

# OUR MODEL COMPARISON

## 1. Random Forest

```
=====
--- FINAL TUNED MODEL RESULTS ---
=====
Final Accuracy on Test Set: 0.9239

Very close! The model's performance has improved significantly.

Final Classification Report:
      precision    recall  f1-score   support

Not Planet      0.95      0.93      0.94       189
   Planet      0.88      0.91      0.89       100

 accuracy              0.92       289
 macro avg      0.91      0.92      0.92       289
weighted avg      0.92      0.92      0.92       289
```

## 2. Esemble Model

```
--- Model Performance ---
Model Accuracy on Test Set: 92.73%

Classification Report:
      precision    recall  f1-score   support

CONFIRMED      0.88      0.92      0.90       100
FALSE POSITIVE  0.96      0.93      0.94       189

 accuracy              0.93       289
 macro avg      0.92      0.93      0.92       289
weighted avg      0.93      0.93      0.93       289
```

## 3. XGBoost

```
===== XGBoost (Tuned) =====
Best Parameters: {'colsample_bytree': np.float64(0.9727961206236346), 'gamma': np.float64(0.12938999080000846), 'learning_rate': np.float64(0.1425044568707964), 'max_depth': 4, 'n_estimators': 489, 'subsample': np.float64(0.7623824988604566)}
Accuracy: 0.9591942148760331
F1 Score: 0.9597144314125446
Confusion Matrix:
[[916  52]
 [ 27 941]]
Classification Report:
      precision    recall  f1-score   support

0.0      0.97      0.95      0.96       968
1.0      0.95      0.97      0.96       968

 accuracy              0.96      1936
 macro avg      0.96      0.96      0.96      1936
weighted avg      0.96      0.96      0.96      1936
```