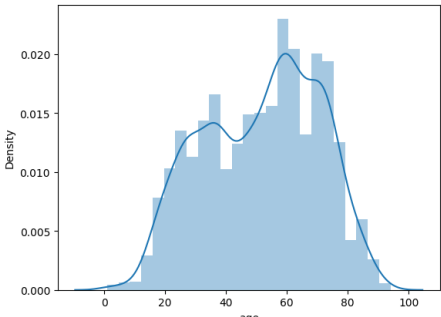


## Data Collection and Preprocessing Phase

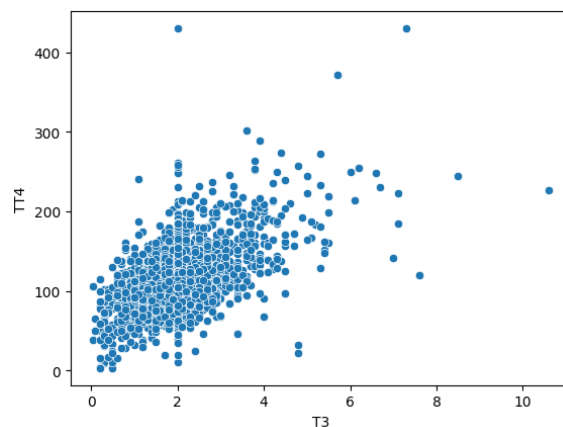
Date	3 July 2024
Team ID	740091
Project Title	Thyroid Classification using machine Learning
Maximum Marks	6 Marks

### Data Exploration and Preprocessing Template

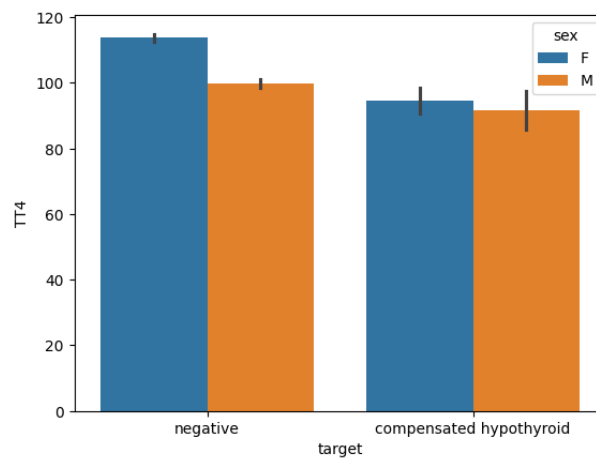
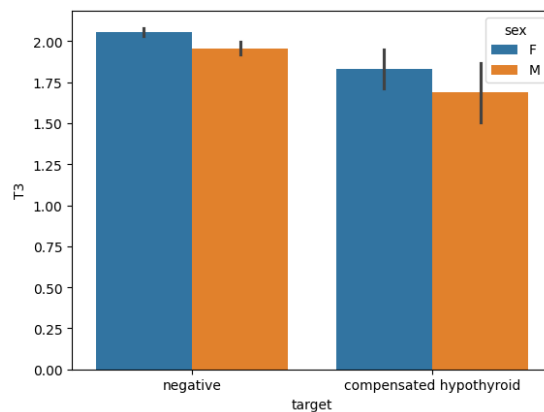
Identifies data sources, assesses quality issues like missing values and duplicates, and implements resolution plans to ensure accurate and reliable analysis.

Section	Description																																																															
Data Overview	Dimensions: 4744 rows x 30 cols																																																															
	Descriptive Analysis:																																																															
	<table><thead><tr><th></th><th>age</th><th>TSH</th><th>T3</th><th>TT4</th><th>T4U</th><th>FTI</th></tr></thead><tbody><tr><td>count</td><td>4581.000000</td><td>4581.000000</td><td>4581.000000</td><td>4581.000000</td><td>4581.000000</td><td>4581.000000</td></tr><tr><td>mean</td><td>51.586335</td><td>3.084818</td><td>2.016608</td><td>108.987645</td><td>0.989697</td><td>111.248810</td></tr><tr><td>std</td><td>19.000420</td><td>14.920483</td><td>0.709480</td><td>32.830981</td><td>0.185445</td><td>29.344041</td></tr><tr><td>min</td><td>1.000000</td><td>0.005000</td><td>0.050000</td><td>2.900000</td><td>0.250000</td><td>2.800000</td></tr><tr><td>25%</td><td>36.000000</td><td>0.590000</td><td>1.700000</td><td>90.000000</td><td>0.890000</td><td>95.000000</td></tr><tr><td>50%</td><td>54.000000</td><td>1.300000</td><td>2.000000</td><td>104.000000</td><td>0.970000</td><td>107.000000</td></tr><tr><td>75%</td><td>67.000000</td><td>2.300000</td><td>2.200000</td><td>123.000000</td><td>1.060000</td><td>122.000000</td></tr><tr><td>max</td><td>94.000000</td><td>530.000000</td><td>10.600000</td><td>430.000000</td><td>2.320000</td><td>395.000000</td></tr></tbody></table>		age	TSH	T3	TT4	T4U	FTI	count	4581.000000	4581.000000	4581.000000	4581.000000	4581.000000	4581.000000	mean	51.586335	3.084818	2.016608	108.987645	0.989697	111.248810	std	19.000420	14.920483	0.709480	32.830981	0.185445	29.344041	min	1.000000	0.005000	0.050000	2.900000	0.250000	2.800000	25%	36.000000	0.590000	1.700000	90.000000	0.890000	95.000000	50%	54.000000	1.300000	2.000000	104.000000	0.970000	107.000000	75%	67.000000	2.300000	2.200000	123.000000	1.060000	122.000000	max	94.000000	530.000000	10.600000	430.000000	2.320000	395.000000
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Univariate Analysis																																																																

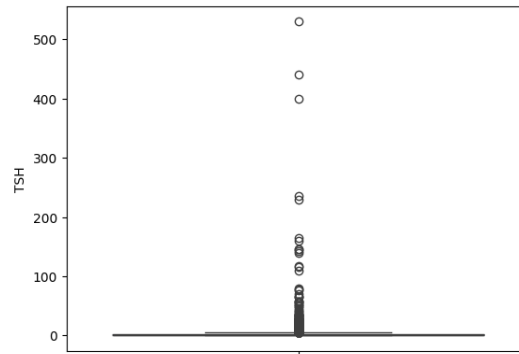
## Bivariate Analysis



## Multivariate Analysis



## Outliers and Anomalies



## Data Preprocessing Code Screenshots

### Loading Data

```
df=pd.read_csv('/content/dataset123.csv')
```

### Handling Missing Data

```
df.isnull().sum()
age                0
TSH                0
T3                0
TT4               0
T4U               0
FTI               0
target            0
sex_F             0
sex_M             0
on_thyroxine_f    0
on_thyroxine_t    0
on_antithyroid_medication_f  0
on_antithyroid_medication_t  0
sick_F            0
sick_t            0
pregnant_f        0
pregnant_t        0
thyroid_surgery_f  0
thyroid_surgery_t  0
I131_treatment_f  0
I131_treatment_t  0
query_on_thyroxine_f  0
query_on_thyroxine_t  0
query_hypothyroid_f  0
query_hypothyroid_t  0
query_hyperthyroid_f  0
query_hyperthyroid_t  0
lithium_f         0
lithium_t         0
```

```
impute=SimpleImputer(strategy='most_frequent')
impute1=SimpleImputer(strategy='median')
```

```
df.replace('?',np.nan,inplace=True)
df[['sex']]=impute.fit_transform(df[['sex']])
```

```
df_values=['negative','compensated hypothyroid','primary thyroid']
df= df[df['target'].isin(df_values)]
df['target'].value_counts()
```

```
df['age']=pd.to_numeric(df['age'],errors='coerce')
df=df[df['age']!=455]
mean_age=df['age'].mean()
df['age']=df['age'].fillna(mean_age) #df['age']=impute1.fit_transform(df[['age']])
df['age']=df['age'].round(0).astype('int')
df['age'].unique()
```

	<pre>df['TSH']=pd.to_numeric(df['TSH'],errors='coerce') df['T3']=pd.to_numeric(df['T3'],errors='coerce') df['TT4']=pd.to_numeric(df['TT4'],errors='coerce') df['FTI']=pd.to_numeric(df['FTI'],errors='coerce') df['T4U']=pd.to_numeric(df['T4U'],errors='coerce')</pre> <pre>df['TSH']=impute1.fit_transform(df[['TSH']]) df['TSH']</pre> <pre>df['T3']=impute1.fit_transform(df[['T3']]) df['T3'].unique()</pre> <pre>df['TT4']=impute1.fit_transform(df[['TT4']]) df['TT4'].unique()</pre> <pre>df['T4U']=impute1.fit_transform(df[['T4U']]) df['T4U'].unique()</pre> <pre>df['FTI']=impute1.fit_transform(df[['FTI']]) df['FTI'].unique()</pre>
Data Transformation	-
Feature Engineering	-
Save Processed Data	-