Table A2. Selected hyperparameters of the developed models.

Model type	Model	Road type	Selected model hyperparameters
Statistical time series	ARIMA	Arterial	$\delta_1 = 4,\ \delta_2 = 0,\ \delta_3 = 5.$
		Expressway	$\delta_1 = 5,\ \delta_2 = 0,\ \delta_3 = 0.$
		Freeway	$\delta_1 = 2,\ \delta_2 = 0,\ \delta_3 = 0.$
Shallow learning	KNN	Arterial	$\alpha_1 = 9,\ \alpha_2 = 1.$
		Expressway	$\alpha_1 = 9,\ \alpha_2 = 1.$
		Freeway	$\alpha_1 = 9,\ \alpha_2 = 1.$
	LASSO	Arterial	$\alpha_3 = 0.5,\ \alpha_4 = 1500.$
		Expressway	$\alpha_3 = 0.15,\ \alpha_4 = 1500.$
		Freeway	$\alpha_3 = 0.15,\ \alpha_4 = 1500.$
	RR	Arterial	$\alpha_3 = 50.$
		Expressway	$\alpha_3 = 90.$
		Freeway	$\alpha_3 = 50.$
	RT	Arterial	$\theta_1 = 6.$
		Expressway	$\theta_1 = 6.$
		Freeway	$\theta_1 = 5.$
	ET	Arterial	$\theta_1 = 8.$
		Expressway	$\theta_1 = 8.$
		Freeway	$\theta_1 = 6.$
Deep learning	LSTNET	Arterial	$\beta_1 = 4,\ \beta_2 = 1,\ \beta_3 = \text{GRU},\ \beta_4 = 64,\ \beta_5 = \text{GRU},\ \beta_6 = 16,\ \beta_7 = 0.0,\ \beta_8 = 32,\ \beta_9 = 100,\ \beta_{10} = 0.0019,\ \beta_{11} = 20.$
		Expressway	$\beta_1 = 8,\ \beta_2 = 3,\ \beta_3 = \text{LSTM},\ \beta_4 = 16,\ \beta_5 = \text{GRU},\ \beta_6 = 8,\ \beta_7 = 0.4,\ \beta_8 = 64,\ \beta_9 = 50,\ \beta_{10} = 0.0093,\ \beta_{11} = 20.$
		Freeway	$\beta_1 = 8,\ \beta_2 = 3,\ \beta_3 = \text{LSTM},\ \beta_4 = 1,\ \beta_5 = \text{LSTM},\ \beta_6 = 16,\ \beta_7 = 0.0,\ \beta_8 = 48,\ \beta_9 = 300,\ \beta_{10} = 0.0029,\ \beta_{11} = 20.$
	DeepAR	Arterial	$\beta_8 = 32,\ \beta_9 = 100,\ \beta_{10} = 0.0066,\ \beta_{11} = 20,\ \beta_{12} = \text{LSTM},\ \beta_{13} = [32, 32],\ \beta_{14} = 64,\ \beta_{15} = 1,\ \beta_{16} = 0.2.$
		Expressway	$\beta_8 = 96,\ \beta_9 = 300,\ \beta_{10} = 0.0044,\ \beta_{11} = 15,\ \beta_{12} = \text{GRU},\ \beta_{13} = [32],\ \beta_{14} = 192,\ \beta_{15} = 2,\ \beta_{16} = 0.35.$
		Freeway	$\beta_8 = 128,\ \beta_9 = 150,\ \beta_{10} = 0.0056,\ \beta_{11} = 20,\ \beta_{12} = \text{LSTM},\ \beta_{13} = [32, 32],\ \beta_{14} = 32,\ \beta_{15} = 3,\ \beta_{16} = 0.4.$
	NBEATS	Arterial	$\beta_8 = 32,\ \beta_9 = 250,\ \beta_{10} = 0.0065,\ \beta_{11} = 5,\ \beta_{17} = \text{False},\ \beta_{18} = 3,\ \beta_{19} = 3,\ \beta_{20} = 4,\ \beta_{21} = 192,\ \beta_{22} = 96,\ \beta_{23} = 5.$
		Expressway	$\beta_8 = 48,\ \beta_9 = 250,\ \beta_{10} = 0.0041,\ \beta_{11} = 20,\ \beta_{17} = \text{False},\ \beta_{18} = 5,\ \beta_{19} = 3,\ \beta_{20} = 3,\ \beta_{21} = 224,\ \beta_{22} = 192,\ \beta_{23} = 5.$
		Freeway	$\beta_8 = 128,\ \beta_9 = 300,\ \beta_{10} = 0.0067,\ \beta_{11} = 20,\ \beta_{17} = \text{False},\ \beta_{18} = 4,\ \beta_{19} = 3,\ \beta_{20} = 3,\ \beta_{21} = 64,\ \beta_{22} = 224,\ \beta_{23} = 4.$
	RNN	Arterial	$\beta_8 = 32,\ \beta_9 = 150,\ \beta_{10} = 0.0088,\ \beta_{11} = 5,\ \beta_{12} = \text{LSTM},\ \beta_{13} = [128],\ \beta_{14} = 160,\ \beta_{15} = 1,\ \beta_{16} = 0.15.$
		Expressway	$\beta_8 = 32,\ \beta_9 = 250,\ \beta_{10} = 0.00057,\ \beta_{11} = 5,\ \beta_{12} = \text{LSTM},\ \beta_{13} = [32, 32],\ \beta_{14} = 128,\ \beta_{15} = 3,\ \beta_{16} = 0.30.$
		Freeway	$\beta_8 = 16,\ \beta_9 = 100,\ \beta_{10} = 0.0013,\ \beta_{11} = 20,\ \beta_{12} = \text{LSTM},\ \beta_{13} = [64, 64, 64],\ \beta_{14} = 96,\ \beta_{15} = 1,\ \beta_{16} = 0.0.$
	Transformer	Arterial	$\beta_8 = 32,\ \beta_9 = 250,\ \beta_{10} = 0.00065,\ \beta_{11} = 10,\ \beta_{16} = 0.1,\ \beta_{24} = 8,\ \beta_{25} = 1,\ \beta_{26} = 2,\ \beta_{27} = 192,\ \beta_{28} = \text{Relu}.$
		Expressway	$\beta_8 = 96,\ \beta_9 = 50,\ \beta_{10} = 0.00023,\ \beta_{11} = 20,\ \beta_{16} = 0.0,\ \beta_{24} = 4,\ \beta_{25} = 10,\ \beta_{26} = 1,\ \beta_{27} = 96,\ \beta_{28} = \text{Relu}.$
		Freeway	$\beta_8 = 112,\ \beta_9 = 300,\ \beta_{10} = 0.0019,\ \beta_{11} = 20,\ \beta_{16} = 0.0,\ \beta_{24} = 4,\ \beta_{25} = 3,\ \beta_{26} = 2,\ \beta_{27} = 128,\ \beta_{28} = \text{Gelu}.$
Ensemble learning	RF	Arterial	$\theta_1 = 8,\ \theta_2 = 50.$
		Expressway	$\theta_1 = 8,\ \theta_2 = 80.$
		Freeway	$\theta_1 = 8,\ \theta_2 = 100.$
	EF	Arterial	$\theta_1 = 8,\ \theta_2 = 90.$
		Expressway	$\theta_1 = 8,\ \theta_2 = 100.$
		Freeway	$\theta_1 = 8,\ \theta_2 = 100.$
	GBDT	Arterial	$\theta_1 = 8,\ \theta_2 = 100.$
		Expressway	$\theta_1 = 5,\ \theta_2 = 50.$
		Freeway	$\theta_1 = 5,\ \theta_2 = 100.$
	XGBoost	Arterial	$\theta_1 = 4,\ \theta_2 = 50.$
		Expressway	$\theta_1 = 4,\ \theta_2 = 50.$
		Freeway	$\theta_1 = 4,\ \theta_2 = 50.$
	LightGBM	Arterial	$\theta_1 = 4,\ \theta_2 = 60.$
		Expressway	$\theta_1 = 5,\ \theta_2 = 50.$
		Freeway	$\theta_1 = 7,\ \theta_2 = 80.$