Data Collection and Preprocessing Phase

Date	7 July 2024
Team ID	739677
Project Title	FetalAI: Using Machine Learning To Predict And Monitor Fetal Health
Maximum Marks	6 Marks

Data Exploration and Preprocessing Template

Identifies data sources, assesses quality issues like missing values and duplicates, and implements resolution plans to ensure accurate and reliable analysis.

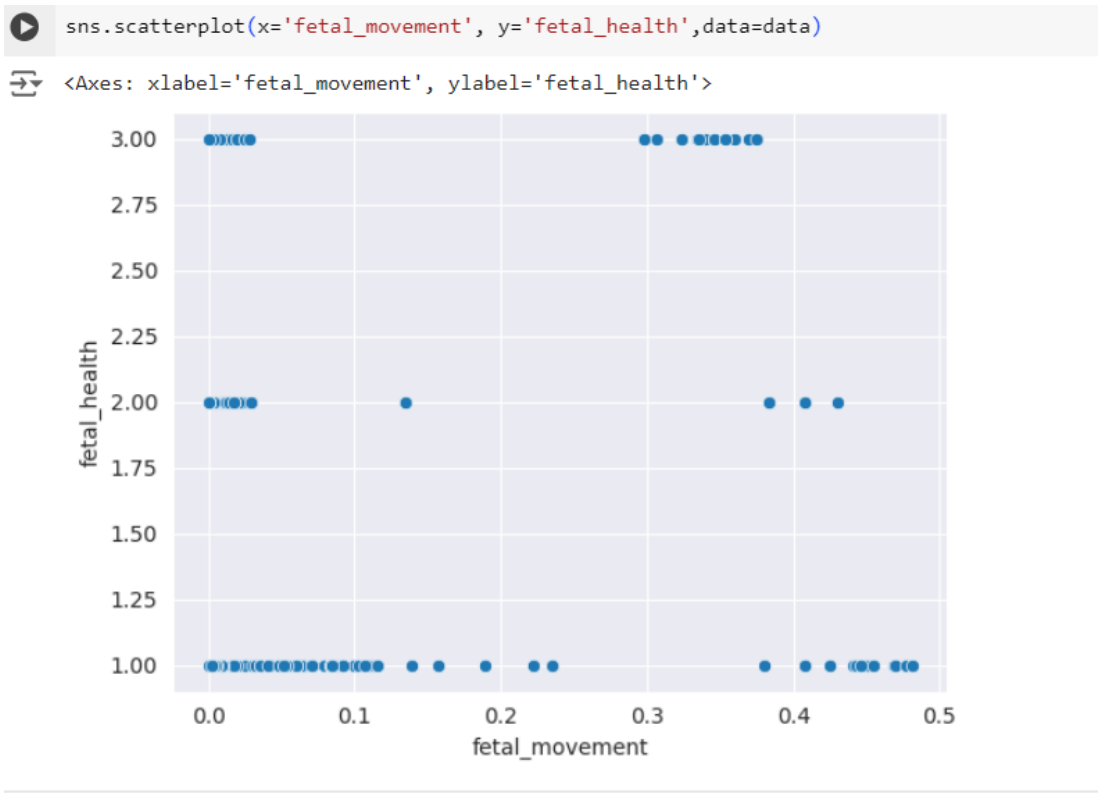
Section

Data Overview

Description

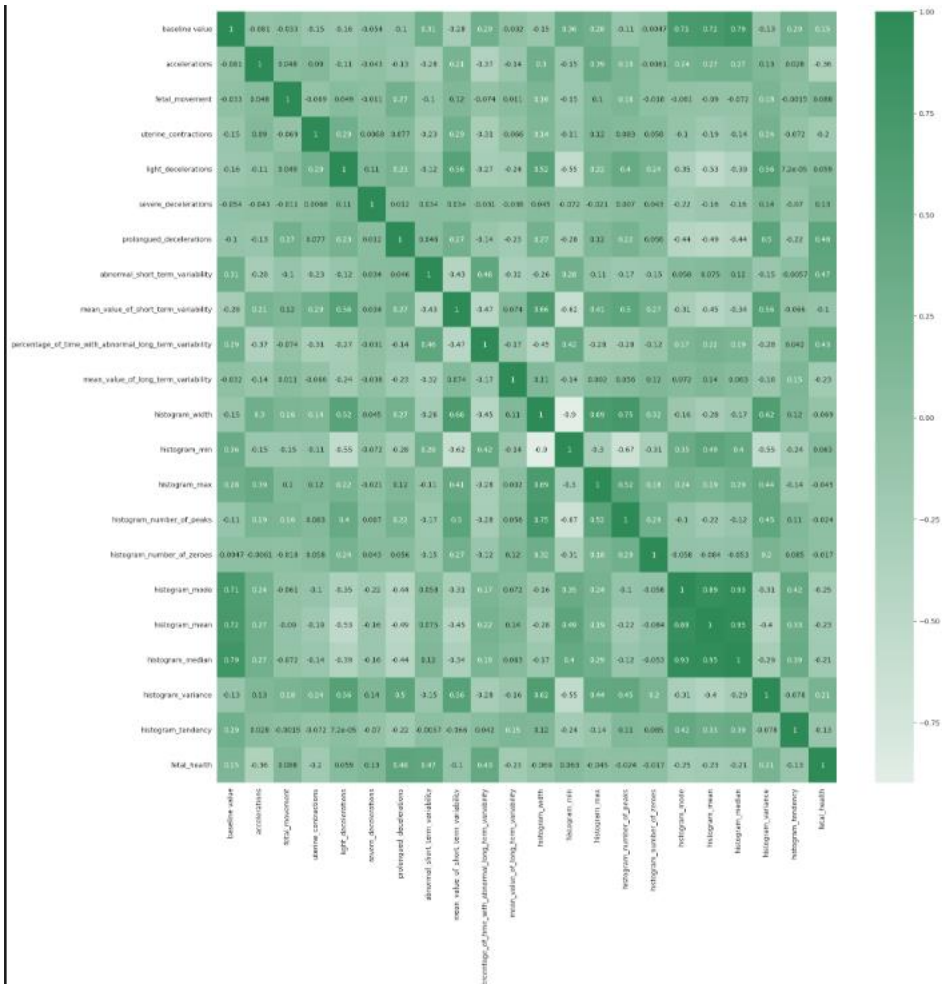
```
data.describe().T
```

	count	mean	std	min	25%	50%	75%	max
baseline value	2126.0	133.303857	9.840844	106.0	126.000	133.000	140.000	160.000
accelerations	2126.0	0.003178	0.003866	0.0	0.000	0.002	0.006	0.019
fetal_movement	2126.0	0.009481	0.046666	0.0	0.000	0.000	0.003	0.481
uterine_contractions	2126.0	0.004366	0.002946	0.0	0.002	0.004	0.007	0.015
light_decelerations	2126.0	0.001889	0.002960	0.0	0.000	0.000	0.003	0.015
severe_decelerations	2126.0	0.000003	0.000057	0.0	0.000	0.000	0.000	0.001
prolongued_decelerations	2126.0	0.000159	0.000590	0.0	0.000	0.000	0.000	0.005
abnormal_short_term_variability	2126.0	46.990122	17.192814	12.0	32.000	49.000	61.000	87.000
mean_value_of_short_term_variability	2126.0	1.332785	0.883241	0.2	0.700	1.200	1.700	7.000
percentage_of_time_with_abnormal_long_term_variability	2126.0	9.846660	18.396880	0.0	0.000	0.000	11.000	91.000
mean_value_of_long_term_variability	2126.0	8.187629	5.628247	0.0	4.600	7.400	10.800	50.700
histogram_width	2126.0	70.445908	38.955693	3.0	37.000	67.500	100.000	180.000
histogram_min	2126.0	93.579492	29.560212	50.0	67.000	93.000	120.000	159.000
histogram_max	2126.0	164.025400	17.944183	122.0	152.000	162.000	174.000	238.000
histogram_number_of_peaks	2126.0	4.068203	2.949386	0.0	2.000	3.000	6.000	18.000
histogram_number_of_zeroes	2126.0	0.323612	0.706059	0.0	0.000	0.000	0.000	10.000
histogram_mode	2126.0	137.452023	16.381289	60.0	129.000	139.000	148.000	187.000
histogram_mean	2126.0	134.610536	15.593596	73.0	125.000	136.000	145.000	182.000
histogram_median	2126.0	138.090310	14.466589	77.0	129.000	139.000	148.000	186.000
histogram_variance	2126.0	18.808090	28.977636	0.0	2.000	7.000	24.000	269.000
histogram_tendency	2126.0	0.320320	0.610829	-1.0	0.000	0.000	1.000	1.000
fetal_health	2126.0	1.304327	0.614377	1.0	1.000	1.000	1.000	3.000

Univariate Analysis	
Bivariate Analysis	


```
sns.scatterplot(x='fetal_movement', y='fetal_health',data=data)
```

```
<Axes: xlabel='fetal_movement', ylabel='fetal_health'>
```

Multivariate Analysis	

Data Preprocessing Code Screenshots

Loading Data

```
[ ] data = pd.read_csv("/content/fetal_health dataset.csv")

[ ] data.head()
```

	baseline value	accelerations	fetal_movement	uterine_contractions	light_decelerations	severe_decelerations	prolongued_decelerations	abnormal_short_term_variability	mean_value_of_short_term_
0	120	0.000	0.0	0.000	0.000	0.0	0.0	73	
1	132	0.006	0.0	0.006	0.003	0.0	0.0	17	
2	133	0.003	0.0	0.008	0.003	0.0	0.0	16	
3	134	0.003	0.0	0.008	0.003	0.0	0.0	16	
4	132	0.007	0.0	0.008	0.000	0.0	0.0	16	

5 rows × 22 columns

Handling Missing Data	`data.isnull().sum()`
	
	baseline value 0
	accelerations 0
	fetal_movement 0
	uterine_contractions 0
	light_decelerations 0
	severe_decelerations 0
	prolongued_decelerations 0
	abnormal_short_term_variability 0
	mean_value_of_short_term_variability 0
	percentage_of_time_with_abnormal_long_term_variability 0
	mean_value_of_long_term_variability 0
	histogram_width 0
	histogram_min 0
	histogram_max 0
	histogram_number_of_peaks 0
	histogram_number_of_zeroes 0
	histogram_mode 0
	histogram_mean 0
	histogram_median 0
	histogram_variance 0
	histogram_tendency 0
	fetal_health 0
	dtype: int64
	
	`data.isnull().any()`
	
	baseline value False
	accelerations False
	fetal_movement False
	uterine_contractions False
	light_decelerations False
	severe_decelerations False
	prolongued_decelerations False
	abnormal_short_term_variability False
	mean_value_of_short_term_variability False
	percentage_of_time_with_abnormal_long_term_variability False
	mean_value_of_long_term_variability False
	histogram_width False
	histogram_min False
	histogram_max False
	histogram_number_of_peaks False
	histogram_number_of_zeroes False
	histogram_mode False
	histogram_mean False
	histogram_median False
	histogram_variance False
	histogram_tendency False
	fetal_health False
	dtype: bool

Data Transformation	Scaling Data
	
	`scale = MinMaxScaler()`
	`X = pd.DataFrame(scale.fit_transform(X), columns=X.columns)`
	`X.head()`
	
	prolongued_decelerations abnormal_short_term_variability percentage_of_time_with_abnormal_long_term_variability histogram_variance histogram_median mean_value_of_long_term_variability
	0 0.0 0.813333 0.472527 0.271375 0.403670 0.047337
	1 0.0 0.066667 0.000000 0.044610 0.577982 0.205128
	2 0.0 0.053333 0.000000 0.048327 0.559633 0.264300
	3 0.0 0.053333 0.000000 0.048327 0.550459 0.453649
	4 0.0 0.053333 0.000000 0.040892 0.559633 0.392505

Feature Engineering	Attached the codes in final submission.
Save Processed Data	-