

Model Development Phase Template

Date	06-07-2024
Team ID	739733
Project Title	Fetal AI: Using Machine Learning to Predict and Monitor Fetal Health
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

```

Random Forest

[28] from sklearn.ensemble import RandomForestClassifier

[29] rf=RandomForestClassifier()
     rf.fit(x_train_smote,y_train_smote)

▼ RandomForestClassifier
RandomForestClassifier()

Accuracy Score of Random Forest

pred=rf.predict(x_test)
print("accuracy score")
print(accuracy_score(y_test,pred))
print("\n")
print("confusion matrix")
print(classification_report(y_test,pred))
print(confusion_matrix(y_test,pred))

```

Decision Tree

```
[32] from sklearn.tree import DecisionTreeClassifier
```

```
dt=DecisionTreeClassifier()  
dt.fit(x_train_smote,y_train_smote)  
pred=dt.predict(x_test)  
print("accuracy score")  
print(accuracy_score(y_test,pred))  
print("\n")  
print("confusion matrix")  
print(classification_report(y_test,pred))
```

Logistic Regression

```
[35] from sklearn.linear_model import LogisticRegression
```

```
[36] lr=LogisticRegression()  
lr.fit(x_train_smote,y_train_smote)  
pred=lr.predict(x_test)  
print("accuracy score")  
print(accuracy_score(y_test,pred))  
print("\n")  
print("confusion matrix")
```

k-Nearest Neighbors

```
[38] from sklearn.neighbors import KNeighborsClassifier
```

```
knn=KNeighborsClassifier(n_neighbors=5)  
knn.fit(x_train_smote,y_train_smote)  
pred=knn.predict(x_test)  
print("accuracy score")  
print(accuracy_score(y_test,pred))  
print("\n")  
print("confusion matrix")  
print(classification_report(y_test,pred))
```

Model Validation and Evaluation Report:

Model	Classification Report/ Confusion Matrix	F1 score																																			
Decision Tree	<pre>print(classification_report(y_test,pred))</pre> <pre>accuracy score 0.9295774647887324</pre> <pre>confusion matrix</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>1</td><td>0.97</td><td>0.95</td><td>0.96</td><td>326</td></tr><tr><td>2</td><td>0.72</td><td>0.81</td><td>0.76</td><td>58</td></tr><tr><td>3</td><td>0.93</td><td>0.93</td><td>0.93</td><td>42</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.93</td><td>426</td></tr><tr><td>macro avg</td><td>0.87</td><td>0.90</td><td>0.88</td><td>426</td></tr><tr><td>weighted avg</td><td>0.93</td><td>0.93</td><td>0.93</td><td>426</td></tr></tbody></table>		precision	recall	f1-score	support	1	0.97	0.95	0.96	326	2	0.72	0.81	0.76	58	3	0.93	0.93	0.93	42	accuracy			0.93	426	macro avg	0.87	0.90	0.88	426	weighted avg	0.93	0.93	0.93	426	92%
	precision	recall	f1-score	support																																	
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KNN	<pre>print(classification_report(y_test,pred))</pre> <pre>accuracy score 0.8427230046948356</pre> <pre>confusion matrix</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>1</td><td>0.95</td><td>0.85</td><td>0.90</td><td>326</td></tr><tr><td>2</td><td>0.49</td><td>0.78</td><td>0.60</td><td>58</td></tr><tr><td>3</td><td>0.84</td><td>0.86</td><td>0.85</td><td>42</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.84</td><td>426</td></tr><tr><td>macro avg</td><td>0.76</td><td>0.83</td><td>0.78</td><td>426</td></tr><tr><td>weighted avg</td><td>0.88</td><td>0.84</td><td>0.85</td><td>426</td></tr></tbody></table>		precision	recall	f1-score	support	1	0.95	0.85	0.90	326	2	0.49	0.78	0.60	58	3	0.84	0.86	0.85	42	accuracy			0.84	426	macro avg	0.76	0.83	0.78	426	weighted avg	0.88	0.84	0.85	426	77%
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Random Forest	<pre>print(confusion_matrix(y_test,pred))</pre> <pre>accuracy score</pre> <div>Code cell output actions</div> <pre>confusion matrix</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>1</td><td>0.96</td><td>0.97</td><td>0.97</td><td>326</td></tr><tr><td>2</td><td>0.81</td><td>0.76</td><td>0.79</td><td>58</td></tr><tr><td>3</td><td>0.89</td><td>0.93</td><td>0.91</td><td>42</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.94</td><td>426</td></tr><tr><td>macro avg</td><td>0.89</td><td>0.89</td><td>0.89</td><td>426</td></tr><tr><td>weighted avg</td><td>0.94</td><td>0.94</td><td>0.94</td><td>426</td></tr></tbody></table>		precision	recall	f1-score	support	1	0.96	0.97	0.97	326	2	0.81	0.76	0.79	58	3	0.89	0.93	0.91	42	accuracy			0.94	426	macro avg	0.89	0.89	0.89	426	weighted avg	0.94	0.94	0.94	426	93%
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