

# FML\_Assignment1

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```
# Importing the dataset downloaded from kaggle to R
#Data Source: https://www.kaggle.com/datasets/ammaraahmad/top-10-machine-learning-datasets?select=CO2_e

dataset = read.csv("C:/Durga/CO2_emission (1).csv")

#View dataset

dataset
```

##	Model_Year	Make	Model	Vehicle_Class
## 1	2021	Acura	ILX	Compact
## 2	2021	Acura	NSX	Two-seater
## 3	2021	Acura	RDX SH-AWD	SUV: Small
## 4	2021	Acura	RDX SH-AWD A-SPEC	SUV: Small
## 5	2021	Acura	TLX SH-AWD	Compact
## 6	2021	Acura	TLX SH-AWD A-SPEC	Compact
## 7	2021	Alfa Romeo	Giulia	Mid-size
## 8	2021	Alfa Romeo	Giulia AWD	Mid-size
## 9	2021	Alfa Romeo	Giulia Quadrifoglio	Mid-size
## 10	2021	Alfa Romeo	Stelvio	SUV: Small
## 11	2021	Alfa Romeo	Stelvio AWD	SUV: Small
## 12	2021	Alfa Romeo	Stelvio AWD Quadrifoglio	SUV: Small
## 13	2021	Aston Martin	DB11 V8	Minicompact
## 14	2021	Aston Martin	DB11 AMR	Minicompact
## 15	2021	Aston Martin	DBS Superleggera	Minicompact
## 16	2021	Aston Martin	DBX V8	SUV: Standard
## 17	2021	Aston Martin	Vantage V8	Two-seater
## 18	2021	Aston Martin	Vantage V8	Two-seater
## 19	2021	Audi	A4 allroad 45 TFSI quattro	Station wagon: Small
## 20	2021	Audi	A4 Sedan 40 TFSI quattro	Compact
## 21	2021	Audi	A4 Sedan 45 TFSI quattro	Compact
## 22	2021	Audi	A5 Cabriolet 45 TFSI quattro	Subcompact
## 23	2021	Audi	A5 Coupe 45 TFSI quattro	Subcompact
## 24	2021	Audi	A5 Sportback 45 TFSI quattro	Mid-size
## 25	2021	Audi	A6 allroad 55 TFSI quattro	Station wagon: Mid-size
## 26	2021	Audi	A6 Sedan 45 TFSI quattro	Mid-size
## 27	2021	Audi	A6 Sedan 55 TFSI quattro	Mid-size
## 28	2021	Audi	A7 Sportback 55 TFSI quattro	Mid-size
## 29	2021	Audi	A8 L Sedan 55 TFSI quattro	Full-size
## 30	2021	Audi	A8 L Sedan 60 TFSI quattro	Full-size
## 31	2021	Audi	Q3 40 TFSI quattro	SUV: Small
## 32	2021	Audi	Q3 45 TFSI quattro	SUV: Small

## 33	2021	Audi	Q5 45 TFSI quattro	SUV: Small
## 34	2021	Audi	Q5 Sportback 45 TFSI quattro	SUV: Small
## 35	2021	Audi	Q7 45 TFSI quattro	SUV: Standard
## 36	2021	Audi	Q7 55 TFSI quattro	SUV: Standard
## 37	2021	Audi	Q8 55 TFSI quattro	SUV: Standard
## 38	2021	Audi	R8 Coupe	Two-seater
## 39	2021	Audi	R8 Coupe quattro	Two-seater
## 40	2021	Audi	R8 Spyder	Two-seater
## 41	2021	Audi	R8 Spyder quattro	Two-seater
## 42	2021	Audi	RS 5 Coupe quattro	Subcompact
## 43	2021	Audi	RS 5 Sportback quattro	Mid-size
## 44	2021	Audi	RS 6 Avant quattro	Station wagon: Mid-size
## 45	2021	Audi	RS 7 Sportback quattro	Mid-size
## 46	2021	Audi	RS Q8 quattro	SUV: Standard
## 47	2021	Audi	S4 Sedan quattro	Compact
## 48	2021	Audi	S5 Cabriolet quattro	Subcompact
## 49	2021	Audi	S5 Coupe quattro	Subcompact
##	Engine_Size	Cylinders	Transmission	Fuel_Consumption_in_City.L.100.km.
## 1	2.4	4	AM8	9.9
## 2	3.5	6	AM9	11.1
## 3	2.0	4	AS10	11.0
## 4	2.0	4	AS10	11.3
## 5	2.0	4	AS10	11.2
## 6	2.0	4	AS10	11.3
## 7	2.0	4	A8	10.0
## 8	2.0	4	A8	10.5
## 9	2.9	6	A8	13.5
## 10	2.0	4	A8	10.3
## 11	2.0	4	A8	10.8
## 12	2.9	6	A8	13.9
## 13	4.0	8	A8	13.0
## 14	5.2	12	A8	15.5
## 15	5.2	12	A8	16.4
## 16	4.0	8	A9	17.1
## 17	4.0	8	A8	13.1
## 18	4.0	8	M7	16.7
## 19	2.0	4	AM7	9.8
## 20	2.0	4	AM7	9.3
## 21	2.0	4	AM7	9.8
## 22	2.0	4	AM7	10.4
## 23	2.0	4	AM7	9.8
## 24	2.0	4	AM7	9.8
## 25	3.0	6	AM7	11.8
## 26	2.0	4	AM7	10.3
## 27	3.0	6	AM7	10.9
## 28	3.0	6	AM7	10.9
## 29	3.0	6	AS8	13.5
## 30	4.0	8	AS8	15.4
## 31	2.0	4	AS8	10.6
## 32	2.0	4	AS8	11.7
## 33	2.0	4	AM7	10.1
## 34	2.0	4	AM7	10.1
## 35	2.0	4	AS8	12.4
## 36	3.0	6	AS8	13.4

## 37	3.0	6	AS8	13.4
## 38	5.2	10	AM7	17.2
## 39	5.2	10	AM7	17.6
## 40	5.2	10	AM7	17.2
## 41	5.2	10	AM7	17.6
## 42	2.9	6	AS8	13.1
## 43	2.9	6	AS8	13.1
## 44	4.0	8	AS8	16.1
## 45	4.0	8	AS8	16.0
## 46	4.0	8	AS8	18.0
## 47	3.0	6	AS8	11.5
## 48	3.0	6	AS8	11.7
## 49	3.0	6	AS8	11.5
##	Fuel_Consumption_in_City_Hwy.L.100.km. Fuel_Consumption_comb.L.100km.			
## 1			7.0	8.6
## 2			10.8	11.0
## 3			8.6	9.9
## 4			9.1	10.3
## 5			8.0	9.8
## 6			8.1	9.8
## 7			7.2	8.7
## 8			7.7	9.2
## 9			9.3	11.6
## 10			8.1	9.3
## 11			8.3	9.6
## 12			10.3	12.3
## 13			9.8	11.5
## 14			10.6	13.3
## 15			10.7	13.8
## 16			12.8	15.2
## 17			9.6	11.5
## 18			11.2	14.2
## 19			7.9	8.9
## 20			7.0	8.3
## 21			7.6	8.8
## 22			7.5	9.1
## 23			7.6	8.8
## 24			7.6	8.8
## 25			9.1	10.6
## 26			7.8	9.2
## 27			8.2	9.7
## 28			8.2	9.7
## 29			8.9	11.5
## 30			10.4	13.2
## 31			7.7	9.3
## 32			8.4	10.2
## 33			8.3	9.3
## 34			8.3	9.3
## 35			10.1	11.3
## 36			10.4	12.0
## 37			10.4	12.0
## 38			10.2	14.1
## 39			12.0	15.1
## 40			10.2	14.1

## 41		12.0	15.1
## 42		9.5	11.5
## 43		9.3	11.4
## 44		10.7	13.7
## 45		10.5	13.5
## 46		12.3	15.4
## 47		8.5	10.1
## 48		8.9	10.5
## 49		8.5	10.1
##	CO2_Emissions	Smog_Level	
## 1	199	3	
## 2	256	3	
## 3	232	6	
## 4	242	6	
## 5	230	7	
## 6	231	7	
## 7	205	3	
## 8	217	3	
## 9	271	3	
## 10	218	3	
## 11	226	3	
## 12	288	3	
## 13	271	3	
## 14	312	3	
## 15	324	3	
## 16	357	3	
## 17	270	3	
## 18	333	3	
## 19	208	5	
## 20	194	5	
## 21	205	5	
## 22	212	5	
## 23	205	5	
## 24	205	5	
## 25	247	5	
## 26	214	5	
## 27	227	5	
## 28	227	5	
## 29	267	5	
## 30	308	3	
## 31	218	7	
## 32	239	7	
## 33	217	5	
## 34	217	5	
## 35	264	3	
## 36	281	5	
## 37	281	5	
## 38	329	1	
## 39	353	1	
## 40	329	1	
## 41	353	1	
## 42	269	5	
## 43	266	5	
## 44	319	3	

```
## 45      315      3
## 46      360      3
## 47      237      5
## 48      244      5
## 49      237      5
```

```
# Descriptive statistics for Quantitative Variables and categorical variables
```

```
mean(dataset$CO2_Emissions)
```

```
## [1] 259.7755
```

```
sd(dataset$CO2_Emissions)
```

```
## [1] 48.70287
```

```
table(dataset$Model)
```

```
##
##  A4 allroad 45 TFSI quattro      A4 Sedan 40 TFSI quattro
##                                1                                1
##  A4 Sedan 45 TFSI quattro A5 Cabriolet 45 TFSI quattro
##                                1                                1
##  A5 Coupe 45 TFSI quattro A5 Sportback 45 TFSI quattro
##                                1                                1
##  A6 allroad 55 TFSI quattro      A6 Sedan 45 TFSI quattro
##                                1                                1
##  A6 Sedan 55 TFSI quattro A7 Sportback 55 TFSI quattro
##                                1                                1
##  A8 L Sedan 55 TFSI quattro A8 L Sedan 60 TFSI quattro
##                                1                                1
##                                DB11 AMR                        DB11 V8
##                                1                                1
##                                DBS Superleggera                DBX V8
##                                1                                1
##                                Giulia                          Giulia AWD
##                                1                                1
##  Giulia Quadrifoglio                                ILX
##                                1                                1
##                                NSX      Q3 40 TFSI quattro
##                                1                                1
##  Q3 45 TFSI quattro      Q5 45 TFSI quattro
##                                1                                1
##  Q5 Sportback 45 TFSI quattro      Q7 45 TFSI quattro
##                                1                                1
##  Q7 55 TFSI quattro      Q8 55 TFSI quattro
##                                1                                1
##                                R8 Coupe      R8 Coupe quattro
##                                1                                1
##                                R8 Spyder      R8 Spyder quattro
##                                1                                1
##                                RDX SH-AWD      RDX SH-AWD A-SPEC
```

```
##          1          1
##      RS 5 Coupe quattro      RS 5 Sportback quattro
##          1          1
##      RS 6 Avant quattro      RS 7 Sportback quattro
##          1          1
##          RS Q8 quattro      S4 Sedan quattro
##          1          1
##      S5 Cabriolet quattro      S5 Coupe quattro
##          1          1
##          Stelvio      Stelvio AWD
##          1          1
##      Stelvio AWD Quadrifoglio      TLX SH-AWD
##          1          1
##          TLX SH-AWD A-SPEC      Vantage V8
##          1          2
```

```
var(dataset$CO2_Emissions)
```

```
## [1] 2371.969
```

```
dataset$CO2_Emissions= mean(dataset$CO2_Emissions)- sd(dataset$CO2_Emissions)
dataset$CO2_Emissions
```

```
## [1] 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726
## [9] 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726
## [17] 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726
## [25] 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726
## [33] 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726
## [41] 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726 211.0726
## [49] 211.0726
```

```
# Transformed the CO2_Emissions variable by taking sqrt
```

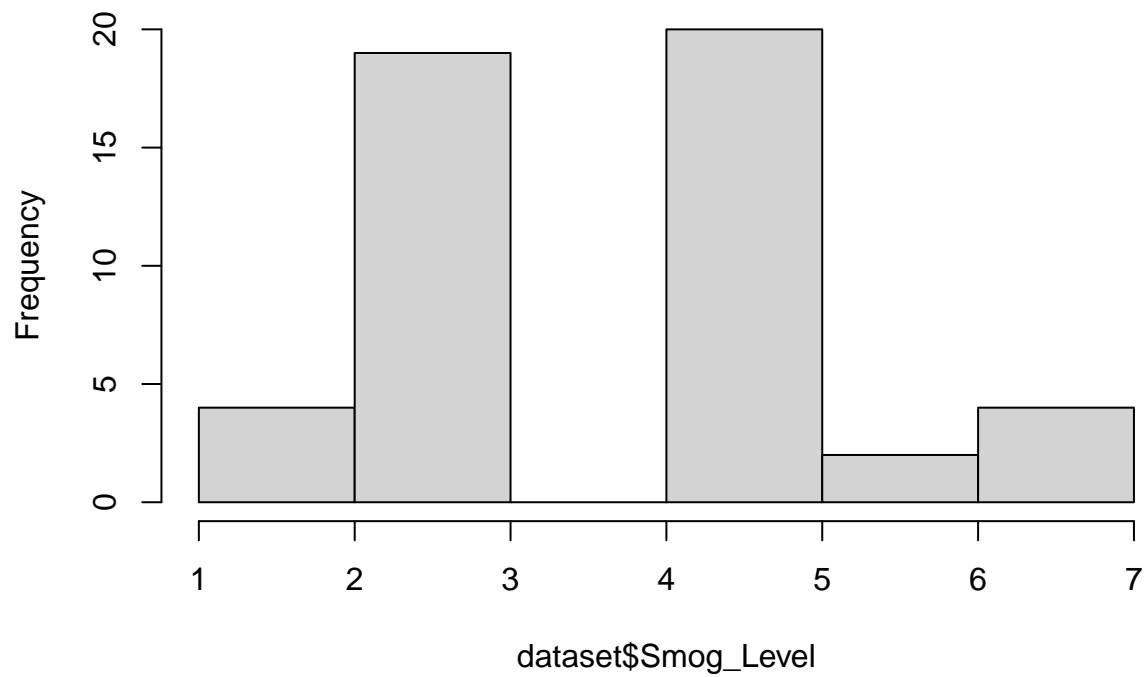
```
dataset$CO2_Emissions_Transformed = sqrt(dataset$CO2_Emissions)
dataset$CO2_Emissions_Transformed
```

```
## [1] 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834
## [9] 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834
## [17] 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834
## [25] 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834
## [33] 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834
## [41] 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834 14.52834
## [49] 14.52834
```

```
#Plotting Smog_Level and CO2_Emissions
```

```
hist(dataset$Smog_Level)
```

**Histogram of dataset\$Smog\_Level**



```
x = dataset$CO2_Emissions
y = dataset$Smog_Level
plot(x,y, main = "Area and Length", xlab = "Area", ylab = "Length")
```

