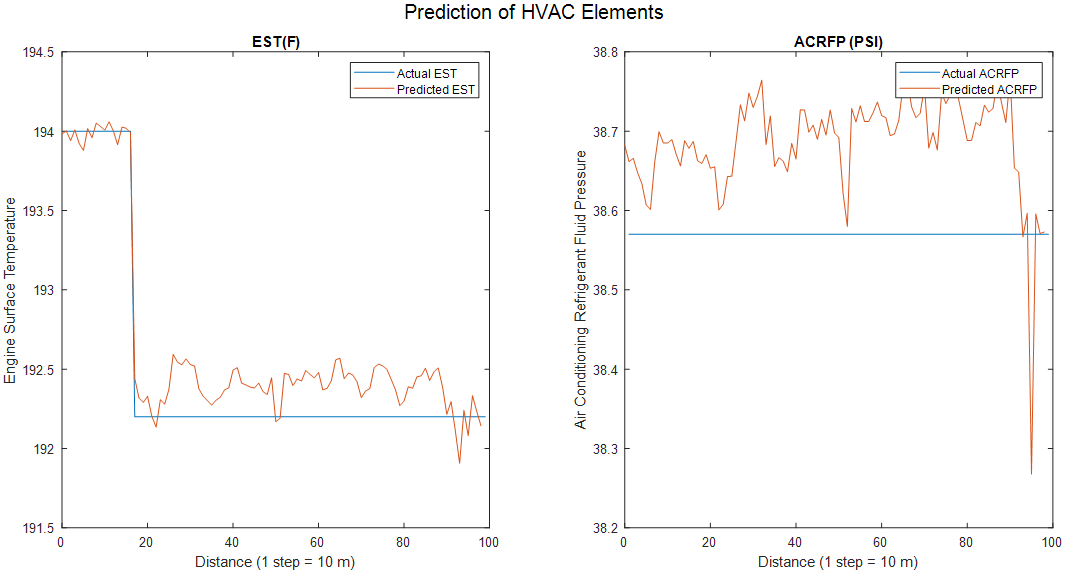
**Figure S22**: ACCSSP = 75 MPH, CAT = 69 ℉, EAT = 84.62 ℉

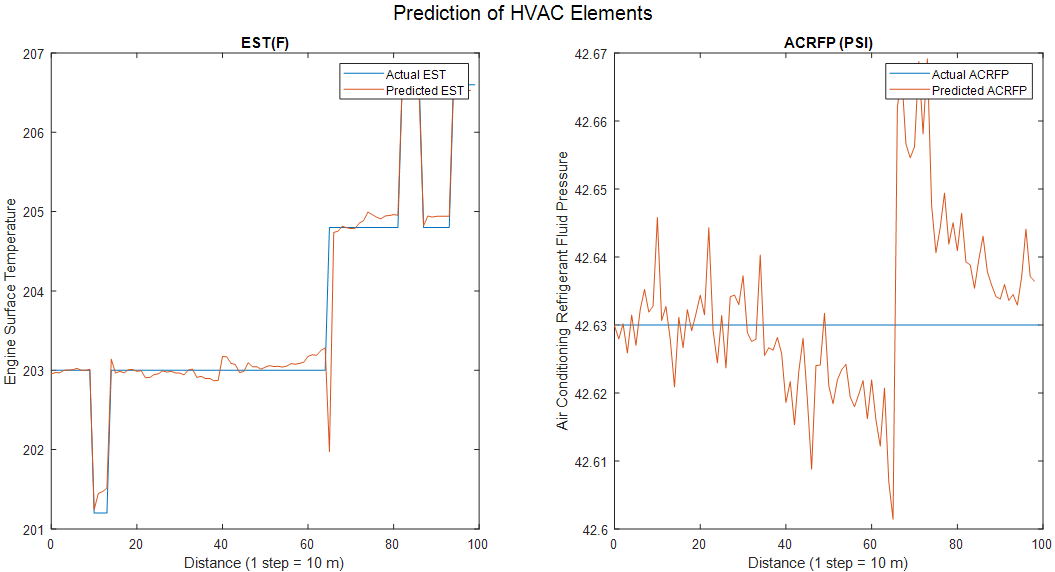
1. **Prediction of CATOP - 2020 Cadillac CT5 (EAT < 45** ℉**)**

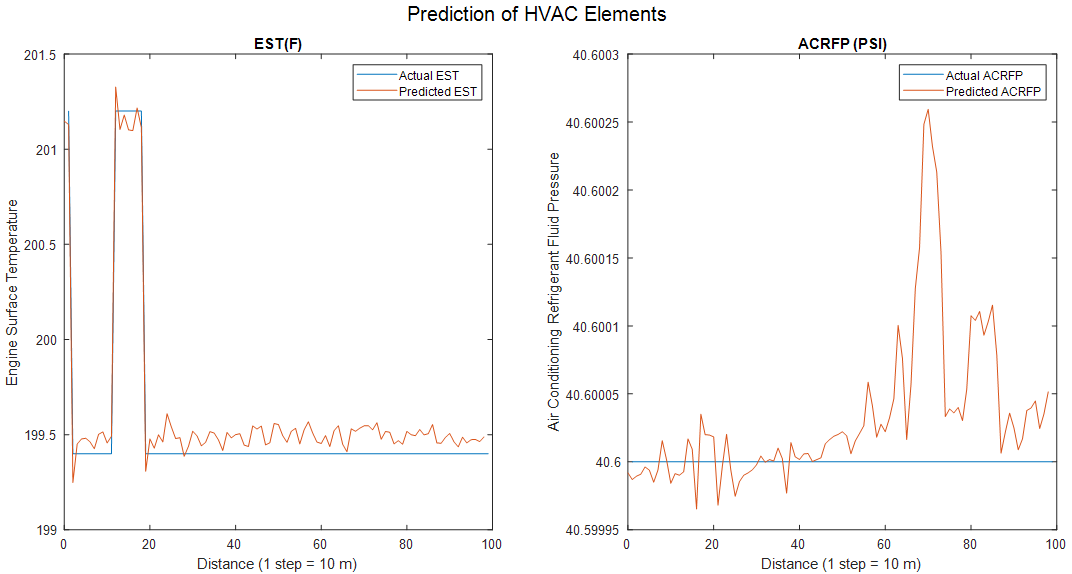
**Figure S23**: ACCSSP = 35 MPH, CAT = 76 ℉,

EAT=36.4 ℉

**Figure S24**: ACCSSP = 45 MPH, CAT = 71 ℉,   
EAT=39.1 ℉

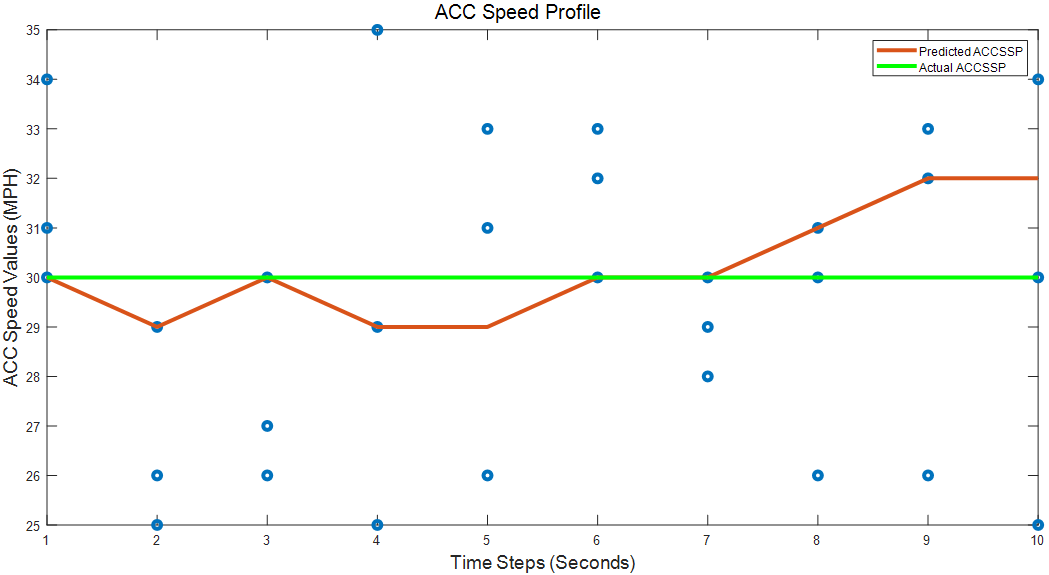
**Figure S25**: ACCSSP = 55 MPH, CAT = 85 ℉,   
EAT=34.7 ℉

**Figure S26**: ACCSSP =65 MPH, CAT = 80 ℉,   
EAT=38.9 ℉

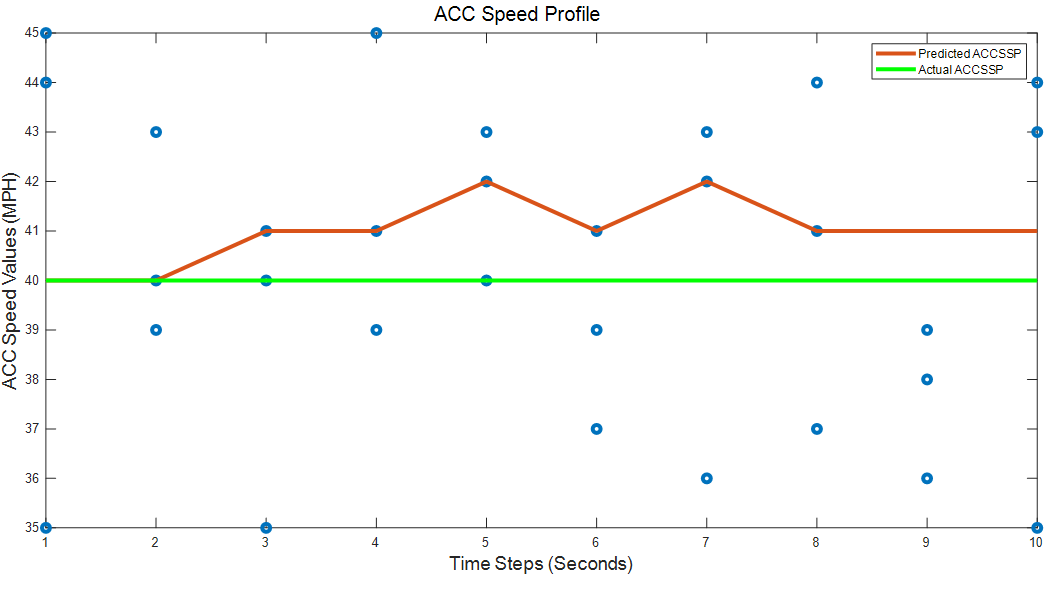


**Figure S27**: ACCSSP = 75 MPH, CAT = 75 ℉, EAT = 37.4 ℉

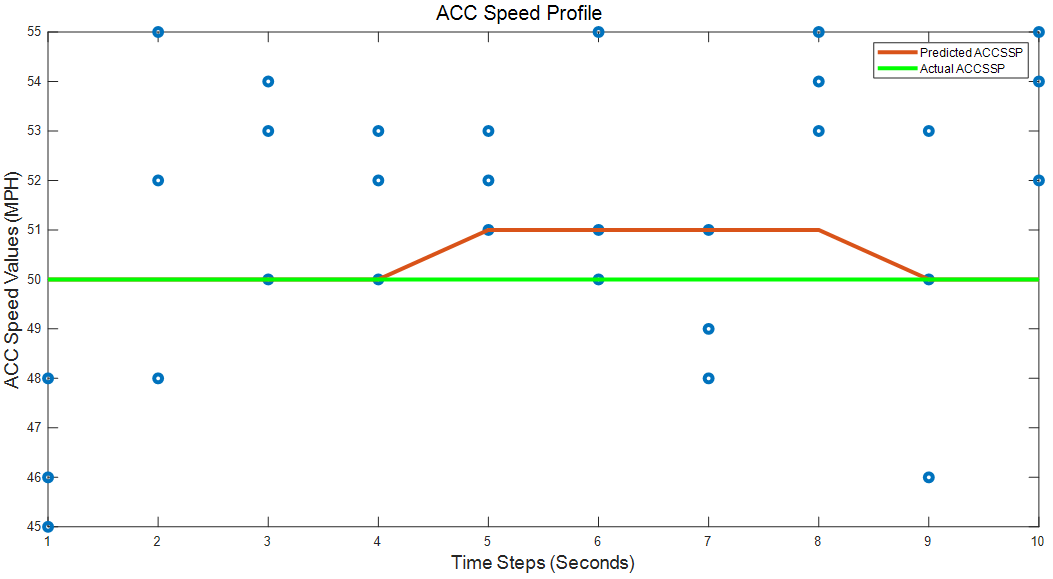
1. **Prediction of ACCSSP - 2020 Cadillac CT5**



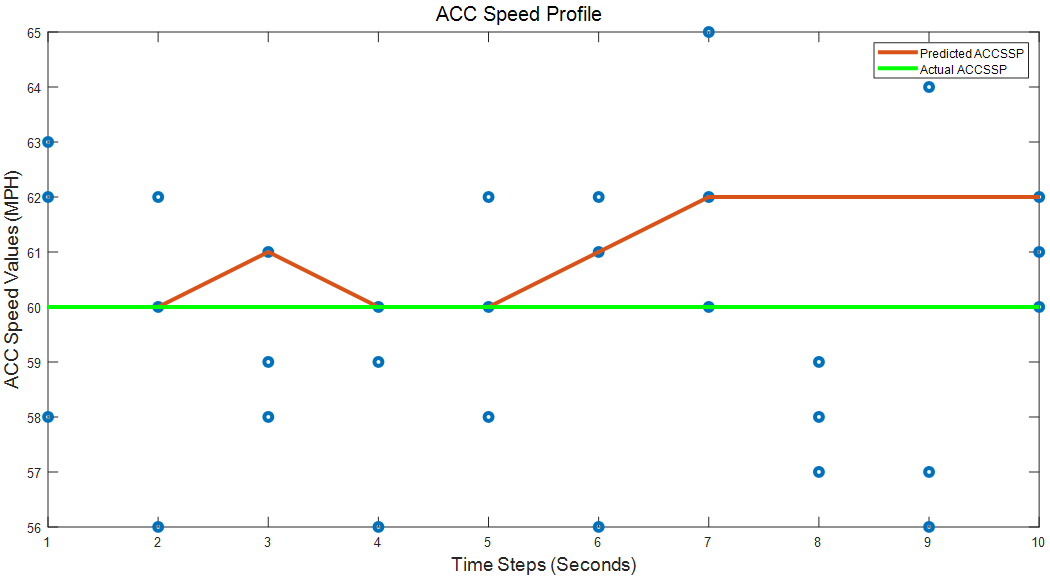
**Figure S28:** Predicted ACCSSP—Initial ACC Speed = 30 MPH.



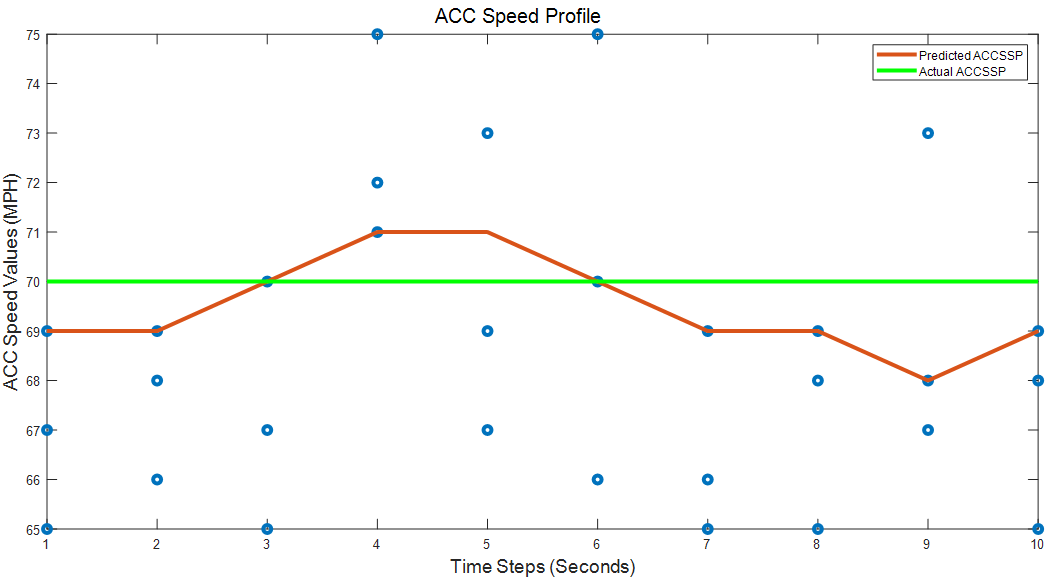
**Figure S29:** Predicted ACCSSP—Initial ACC Speed = 40 MPH.



**Figure S30:** Predicted ACCSSP—Initial ACC Speed = 50 MPH.

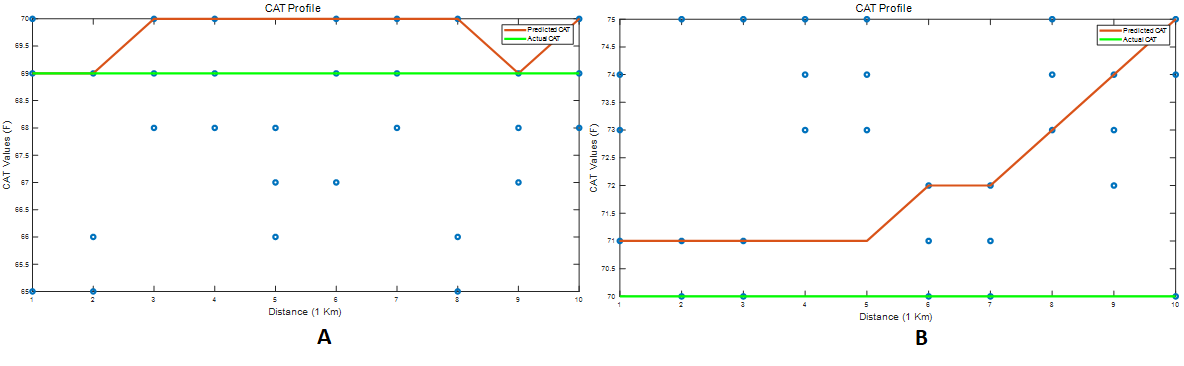


**Figure S31:** Predicted ACCSSP—Initial ACC Speed = 60 MPH.

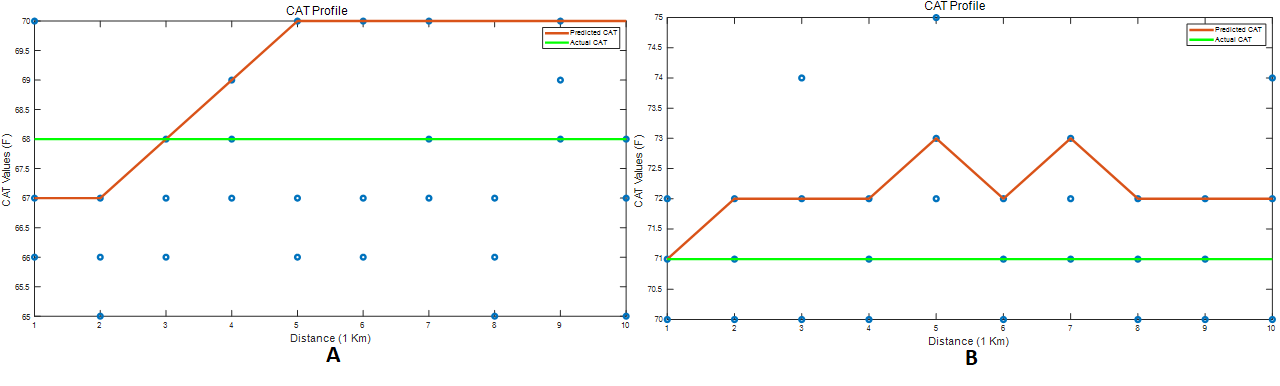


**Figure S32:** Predicted ACCSSP—Initial ACC Speed = 70 MPH.

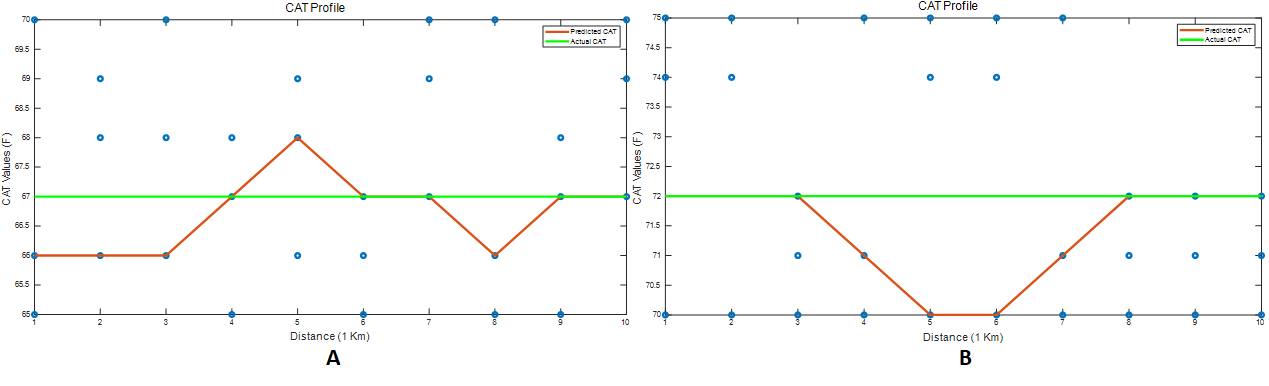
1. **Prediction of CATSP - 2020 Cadillac CT5**



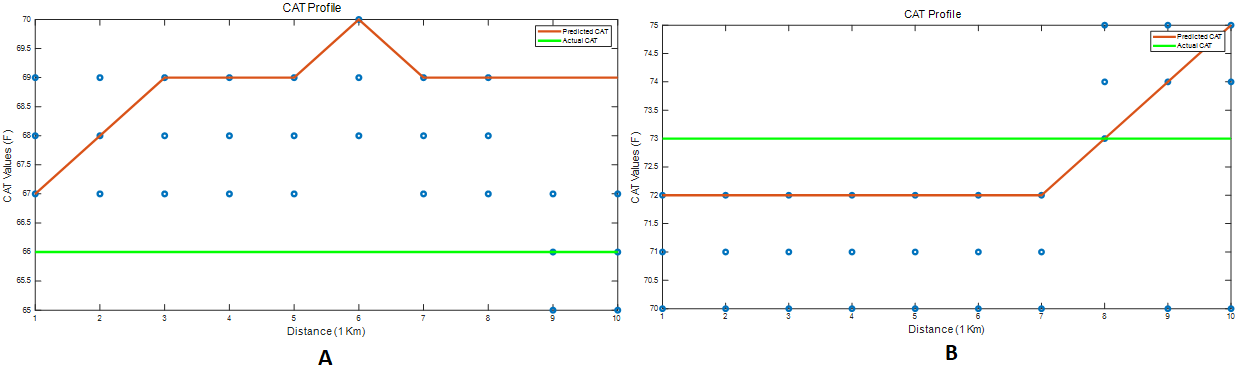
**Figure S33:** CATSP: (A) ICAT = 69 ℉; EAT = 82.07 ℉; (B) ICAT = 70 ℉; EAT = 37.98 ℉—ACCSSP = 30 MPH.



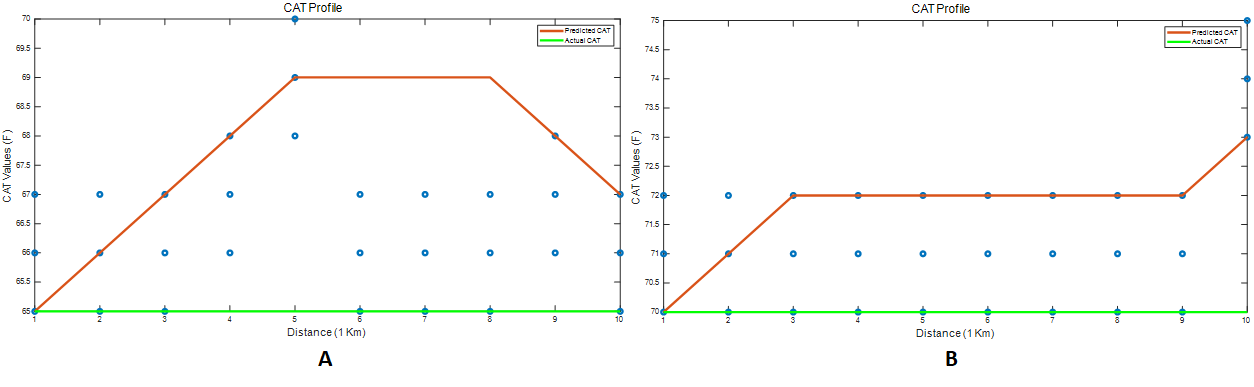
**Figure S34:** CATSP: (A) ICAT = 68 ℉; EAT = 85.29 ℉; (B) ICAT = 71 ℉; EAT = 37.63 ℉—ACCSSP = 40 MPH.



**Figure S35:** CATSP: (A) ICAT = 66 ℉; EAT = 80.726 ℉; (B) ICAT = 72 ℉; EAT = 40.1 ℉—ACCSSP = 50 MPH.

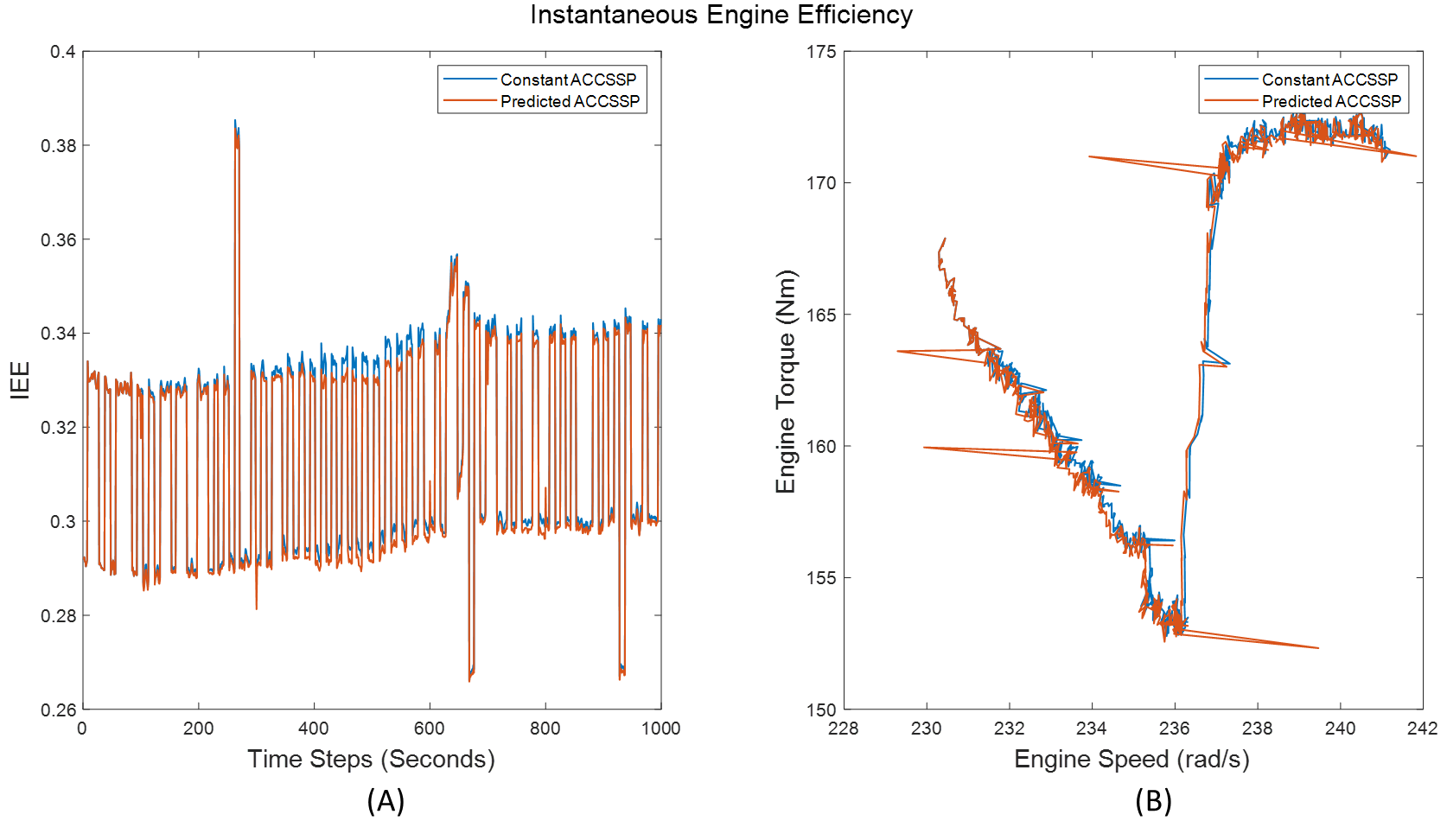


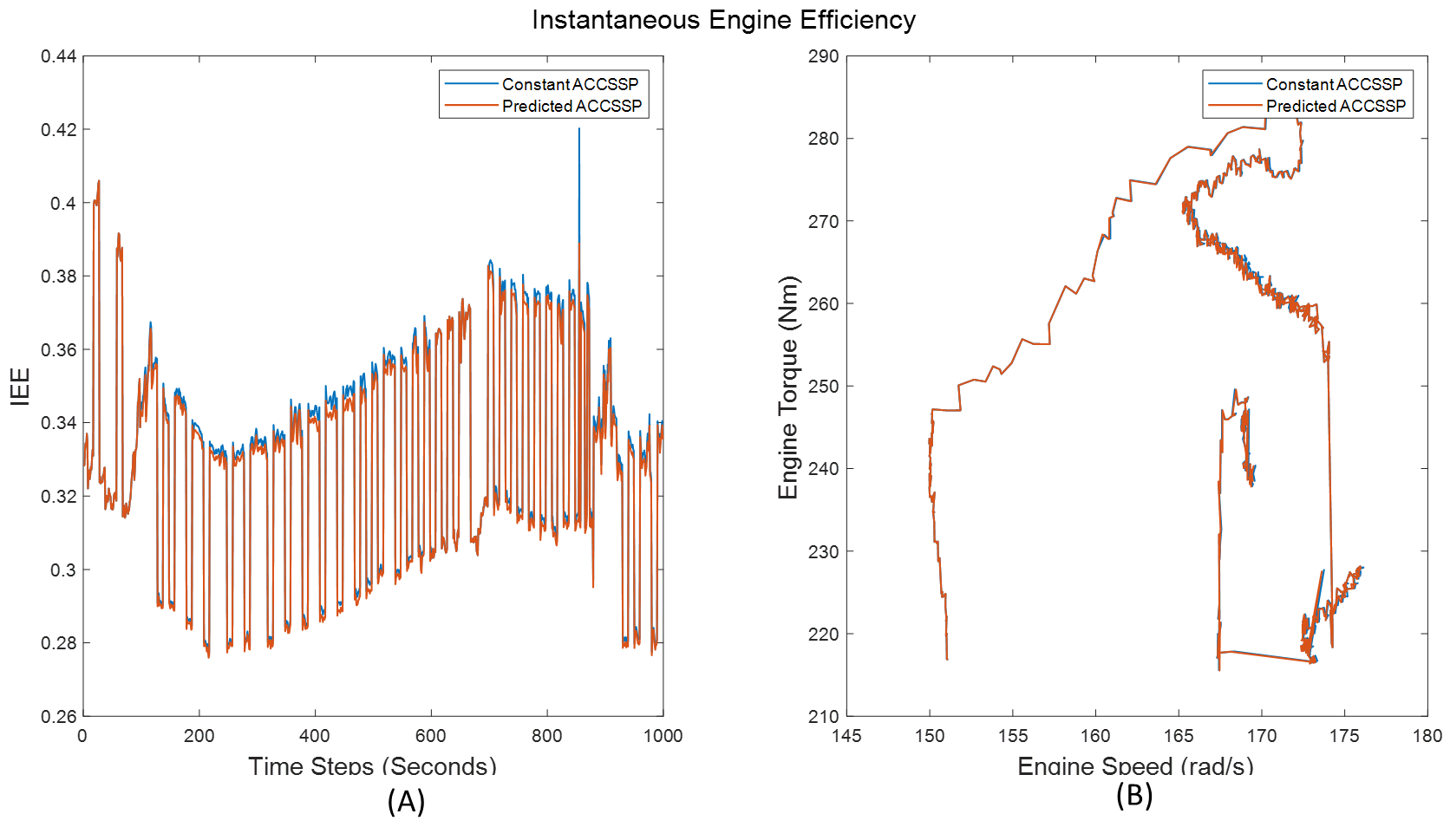
**Figure S36:** CATSP: (A) ICAT = 66 ℉; EAT = 79.44 ℉; (B) ICAT = 73 ℉; EAT = 38.86 ℉—ACCSSP = 60 MPH.

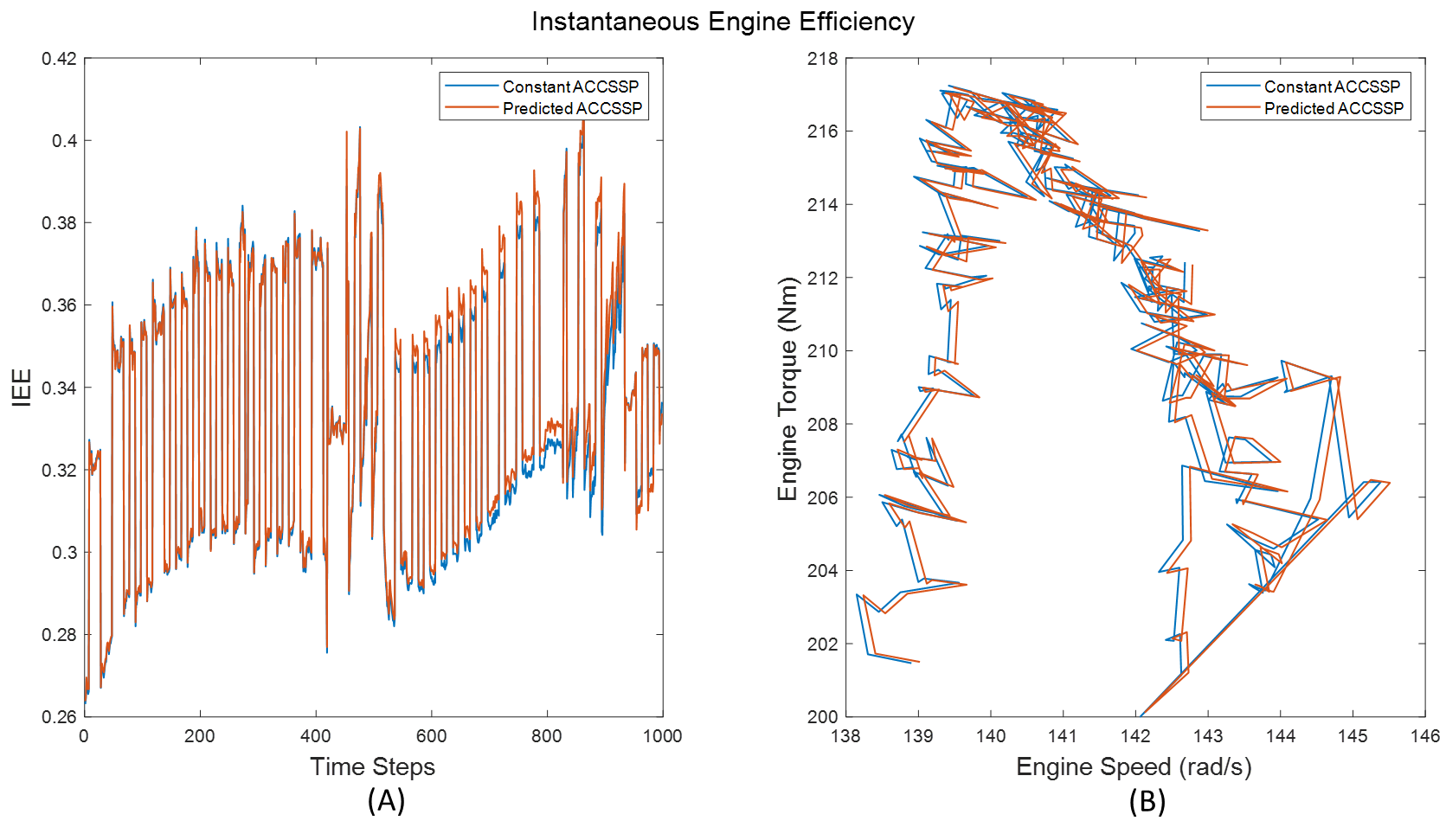


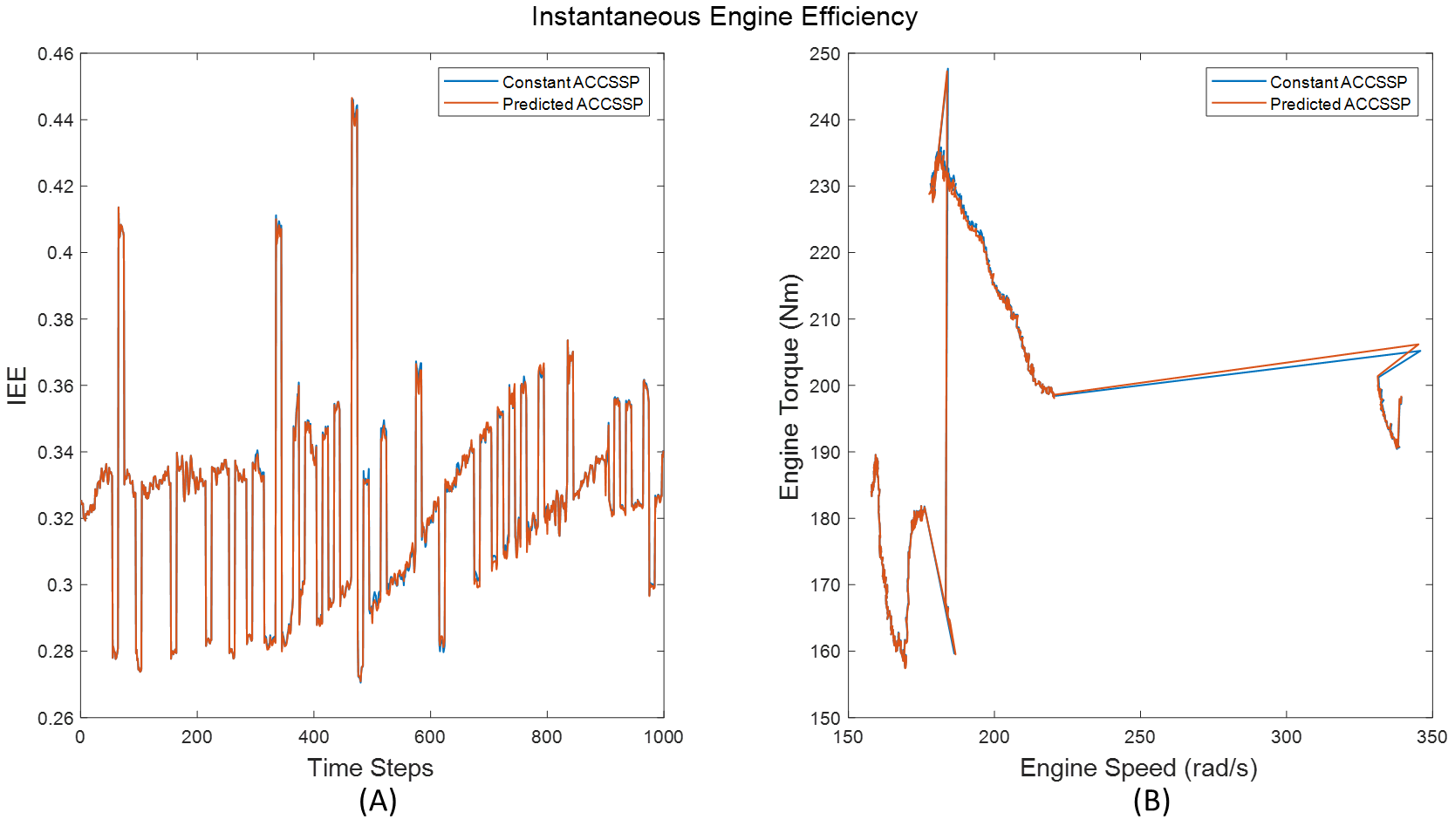
**Figure S37:** CATSP: (A) ICAT = 65 ℉; EAT = 76.1℉; (B) ICAT = 70 ℉; EAT = 36.518 ℉—ACCSSP = 70 MPH.

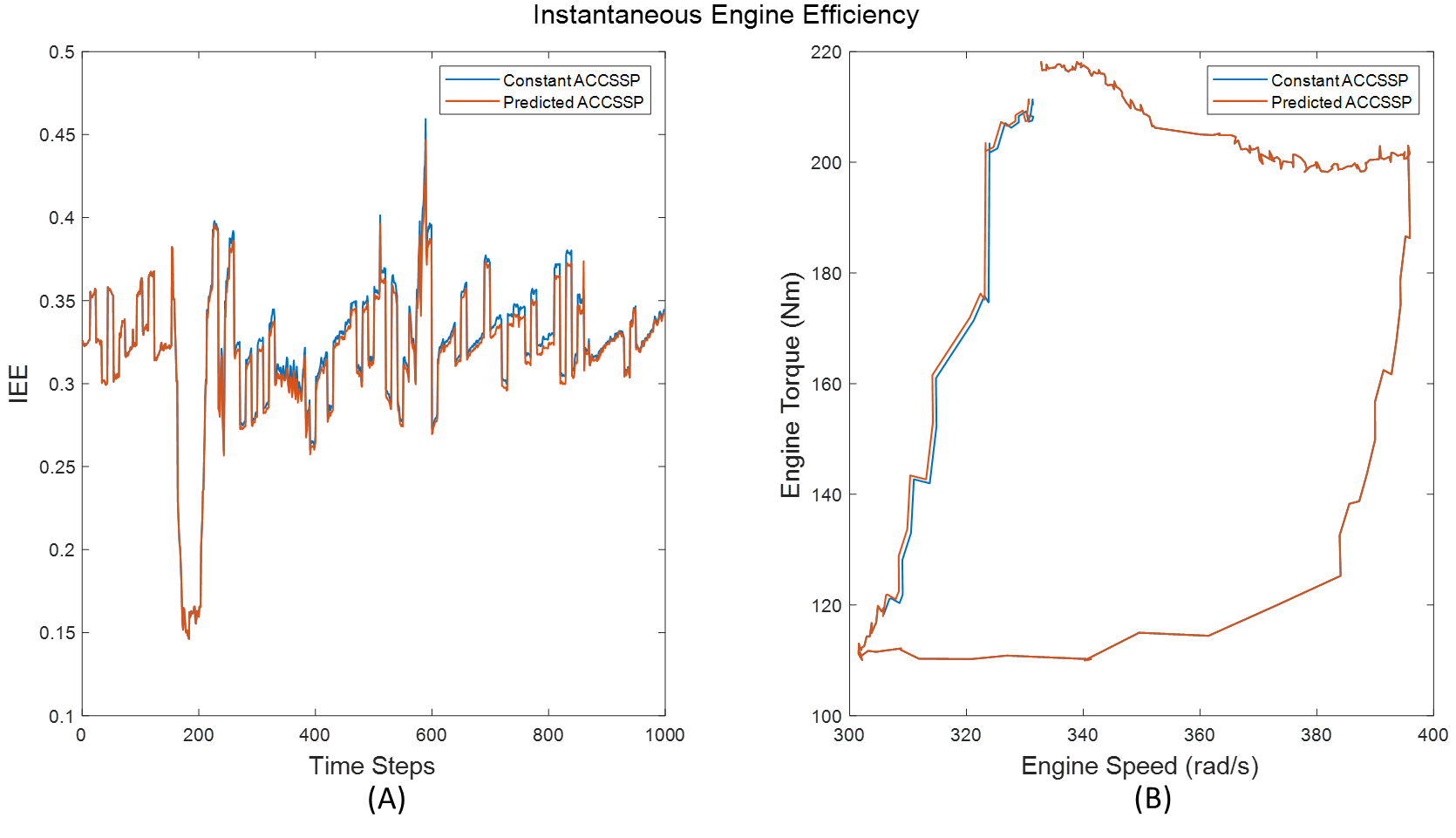
1. **Quantification of [IEE, IEM] - 2020 Cadillac CT5**

**Figure S38:** Validation: (A) IEE; (B) IEM—ACCSSP = 70 MPH.

  
**Figure S39:** Validation: (A) IEE; (B) IEM—ACCSSP = 60 MPH.

  
**Figure S40:** Validation: (A) IEE; (B) IEM—ACCSSP = 50 MPH.

  
**Figure S41:** Validation: (A) IEE; (B) IEM—ACCSSP = 40 MPH.

  
**Figure S42:** Validation: (A) IEE; (B) IEM—ACCSSP = 30 MPH.