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Fleet DNA Project – Data Dictionary for Public Download Files

A. Duran, E. Burton, K. Kelly, and K. Walkowicz

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Technical Report
NREL/TP-5400-62572
September 2014

Contract No. DE-AC36-08GO28308

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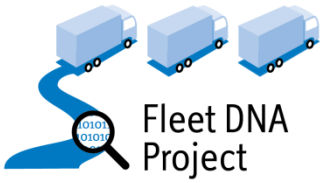
Fleet DNA Project

Data Dictionary for Public Download Files



The Fleet DNA project helps users such as vehicle manufacturers, fleet managers, researchers, and regulators understand the broad operational range for many of today's commercial vehicles. This tool offers access to vehicle fleet data summaries and visualizations similar to real-world "genetics" for medium- and heavy-duty commercial fleet vehicles operating within a variety of vocations.

Fleet DNA consists of high resolution vehicle operation data that NREL collects from fleets around the country. The data are processed using a standard processing routine, and the aggregated results of each study are cleansed of personally identifying information before being made available for download.

The NREL processing routine produces over 350 unique results ranging from statistics indicating the type of roads used during travel to drive-cycle metrics that characterize vehicle operating behavior. The details of the processing routine are available on the Fleet DNA website.

The data in Fleet DNA are organized by provider, deployment, and vehicle. Each provider has multiple deployments that consist of a series of vehicles with the same configuration operating in the same location. For example, if data are logged by both hybrid and conventional delivery trucks in California for the same provider, the vehicles would be grouped into two separate deployments to account for the hybrid vs. conventional drivetrain operational differences. Furthermore, if the same provider also operated hybrid and conventional delivery trucks in another California location, this information would be classified as separate deployments because of the difference in depot location and subsequent vehicle usage profile.

While the provider is not identified by name and the detail of the city is not provided, this method of organization allows the data to be organized and assessed using any arrangement of the classification system:

- Class – Vehicle weight
- Type – Shape of the vehicle
- Vocation – Operation of the vehicle
- Drivetrain – Hybrid/conventional/electric
- Fuel – Type of Fuel used by the vehicle
- City – City where depot is located
- State – State where depot is located

The data available are grouped by vehicle day, which consists of a 24-hour period of operation. The tables below provide the descriptions for the vehicle day table and the lookup tables for the classification system.

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List of Definitions

Column	Data type	Comment
Vid	integer	Unique NREL vehicle identifier
did	integer	Unique deployment identifier
day_id	integer	Day identifier ordered start to end, unique to vehicle
trip_count	integer	The count of trips occurring for the vehicle day
mt_count	integer	The count of micro-trips occurring for the vehicle day
start_ts	timestamp without time zone	The local timestamp of the first recorded point for the day
end_ts	timestamp without time zone	The local timestamp of the last recorded point for the day
start_rts	double precision	Seconds from first recorded timestamp for the vehicle when the day began
end_rts	double precision	Seconds from first recorded timestamp for the vehicle when the day ended
absolute_time_duration_hrs	double precision	Absolute time duration in hours (calculated on the total number of samples collected and independent of real time duration)
speed_data_duration_hrs	double precision	Total number of hours of data collected (includes zero-speed components)
driving_data_duration_hrs	double precision	Duration of collected data while vehicle is in motion (does not include zero-speed time)
non_recorded_time_hrs	double precision	Total number of hours that were not recorded by the device (calculated as the difference between the real time duration of the data and the collected data duration)
collected_vs_real_time_ratio	double precision	Ratio of collected sample duration to real time duration
mean_estimated_sampling_rate_hz	double precision	Computed sampling rate based on average time gap observed between samples in collected data
max_gap_between_samples_s	double precision	Maximum time gap observed between samples in collected data
min_gap_between_samples_s	double precision	Minimum time gap observed between samples in collected data

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Column	Data type	Comment
mean_gap_between_samples_s	double precision	Average time gap observed between samples in collected data
median_gap_between_samples_s	double precision	Median time gap observed between samples in collected data
std_gap_between_samples_s	double precision	Standard deviation of time gaps between samples observed in collected data
var_gap_between_samples_s	double precision	Variance of time gaps observed in collected data
gap_25th_percentile_s	double precision	25th percentile time gap between samples observed in collected data
gap_75th_percentile_s	double precision	75th percentile time gap between samples observed in collected data
gap_inter_quartile_range_s	double precision	Inter-quartile range for distribution of time gaps between samples observed in collected data
gap_median_absolute_deviation_s	double precision	Median absolute deviation for distribution of time gaps between samples observed in collected data
median_estimated_sampling_rate_hz	double precision	Estimated sampling rate based on median time gap observed between samples in collected data
max_speed	double precision	Maximum observed driving speed
total_average_speed	double precision	Average speed over cycle, including zero-speed components
total_median_speed	double precision	Median of all observed speed data (includes zero-speed components)
total_root_mean_cubed_speed	double precision	Root mean cubed value of all observed speed data (includes zero-speed components)
total_speed_variance	double precision	Variance of all observed speed values (includes zero-speed components)
total_speed_standard_deviation	double precision	Standard deviation of all observed speed values (includes zero-speed components)
total_speed_velocity_ratio	double precision	Total vehicle speed velocity ratio
total_speed_25th_percentile	double precision	25th percentile value for speed distribution (includes zero-speed components)
total_speed_75th_percentile	double precision	75th percentile value for all observed speed points (includes zero-speed components)

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Column	Data type	Comment
total_speed_inter_quartile_range	double precision	Inter-quartile range for distribution including all observed speed points (includes zero-speed components)
total_speed_median_absolute_deviation	double precision	Median absolute deviation of all observed speed values (includes zero-speed components)
driving_average_speed	double precision	Average driving speed over cycle (does not include any zero-speed components)
driving_median_speed	double precision	Median driving speed over cycle (does not include any zero-speed components)
driving_root_mean_cubed_speed	double precision	The square root of the mean driving speed cubed
driving_speed_variance	double precision	Variance of observed driving speed (does not include zero-speed components)
driving_speed_standard_deviation	double precision	Standard deviation of driving speed distribution (does not include zero-speed components)
driving_speed_velocity_ratio	double precision	Ratio of root mean cubed speed to mean total speed
driving_speed_25th_percentile	double precision	25th percentile for driving speed distribution
driving_speed_75th_percentile	double precision	75th percentile value for driving speed distribution (does not include zero-speed components)
driving_speed_inter_quartile_range	double precision	Inter-quartile range of observed driving speed distribution (does not include zero-speed components)
driving_speed_median_absolute_deviation	double precision	Median absolute deviation of observed driving speeds (does not include zero-speed components)
zero_seconds	double precision	Number of seconds at zero speed
zero_five_seconds	double precision	Total time spent at speeds between zero and five miles per hour
five_ten_seconds	double precision	Total time spent at speeds between five and ten miles per hour
ten_fifteen_seconds	double precision	Total time spent at speeds between ten and fifteen miles per hour
fifteen_twenty_seconds	double precision	Total time spent at speeds between fifteen and twenty miles per hour
twenty_twenty_five_seconds	double precision	Total time spent at speeds between twenty and twenty-five miles per hour

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Column	Data type	Comment
twenty_five_thirty_seconds	double precision	Total time spent at speeds between twenty-five and thirty miles per hour
thirty_thirty_five_seconds	double precision	Total time spent at speeds between thirty and thirty-five miles per hour
thirty_five_fourty_seconds	double precision	Total amount of time spent at speeds between thirty-five and forty miles per hour
fourty_fourty_five_seconds	double precision	Total amount of time at speeds between forty and forty-five miles per hour
fourty_five_fifty_seconds	double precision	Number of seconds spent between forty-five and fifty miles per hour vehicle speed
fifty_fifty_five_seconds	double precision	Total amount of time spent at speeds between fifty and fifty-five miles per hour
fifty_five_sixty_seconds	double precision	Total time spent at speeds between fifty-five and sixty miles per hour
sixty_sixty_five_seconds	double precision	Total amount of time spent at speeds between sixty and sixty-five miles per hour
sixty_five_seventy_seconds	double precision	Total amount of time spent at speeds between sixty-five and seventy miles per hour
seventy_seventy_five_seconds	double precision	Total time observed at speeds between seventy and seventy-five miles per hour
seventy_five_plus_seconds	double precision	Total amount of time spent at speeds in excess of seventy-five miles per hour
driving_time_seconds	double precision	Total time spent while vehicle is in motion (does not include zero-speed time)
percent_zero	double precision	Percent of total time spent at zero speed
percent_zero_five	double precision	Percent of total time spent at speeds between zero and five miles per hour
percent_five_ten	double precision	Percent of total time spent at speeds between five and ten miles per hour
percent_ten_fifteen	double precision	Percent of total time spent at speeds between ten and fifteen miles per hour
percent_fifteen_twenty	double precision	Percent of total time spent at speeds between fifteen and twenty miles per hour
percent_twenty_twenty_five	double precision	Percent of total time spent at speeds between twenty and twenty-five miles per hour

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Column	Data type	Comment
percent_twenty_five_thirty	double precision	Percent of total time spent at speeds between twenty-five and thirty miles per hour
percent_thirty_thirty_five	double precision	Percent of total time spent at speeds between thirty and thirty-five miles per hour
percent_thirty_five_fourty	double precision	Percent of total time spent at speeds between thirty-five and forty miles per hour
percent_fourty_fourty_five	double precision	Percent of total time spent at speeds between forty and forty-five miles per hour
percent_fourty_five_fifty	double precision	Percent of total time spent at speeds between forty-five and fifty miles per hour
percent_fifty_fifty_five	double precision	Percent of total time spent at speeds between fifty and fifty-five miles per hour
percent_fifty_five_sixty	double precision	Percent of total time spent at speeds between fifty-five and sixty miles per hour
percent_sixty_sixty_five	double precision	Percent of total time spent at speeds between sixty and sixty-five miles per hour
percent_sixty_five_seventy	double precision	Percent of total time spent at speeds between sixty-five and seventy miles per hour
percent_seventy_seventy_five	double precision	Percent of total time spent at speeds between seventy and seventy-five miles per hour
percent_seventy_five_plus	double precision	Percent of total time spent at speeds in excess of seventy-five miles per hour
percent_distance_zero_five	double precision	Percent of total distance traveled at speeds between zero and five miles per hour
percent_distance_twenty_twenty_five	double precision	Percent of total distance traveled at speeds between twenty and twenty-five miles per hour
percent_distance_twenty_five_thirty	double precision	Percent of total distance traveled at speeds between twenty-five and thirty miles per hour
percent_distance_total	double precision	Percent of total distance traveled at all speeds in cycle (will always sum to 100%)

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Column	Data type	Comment
percent_distance_thirty_thirty_five	double precision	Percent of total distance traveled at speeds between thirty and thirty-five miles per hour
percent_distance_thirty_five_fourty	double precision	Percent of total distance traveled at speeds between thirty-five and forty miles per hour
percent_distance_ten_fifteen	double precision	Percent of total distance traveled at speeds between ten and fifteen miles per hour
percent_distance_sixty_sixty_five	double precision	Percent of total distance traveled at speeds between sixty and sixty-five miles per hour
percent_distance_sixty_five_seventy	double precision	Percent of total distance traveled at speeds between sixty-five and seventy miles per hour
percent_distance_seventy_seventy_five	double precision	Percent of total distance traveled at speeds between seventy and seventy-five miles per hour
percent_distance_seventy_five_plus	double precision	Percent of total distance traveled at speeds in excess of seventy-five miles per hour
percent_distance_fourty_fourty_five	double precision	Percent of total distance traveled at speeds between forty and forty-five miles per hour
percent_distance_fourty_five_fifty	double precision	Percent of total distance traveled at speeds between forty-five and fifty miles per hour
percent_distance_five_ten	double precision	Percent of total distance traveled between five and ten miles per hour
percent_distance_fifty_five_sixty	double precision	Percent of total distance traveled at speeds between fifty-five and sixty miles per hour
percent_distance_fifty_fifty_five	double precision	Percent of total distance traveled at speeds between fifty and fifty-five miles per hour
percent_distance_fifteen_twenty	double precision	Percent of total distance traveled at speeds between fifteen and twenty miles per hour
percent_total	double precision	Total time spent at all speeds in cycle (will always add up to 100%)
distance_zero_five	double precision	Total distance traveled in miles at speeds between zero and five miles per hour

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Column	Data type	Comment
distance_five_ten	double precision	Total distance traveled in miles at speeds between five and ten miles per hour
distance_ten_fifteen	double precision	Total distance traveled in miles at speeds between ten and fifteen miles per hour
distance_fifteen_twenty	double precision	Total distance traveled in miles at speeds between fifteen and twenty miles per hour
distance_twenty_twenty_five	double precision	Total distance traveled in miles at speeds between twenty and twenty-five miles per hour
distance_twenty_five_thirty	double precision	Total distance traveled in miles at speeds between twenty-five and thirty miles per hour
distance_thirty_thirty_five	double precision	Total distance traveled in miles at speeds between thirty and thirty-five miles per hour
distance_thirty_five_fourty	double precision	Total distance traveled in miles at speeds between thirty-five and forty miles per hour
distance_fourty_fourty_five	double precision	Total distance traveled in miles at speeds between forty and forty-five miles per hour
distance_fourty_five_fifty	double precision	Total distance traveled in miles at speeds between forty-five and fifty miles per hour
distance_fifty_fifty_five	double precision	Total distance traveled in miles at speeds between fifty and fifty-five miles per hour
distance_fifty_five_sixty	double precision	Total distance traveled in miles at speeds between fifty-five and sixty miles per hour
distance_sixty_sixty_five	double precision	Total distance traveled in miles at speeds between sixty to sixty-five miles per hour
distance_sixty_five_seventy	double precision	Total distance traveled in miles at speeds between sixty-five and seventy miles per hour
distance_seventy_seventy_five	double precision	Total distance traveled in miles at speeds between seventy and seventy-five miles per hour
distance_seventy_five_plus	double precision	Total distance traveled in miles at speeds in excess of 75 miles per hour

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Column	Data type	Comment
distance_total	double precision	Total distance traveled in miles
total_number_of_acceleration_events	double precision	Total number of observed acceleration events
total_number_of_deceleration_events	double precision	Total number of observed deceleration events
acceleration_events_per_mile	double precision	Number of acceleration events observed per mile of distance traveled
deceleration_events_per_mile	double precision	Number of deceleration events observed per mile of distance traveled
max_acceleration_ft_per_second_squared	double precision	Maximum acceleration rate in ft. per second squared
max_deceleration_ft_per_second_squared	double precision	Maximum deceleration rate in ft. per second squared
average_acceleration_ft_per_second_squared	double precision	Average acceleration rate in ft. per second squared
average_deceleration_ft_per_second_squared	double precision	Average deceleration in ft. per second squared
median_acceleration_ft_per_second_squared	double precision	Median acceleration rate in ft. per second squared
median_deceleration_ft_per_second_squared	double precision	Median deceleration rate in ft. per second squared
std_acceleration_ft_per_second_squared	double precision	Standard deviation of acceleration in ft. per second squared
std_deceleration_ft_per_second_squared	double precision	Standard deviation of deceleration in ft. per second squared
var_acceleration_ft_per_second_squared	double precision	Variance of acceleration distribution in ft. per second squared
var_deceleration_ft_per_second_squared	double precision	Variance of deceleration in ft. per second squared
acceleration_25th_percentile_ft_per_second_squared	double precision	25th percentile for acceleration distribution in ft. per second squared
deceleration_25th_percentile_ft_per_second_squared	double precision	25th percentile for deceleration distribution in ft. per second squared
acceleration_75th_percentile_ft_per_second_squared	double precision	75th percentile value for acceleration distribution in ft. per second squared
deceleration_75th_percentile_ft_per_second_squared	double precision	75th percentile value for deceleration rate in ft. per second squared
acceleration_inter_quartile_range_ft_per_second_squared	double precision	Inter-quartile range of acceleration in ft. per second squared
deceleration_inter_quartile_range_ft_per_second_squared	double precision	Inter-quartile range for deceleration distribution in ft. per second squared

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Column	Data type	Comment
acceleration_median_absolute_deviation_ft_per_second_squared	double precision	Median absolute deviation of acceleration in ft. per second squared
deceleration_median_absolute_deviation_ft_per_second_squared	double precision	Median absolute deviation of deceleration in ft. per second squared
cumulative_acceleration_duration	double precision	Total time spent accelerating
cumulative_deceleration_duration	double precision	Total time spent decelerating
cumulative_acceleration_cycle_duration_percent	double precision	Percent of total time spent accelerating
cumulative_deceleration_cycle_duration_percent	double precision	Percent of total time spent decelerating
absolute_time_cumulative_acceleration_duration	double precision	Sum of time spent accelerating
absolute_time_cumulative_deceleration_duration	double precision	Sum of time spent decelerating
absolute_time_cumulative_acceleration_cycle_duration_percent	double precision	Percent of total time spent accelerating
absolute_time_cumulative_deceleration_cycle_duration_percent	double precision	Percent of total time spent decelerating
average_acceleration_event_duration	double precision	Average duration of observed acceleration events
average_deceleration_event_duration	double precision	Average duration of observed deceleration events
min_acceleration_event_duration	double precision	Minimum duration observed for acceleration event
min_deceleration_event_duration	double precision	Minimum duration observed for deceleration event
max_acceleration_event_duration	double precision	Maximum duration of observed acceleration events
max_deceleration_event_duration	double precision	Maximum duration of observed deceleration events
std_acceleration_event_duration	double precision	Standard deviation of acceleration event duration distribution
std_deceleration_event_duration	double precision	Standard deviation of deceleration event duration distribution
var_acceleration_event_duration	double precision	Variance of acceleration event durations
var_deceleration_event_duration	double precision	Variance of deceleration event duration
median_acceleration_event_duration	double precision	Median duration of all acceleration events

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Column	Data type	Comment
median_deceleration_event_duration	double precision	Median observed duration of all deceleration events
acceleration_event_duration_25th_percentile	double precision	25th percentile value for acceleration event durations
deceleration_event_duration_25th_percentile	double precision	25th percentile value for deceleration event durations
acceleration_event_duration_75th_percentile	double precision	75th percentile value for acceleration event duration distribution
deceleration_event_duration_75th_percentile	double precision	75th percentile value for deceleration event duration distribution
acceleration_event_duration_inter_quartile_range	double precision	Inter-quartile range for acceleration event duration distribution
deceleration_event_duration_inter_quartile_range	double precision	Inter-quartile range for distribution of deceleration event durations
acceleration_event_duration_median_absolute_deviation	double precision	Median absolute deviation of acceleration event duration distribution
deceleration_event_duration_median_absolute_deviation	double precision	Median absolute deviation of deceleration event duration distribution
total_stops	double precision	Number of observed stops
stops_0_30	double precision	Number of stops with dwell times between zero and thirty seconds
stops_30_60	double precision	Number of stops with dwell times between thirty and sixty seconds
stops_60_plus	double precision	Number of stops with dwell times in excess of 1 minutes
stops_300_plus	double precision	Number of stops with dwell times in excess of 5 minutes
stops_1800_plus	double precision	Number of stops with dwell times in excess of 30 minutes
stops_3600_plus	double precision	Number of stops with dwell times in excess of 60 minutes
stops_per_mile	double precision	Number of observed stops per miles traveled
average_stop_duration	double precision	Average duration of all stops observed
min_stop_duration	double precision	Minimum dwell time of observed stops
max_stop_duration	double precision	Maximum dwell time of observed stops
median_stop_duration	double precision	Median dwell time of observed stops

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Column	Data type	Comment
mean_stop_duration	double precision	Mean dwell time of observed stops
std_stop_duration	double precision	Standard deviation of stop dwell times
var_stop_duration	double precision	Variance of observed stop dwell times
stop_duration_25th_percentile	double precision	25th percentile value for stop dwell time distribution
stop_duration_75th_percentile	double precision	75th percentile value for stop dwell time distribution
stop_duration_inter_quartile_range	double precision	Inter-quartile range for stop duration distribution
stop_duration_median_absolute_deviation	double precision	Median absolute deviation of observed stop dwell times
max_elevation	double precision	Maximum recorded elevation
min_elevation	double precision	Minimum recorded elevation
mean_elevation	double precision	Mean recorded elevation
median_elevation	double precision	Median recorded elevation
std_of_elevation	double precision	Standard deviation of elevation
var_of_elevation	double precision	Variance of elevation data records
elevation_25th_percentile	double precision	25th percentile value for elevation distribution
elevation_75th_percentile	double precision	75th percentile value for elevation distribution
elevation_inter_quartile_range	double precision	Inter-quartile range for elevation distribution
elevation_median_absolute_deviation	double precision	Median absolute deviation of elevation distribution
delta_elevation	double precision	Net elevation change observed (calculated as final elevation record minus initial elevation record)
delta_elevation_cumulative	double precision	Net total elevation change (sum of all elevation change records)
absolute_delta_elevation_cumulative	double precision	Cumulative absolute change in elevation (sum of absolute value of differential elevation changes recorded)

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Column	Data type	Comment
total_elevation_gained	double precision	Sum of total elevation gained
total_elevation_lost	double precision	Sum of total elevation lost
average_absolute_elevation_rate_change	double precision	Average rate of elevation change regardless of sign
max_climbing_rate	double precision	Maximum recorded climbing rate
average_climbing_rate	double precision	Average recorded climbing rate
median_climbing_rate	double precision	Median recorded climbing rate
max_descending_rate	double precision	Maximum recorded descending rate
average_descending_rate	double precision	Average recorded descending rate
median_descending_rate	double precision	Median recorded descending rate
climbing_rate_25th_percentile	double precision	25th percentile value for recorded climbing rate distribution
descending_rate_25th_percentile	double precision	25th percentile value for descending rate distribution
climbing_rate_75th_percentile	double precision	75th percentile value for climbing rate distribution
descending_rate_75th_percentile	double precision	75th percentile value for descending rate distribution
climbing_rate_inter_quartile_range	double precision	Inter-quartile range for climbing rate distribution
descending_rate_inter_quartile_range	double precision	Inter-quartile range for descending rate
climbing_rate_median_absolute_deviation	double precision	Median absolute deviation of climbing rate
descending_rate_median_absolute_deviation	double precision	Median absolute deviation of descending rate distribution
max_road_grade	double precision	Maximum recorded road grade
min_road_grade	double precision	Minimum recorded road grade
mean_road_grade	double precision	Mean recorded road grade
median_road_grade	double precision	Median recorded road grade

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Column	Data type	Comment
std_of_road_grade	double precision	Standard deviation of recorded road grade
var_of_road_grade	double precision	Variance of road grade recorded
road_grade_25th_percentile	double precision	25th percentile value for recorded road grade distribution
road_grade_75th_percentile	double precision	75th percentile value for recorded road grade distribution
road_grade_inter_quartile_range	double precision	Inter-quartile range for recorded road grade distribution
road_grade_median_absolute_deviation	double precision	Median absolute deviation for recorded road grade distribution
maximum_kinetic_power_density_demand	double precision	Maximum kinetic power density demand
total_kinetic_power_density_demand	double precision	Sum of kinetic power density demand
average_kinetic_power_density_demand	double precision	Average demanded kinetic power density
variance_kinetic_power_density_demand	double precision	Variance of kinetic power density demand
standard_deivation_kinetic_power_density_demand	double precision	Standard deviation of kinetic power density demand
maximum_kinetic_power_density_regen	double precision	Maximum single-sample regenerative kinetic power density
total_kinetic_power_density_regen	double precision	Sum of regenerative kinetic power density
average_kinetic_power_density_regen	double precision	Average regenerative kinetic power density
variance_kinetic_power_density_regen	double precision	Variance of regenerative kinetic power density
standard_deivation_kinetic_power_density_regen	double precision	Standard deviation of regenerative kinetic power density
maximum_potential_power_density_demand	double precision	Maximum demanded potential power density
total_potential_power_density_demand	double precision	Sum of demanded potential power density
average_potential_power_density_demand	double precision	Average demanded potential power density
variance_potential_power_density_demand	double precision	Variance of demanded potential power density
standard_deivation_potential_power_density_demand	double precision	Standard deviation of demanded potential power density

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Column	Data type	Comment
maximum_potential_power_density_regen	double precision	Maximum regenerative potential power density
total_potential_power_density_regen	double precision	Sum of regenerative potential power density
average_potential_power_density_regen	double precision	Average regenerative potential power density
variance_potential_power_density_regen	double precision	Variance of observed regenerative potential power density
standard_deivation_potential_power_density_regen	double precision	Standard deviation of regenerative potential power density
maximum_aerodynamic_power_density_demand	double precision	Maximum demanded aerodynamic power density
total_aerodynamic_power_density_demand	double precision	Sum of demanded aerodynamic power density
average_aerodynamic_power_density_demand	double precision	Average demanded aerodynamic power density
variance_aerodynamic_power_density_demand	double precision	Variance of demanded aerodynamic power density
standard_deivation_aerodynamic_power_density_demand	double precision	Standard deviation of demanded aerodynamic power density
maximum_aerodynamic_power_density_regen	double precision	Maximum regenerative aerodynamic power density
total_aerodynamic_power_density_regen	double precision	Sum of regenerative aerodynamic power density
average_aerodynamic_power_density_regen	double precision	Average regenerative power density from aerodynamics
variance_aerodynamic_power_density_regen	double precision	Variance of regenerative aerodynamic power density
standard_deivation_aerodynamic_power_density_regen	double precision	Standard deviation of regenerative aerodynamic power density
maximum_rolling_power_density_demand	double precision	Maximum rolling power density demand
total_rolling_power_density_demand	double precision	Sum of rolling power density demand
average_rolling_power_density_demand	double precision	Average rolling power density demand
variance_rolling_power_density_demand	double precision	Variance of rolling power density demand
standard_deivation_rolling_power_density_demand	double precision	Standard deviation of rolling power density demand
maximum_rolling_power_density_regen	double precision	Maximum regenerative rolling power density

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Column	Data type	Comment
total_rolling_power_density_regen	double precision	Sum of regenerative rolling power density
average_rolling_power_density_regen	double precision	Average regenerative rolling power density
variance_rolling_power_density_regen	double precision	Variance of regenerative rolling power density
standard_deivation_rolling_power_density_regen	double precision	Standard deviation of regenerative rolling power density
maximum_instantanteous_potential_energy_density	double precision	Maximum potential energy density
average_instantanteous_potential_energy_density	double precision	Average potential energy density
cumulative_instanteous_potential_energy_density	double precision	Sum of potential energy density
maximum_instantanteous_kinetic_energy_density	double precision	Maximum single sample kinetic energy density
average_instantanteous_kinetic_energy_density	double precision	Average kinetic energy density
cumulative_instanteous_kinetic_energy_density	double precision	Sum of kinetic energy density
maximum_instantanteous_aerodynamic_energy_density	double precision	Maximum single sample aerodynamic energy density
average_instantanteous_aerodynamic_energy_density	double precision	Average single-sample aerodynamic energy density
cumulative_instanteous_aerodynamic_energy_density	double precision	Sum of aerodynamic energy density
maximum_instantanteous_rolling_energy_density	double precision	Maximum rolling energy density
average_instantanteous_rolling_energy_density	double precision	Average rolling energy density
cumulative_instanteous_rolling_energy_density	double precision	Sum of rolling energy density
characteristic_acceleration	double precision	Characteristic acceleration
characteristic_deceleration	double precision	Characteristic deceleration (energy while decelerating)
aerodynamic_speed	double precision	Aerodynamic speed
kinetic_intensity	double precision	Kinetic intensity
ca_standard	double precision	Characteristic acceleration reported in standard units

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Column	Data type	Comment
cd_standard	double precision	Characteristic deceleration reported in standard units
as_standard	double precision	Aerodynamic speed reported in standard units
ki_standard	double precision	Kinetic intensity reported in standard units
group_ttl_distance	double precision	Distance for all points recorded in the sequence, calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
group_ttl_mean_speed	double precision	Mean speed of all non-zero speed points recorded in the sequence
group_ttl_std_speed	double precision	Standard deviation of all non-zero speed points recorded in the sequence
group_ttl_ttl	integer	Total point count recorded for the sequence
group_ttl_zero_speed	double precision	Total point count of all zero-speed points recorded in the sequence
matched_ttl_distance	double precision	Distance for all points matched to streets; calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
matched_ttl_mean_speed	double precision	Mean speed of all non-zero speed points recorded matched to streets
matched_ttl_std_speed	double precision	Standard deviation of all non-zero speed points recorded matched to streets
matched_ttl_ttl	integer	Total point count recorded matched to streets
matched_ttl_zero_speed	integer	Total point count of all zero-speed points recorded matched to streets
non_matched_ttl_distance	double precision	Distance for all points not matched to streets; calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
non_matched_ttl_mean_speed	double precision	Mean speed of all non-zero speed points recorded not matched to streets
non_matched_ttl_std_speed	double precision	Standard deviation of all non-zero speed points recorded not matched to streets
non_matched_ttl_ttl	double precision	Total point count recorded not matched to streets
non_matched_ttl_zero_speed	integer	Total point count of all zero-speed points recorded not matched to streets

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Column	Data type	Comment
func_1_distance	double precision	Distance for all points recorded on functional class 1 streets, calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
func_1_mean_speed	double precision	Mean speed of all non-zero speed points recorded on functional class 1 streets
func_1_std_speed	double precision	Standard deviation of all non-zero speed points recorded on functional class 1 streets
func_1_ttl	integer	Total point count recorded on functional class 1 streets
func_1_zero_speed	integer	Total point count of all zero-speed points on functional class 1 streets
func_2_distance	double precision	Distance for all points recorded on functional class 2 streets, calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
func_2_mean_speed	double precision	Mean speed of all non-zero speed points recorded on functional class 2 streets
func_2_std_speed	double precision	Standard deviation of all non-zero speed points recorded on functional class 2 streets
func_2_ttl	integer	Total point count recorded on functional class 2 streets
func_2_zero_speed	integer	Total point count of all zero-speed points on functional class 2 streets
func_3_distance	double precision	Distance for all points recorded on functional class 3 streets, calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
func_3_mean_speed	double precision	Mean speed of all non-zero speed points recorded on functional class 3 streets
func_3_std_speed	double precision	Standard deviation of all non-zero speed points recorded on functional class 3 streets
func_3_ttl	integer	Total point count recorded on functional class 3 streets
func_3_zero_speed	integer	Total point count of all zero-speed points recorded on functional class 3 streets

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Column	Data type	Comment
func_4_distance	double precision	Distance for all points recorded on functional class 4 streets, calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
func_4_mean_speed	double precision	Mean speed of all non-zero speed points recorded on functional class 4 streets
func_4_std_speed	double precision	Standard deviation of all non-zero speed points recorded on functional class 4 streets
func_4_ttl	integer	Total point count recorded on functional class 4 streets
func_4_zero_speed	integer	Total point count of all zero-speed points recorded on functional class 4 streets
func_5_distance	double precision	Distance for all points recorded on functional class 5 streets, calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
func_5_mean_speed	double precision	Mean speed of all non-zero speed points recorded on functional class 5 streets
func_5_std_speed	double precision	Standard deviation of all non-zero speed points recorded on functional class 5 streets
func_5_ttl	integer	Total point count recorded on functional class 5 streets
func_5_zero_speed	integer	Total point count of all zero-speed points recorded on functional class 5 streets
spd_cat_1_distance	double precision	Distance for all points recorded on speed category 1 streets (80 mph + speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_1_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 1 streets (80 mph + speed limit)
spd_cat_1_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 1 streets (80 mph + speed limit)
spd_cat_1_ttl	integer	Total point count recorded on speed category 1 streets (80 mph + speed limit)
spd_cat_1_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 1 streets (80 mph + speed limit)

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Column	Data type	Comment
spd_cat_2_distance	double precision	Distance for all points recorded on speed category 2 streets (70 - 80 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_2_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 2 streets (70 - 80 mph speed limit)
spd_cat_2_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 2 streets (70 - 80 mph speed limit)
spd_cat_2_ttl	integer	Total point count recorded on speed category 2 streets (70 - 80 mph speed limit)
spd_cat_2_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 2 streets (70 - 80 mph speed limit)
spd_cat_3_distance	double precision	Distance for all points recorded on speed category 3 streets (60 - 70 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_3_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 3 streets (60 - 70 mph speed limit)
spd_cat_3_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 3 streets (60 - 70 mph speed limit)
spd_cat_3_ttl	integer	Total point count recorded on speed category 3 streets (60 - 70 mph speed limit)
spd_cat_3_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 3 streets (60 - 70 mph speed limit)
spd_cat_4_distance	double precision	Distance for all points recorded on speed category 4 streets (50 - 60 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_4_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 4 streets (50 - 60 mph speed limit)
spd_cat_4_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 4 streets (50 - 60 mph speed limit)

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Column	Data type	Comment
spd_cat_4_ttl	integer	Total point count recorded on speed category 4 streets (50 - 60 mph speed limit)
spd_cat_4_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 4 streets (50 - 60 mph speed limit)
spd_cat_5_distance	double precision	Distance for all points recorded on speed category 5 streets (40 - 50 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_5_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 5 streets (40 - 50 mph speed limit)
spd_cat_5_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 5 streets (40 - 50 mph speed limit)
spd_cat_5_ttl	integer	Total point count recorded on speed category 5 streets (40 - 50 mph speed limit)
spd_cat_5_zero_speed	integer	Total point count of all zero speed points recorded on speed category 5 streets (40 - 50 mph speed limit)
spd_cat_6_distance	double precision	Distance for all points recorded on speed category 6 streets (30 - 40 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_6_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 6 streets (30 - 40 mph speed limit)
spd_cat_6_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 6 streets (30 - 40 mph speed limit)
spd_cat_6_ttl	integer	Total point count recorded on speed category 6 streets (30 - 40 mph speed limit)
spd_cat_6_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 6 streets (30 - 40 mph speed limit)
spd_cat_7_distance	double precision	Distance for all points recorded on speed category 7 streets (20 - 30 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)

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Column	Data type	Comment
spd_cat_7_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 7 streets (20 - 30 mph speed limit)
spd_cat_7_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 7 streets (20 - 30 mph speed limit)
spd_cat_7_ttl	integer	Total point count recorded on speed category 7 streets (20 - 30 mph speed limit)
spd_cat_7_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 7 streets (20 - 30 mph speed limit)
spd_cat_8_distance	double precision	Distance for all points recorded on speed category 8 streets (10 - 20 mph speed limit), calculated assuming 1-second sample interval and constant speed (instantaneous speed/3600.0 = miles)
spd_cat_8_mean_speed	double precision	Mean speed of all non-zero speed points recorded on speed category 8 streets (10 - 20 mph speed limit)
spd_cat_8_std_speed	double precision	Standard deviation of all non-zero speed points recorded on speed category 8 streets (10 - 20 mph speed limit)
spd_cat_8_ttl	integer	Total point count recorded on speed category 8 streets (10 - 20 mph speed limit)
spd_cat_8_zero_speed	integer	Total point count of all zero-speed points recorded on speed category 8 streets (10 - 20 mph speed limit)

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List of Data Classifiers

Vocation

ID	Description
1	Telecom
2	Beverage Delivery
3	Warehouse Delivery
4	Parcel Delivery
5	School Bus
6	Linen Delivery
7	Refuse Pickup
8	Long Haul
10	Mass Transit
11	Towing
12	Grocery Delivery
13	Port Drayage
14	Food Delivery
15	Snow Plow
16	Utility
18	Local Delivery

Class

ID	Description	Min Weight (lbs)	Max Weight (lbs)
1	Class 1	0	6,000
2	Class 2	6,001	10,000
3	Class 3	10,001	14,000
4	Class 4	14,001	16,000
5	Class 5	16,001	19,500
6	Class 6	19,501	26,000
7	Class 7	26,001	33,000
8	Class 8	33,001	100,000

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Type

ID	Description
1	Beverage
2	Bucket Truck
3	Cement Mixer
4	City Delivery
5	City Transit Bus
6	Conventional Van
7	Crew Size Pickup
8	Dump
9	Fire Truck
10	Fuel
11	Full Size Pickup
12	Furniture
13	Heavy Semi Tractor
14	High Profile Semi
15	Home Fuel
16	Landscape Utility
17	Medium Semi Tractor
18	Mini Bus
20	Mini Pickup
21	Minivan
23	Rack
24	Refrigerated Van
25	Refuse Truck
26	School Bus
27	Semi Sleeper
28	Service Van
29	Single Axle Van
30	Stake Body
31	Step Van
32	Straight Truck
33	SUV
34	Tour Bus
35	Tow
36	Tractor
37	Type C
38	Utility Van
39	Walk In

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Fuel

ID	Description
0	Gasoline
1	Diesel
2	Electricity
3	CNG

Drivetrain

ID	Description
0	Conventional
1	Parallel Hybrid
2	Hydraulic Hybrid
3	Series Hybrid
4	Hybrid
5	Electric
6	Hybrid Electric

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