Model Development Phase Template

Date	29 July 2025
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Project Title	Anemia Sense: Leveraging Machine Learning For Precise Anemia Recognitions
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training will be demonstrated through a screenshot in the subsequent update. The model validation and evaluation report will feature classification reports, accuracy scores, and confusion matrices for multiple models, each presented with their respective screenshots.

Initial Model Training Code:

```
# logistic regression

from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

logistic_regression = LogisticRegression()
logistic_regression.fit(x_train, y_train)
y_pred = logistic_regression.predict(x_test)

acc_lr = accuracy_score(y_test,y_pred)
c_lr = classification_report(y_test,y_pred)

print('Accuracy Score: ',acc_lr)
print(c_lr)
```

```
Accuracy Score:  0.9919354838709677
              precision    recall  f1-score   support

           0       1.00      0.98      0.99       113
           1       0.99      1.00      0.99       135

    accuracy                           0.99       248
   macro avg       0.99      0.99      0.99       248
weighted avg       0.99      0.99      0.99       248
```

```
# Random forest model

from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

random_forest = RandomForestClassifier()
random_forest.fit(x_train, y_train)
y_pred = random_forest.predict(x_test)

acc_rf = accuracy_score(y_test, y_pred)
c_rf = classification_report(y_test, y_pred)

print('Accuracy Score: ', acc_rf)
print(c_rf)
```

```
Accuracy Score:  1.0
              precision    recall  f1-score   support

           0       1.00      1.00      1.00       113
           1       1.00      1.00      1.00       135

    accuracy                           1.00       248
   macro avg       1.00      1.00      1.00       248
weighted avg       1.00      1.00      1.00       248
```

```
# Decision tree model

from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

decision_tree_model = DecisionTreeClassifier()
decision_tree_model.fit(x_train, y_train)
y_pred = decision_tree_model.predict(x_test)

acc_dt = accuracy_score(y_test, y_pred)
c_dt = classification_report(y_test, y_pred)

print('Accuracy Score: ', acc_dt)
print(c_dt)
```

```
Accuracy Score:  1.0
              precision    recall  f1-score   support

           0       1.00      1.00      1.00       113
           1       1.00      1.00      1.00       135

    accuracy                           1.00       248
   macro avg       1.00      1.00      1.00       248
weighted avg       1.00      1.00      1.00       248
```

```
# Gaussian Navies Bayes

from sklearn.naive_bayes import GaussianNB
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

NB = GaussianNB()
NB.fit(x_train, y_train)
y_pred = NB.predict(x_test)

acc_nb = accuracy_score(y_test, y_pred)
c_nb = classification_report(y_test, y_pred)

print('Accuracy Score: ', acc_nb)
print(c_nb)
```

```
Accuracy Score:  0.9798387096774194
              precision    recall  f1-score   support

           0       0.99      0.96      0.98       113
           1       0.97      0.99      0.98       135

    accuracy                           0.98       248
   macro avg       0.98      0.98      0.98       248
weighted avg       0.98      0.98      0.98       248
```

```
# Support Vector.

from sklearn.svm import SVC
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

support_vector = SVC()
support_vector.fit(x_train, y_train)
y_pred = support_vector.predict(x_test)

acc_svc = accuracy_score(y_test, y_pred)
c_svc = classification_report(y_test, y_pred)

print('Accuracy Score: ', acc_svc)
print(c_svc)
```

```
Accuracy Score:  0.9395161290322581
              precision    recall  f1-score   support

           0       0.99      0.88      0.93       113
           1       0.91      0.99      0.95       135

    accuracy                           0.94       248
   macro avg       0.95      0.93      0.94       248
weighted avg       0.94      0.94      0.94       248
```

```
# Gradient Boosting Classifier

from sklearn.ensemble import GradientBoostingClassifier
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report

GBC = GradientBoostingClassifier()
GBC.fit(x_train, y_train)
y_pred = GBC.predict(x_test)

acc_gbc = accuracy_score(y_test, y_pred)
c_gbc = classification_report(y_test, y_pred)

print('Accuracy Score: ', acc_gbc)
print(c_gbc)
```

```
Accuracy Score:  1.0
              precision    recall  f1-score   support

           0       1.00      1.00      1.00       113
           1       1.00      1.00      1.00       135

    accuracy                           1.00       248
   macro avg       1.00      1.00      1.00       248
weighted avg       1.00      1.00      1.00       248
```

Model Validation and Evaluation Report:

Model	Classification Report	F1 Score	Confusion Matrix
Random Forest	Accuracy Score: 1.0 precision recall f1-score support 0 1.00 1.00 1.00 113 1 1.00 1.00 1.00 135 accuracy 1.00 248 macro avg 1.00 1.00 1.00 248 weighted avg 1.00 1.00 1.00 248	81%	Confusion Matrix: [[113 0] [0 135]]
Logistic Regression	Accuracy Score: 0.9919354838709677 precision recall f1-score support 0 1.00 0.98 0.99 113 1 0.99 1.00 0.99 135 accuracy 0.99 248 macro avg 0.99 0.99 0.99 248 weighted avg 0.99 0.99 0.99 248	99%	Confusion Matrix: [[111 2] [0 135]]
Gaussian Navies Bayes	Accuracy Score: 0.9798387096774194 precision recall f1-score support 0 0.99 0.96 0.98 113 1 0.97 0.99 0.98 135 accuracy 0.98 248 macro avg 0.98 0.98 0.98 248 weighted avg 0.98 0.98 0.98 248	98%	Confusion Matrix: [[109 4] [1 134]]

Decision Tree	Accuracy Score: 1.0 precision recall f1-score support 0 1.00 1.00 1.00 113 1 1.00 1.00 1.00 135 accuracy 1.00 248 macro avg 1.00 1.00 1.00 248 weighted avg 1.00 1.00 1.00 248	100%	Confusion Matrix: [[113 0] [0 135]]
Support Vector.	Accuracy Score: 0.9395161290322581 precision recall f1-score support 0 0.99 0.88 0.93 113 1 0.91 0.99 0.95 135 accuracy 0.94 248 macro avg 0.95 0.93 0.94 248 weighted avg 0.94 0.94 0.94 248	94%	Confusion Matrix: [[99 14] [1 134]]
Gradient Boosting	Accuracy Score: 1.0 precision recall f1-score support 0 1.00 1.00 1.00 113 1 1.00 1.00 1.00 135 accuracy 1.00 248 macro avg 1.00 1.00 1.00 248 weighted avg 1.00 1.00 1.00 248	100%	Confusion Matrix: [[113 0] [0 135]]