

Model Development Phase Template

Date	15 July 2024
Team ID	740067
Project Title	Crop Prediction using machine learning
Maximum Marks	4 Marks


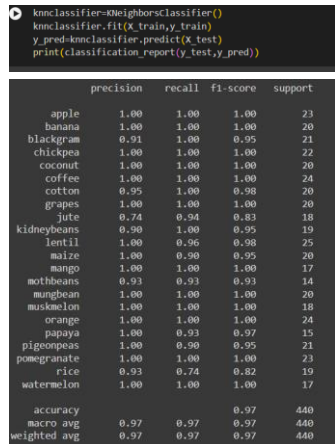
Initial Model Training Code, Model Validation and Evaluation Report

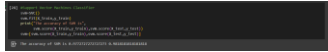


The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

Paste the screenshot of the model training code

Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
1. K Nearest Neighbors Model		0.98579	

2. SVM Model		0.97784	<pre>[] svm-SVC() svm.fit(X_train,y_train) y_pred=svm.predict(X_test) print(classification_report(y_test,y_pred))</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>apple</td><td>1.00</td><td>1.00</td><td>1.00</td><td>23</td></tr><tr><td>banana</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>blackgram</td><td>0.91</td><td>1.00</td><td>0.95</td><td>21</td></tr><tr><td>chickpea</td><td>1.00</td><td>1.00</td><td>1.00</td><td>22</td></tr><tr><td>coconut</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>coffee</td><td>1.00</td><td>1.00</td><td>1.00</td><td>24</td></tr><tr><td>cotton</td><td>0.95</td><td>1.00</td><td>0.98</td><td>20</td></tr><tr><td>grapes</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>jute</td><td>0.74</td><td>0.94</td><td>0.83</td><td>18</td></tr><tr><td>kidneybeans</td><td>0.90</td><td>1.00</td><td>0.95</td><td>19</td></tr><tr><td>lentil</td><td>1.00</td><td>0.96</td><td>0.98</td><td>25</td></tr><tr><td>maize</td><td>1.00</td><td>0.90</td><td>0.95</td><td>20</td></tr><tr><td>mango</td><td>1.00</td><td>1.00</td><td>1.00</td><td>17</td></tr><tr><td>mothbeans</td><td>0.93</td><td>0.93</td><td>0.93</td><td>14</td></tr><tr><td>mungbean</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>muskmelon</td><td>1.00</td><td>1.00</td><td>1.00</td><td>18</td></tr><tr><td>orange</td><td>1.00</td><td>1.00</td><td>1.00</td><td>24</td></tr><tr><td>papaya</td><td>1.00</td><td>0.93</td><td>0.97</td><td>15</td></tr><tr><td>pigeonpeas</td><td>1.00</td><td>0.90</td><td>0.95</td><td>21</td></tr><tr><td>pomegranate</td><td>1.00</td><td>1.00</td><td>1.00</td><td>23</td></tr><tr><td>rice</td><td>0.93</td><td>0.74</td><td>0.82</td><td>19</td></tr><tr><td>watermelon</td><td>1.00</td><td>1.00</td><td>1.00</td><td>17</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.97</td><td>440</td></tr><tr><td>macro avg</td><td>0.97</td><td>0.97</td><td>0.97</td><td>440</td></tr><tr><td>weighted avg</td><td>0.97</td><td>0.97</td><td>0.97</td><td>440</td></tr></tbody></table>		precision	recall	f1-score	support	apple	1.00	1.00	1.00	23	banana	1.00	1.00	1.00	20	blackgram	0.91	1.00	0.95	21	chickpea	1.00	1.00	1.00	22	coconut	1.00	1.00	1.00	20	coffee	1.00	1.00	1.00	24	cotton	0.95	1.00	0.98	20	grapes	1.00	1.00	1.00	20	jute	0.74	0.94	0.83	18	kidneybeans	0.90	1.00	0.95	19	lentil	1.00	0.96	0.98	25	maize	1.00	0.90	0.95	20	mango	1.00	1.00	1.00	17	mothbeans	0.93	0.93	0.93	14	mungbean	1.00	1.00	1.00	20	muskmelon	1.00	1.00	1.00	18	orange	1.00	1.00	1.00	24	papaya	1.00	0.93	0.97	15	pigeonpeas	1.00	0.90	0.95	21	pomegranate	1.00	1.00	1.00	23	rice	0.93	0.74	0.82	19	watermelon	1.00	1.00	1.00	17	accuracy			0.97	440	macro avg	0.97	0.97	0.97	440	weighted avg	0.97	0.97	0.97	440
	precision	recall	f1-score	support																																																																																																																																	
apple	1.00	1.00	1.00	23																																																																																																																																	
banana	1.00	1.00	1.00	20																																																																																																																																	
blackgram	0.91	1.00	0.95	21																																																																																																																																	
chickpea	1.00	1.00	1.00	22																																																																																																																																	
coconut	1.00	1.00	1.00	20																																																																																																																																	
coffee	1.00	1.00	1.00	24																																																																																																																																	
cotton	0.95	1.00	0.98	20																																																																																																																																	
grapes	1.00	1.00	1.00	20																																																																																																																																	
jute	0.74	0.94	0.83	18																																																																																																																																	
kidneybeans	0.90	1.00	0.95	19																																																																																																																																	
lentil	1.00	0.96	0.98	25																																																																																																																																	
maize	1.00	0.90	0.95	20																																																																																																																																	
mango	1.00	1.00	1.00	17																																																																																																																																	
mothbeans	0.93	0.93	0.93	14																																																																																																																																	
mungbean	1.00	1.00	1.00	20																																																																																																																																	
muskmelon	1.00	1.00	1.00	18																																																																																																																																	
orange	1.00	1.00	1.00	24																																																																																																																																	
papaya	1.00	0.93	0.97	15																																																																																																																																	
pigeonpeas	1.00	0.90	0.95	21																																																																																																																																	
pomegranate	1.00	1.00	1.00	23																																																																																																																																	
rice	0.93	0.74	0.82	19																																																																																																																																	
watermelon	1.00	1.00	1.00	17																																																																																																																																	
accuracy			0.97	440																																																																																																																																	
macro avg	0.97	0.97	0.97	440																																																																																																																																	
weighted avg	0.97	0.97	0.97	440																																																																																																																																	
3.Decision Tree Model		0.7613	<pre>dt=DecisionTreeClassifier() dt.fit(X_train,y_train) y_pred=dt.predict(X_test) print(classification_report(y_test,y_pred))</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>apple</td><td>1.00</td><td>1.00</td><td>1.00</td><td>23</td></tr><tr><td>banana</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>blackgram</td><td>0.84</td><td>1.00</td><td>0.91</td><td>21</td></tr><tr><td>chickpea</td><td>1.00</td><td>1.00</td><td>1.00</td><td>22</td></tr><tr><td>coconut</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>coffee</td><td>1.00</td><td>1.00</td><td>1.00</td><td>24</td></tr><tr><td>cotton</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>grapes</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>jute</td><td>0.89</td><td>0.94</td><td>0.92</td><td>18</td></tr><tr><td>kidneybeans</td><td>1.00</td><td>1.00</td><td>1.00</td><td>19</td></tr><tr><td>lentil</td><td>0.92</td><td>0.92</td><td>0.92</td><td>25</td></tr><tr><td>maize</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>mango</td><td>1.00</td><td>1.00</td><td>1.00</td><td>17</td></tr><tr><td>mothbeans</td><td>1.00</td><td>0.71</td><td>0.83</td><td>14</td></tr><tr><td>mungbean</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>muskmelon</td><td>1.00</td><td>1.00</td><td>1.00</td><td>18</td></tr><tr><td>orange</td><td>1.00</td><td>1.00</td><td>1.00</td><td>24</td></tr><tr><td>papaya</td><td>1.00</td><td>1.00</td><td>1.00</td><td>15</td></tr><tr><td>pigeonpeas</td><td>1.00</td><td>1.00</td><td>1.00</td><td>21</td></tr><tr><td>pomegranate</td><td>1.00</td><td>1.00</td><td>1.00</td><td>23</td></tr><tr><td>rice</td><td>0.94</td><td>0.89</td><td>0.92</td><td>19</td></tr><tr><td>watermelon</td><td>1.00</td><td>1.00</td><td>1.00</td><td>17</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.98</td><td>440</td></tr><tr><td>macro avg</td><td>0.98</td><td>0.98</td><td>0.98</td><td>440</td></tr><tr><td>weighted avg</td><td>0.98</td><td>0.98</td><td>0.98</td><td>440</td></tr></tbody></table>		precision	recall	f1-score	support	apple	1.00	1.00	1.00	23	banana	1.00	1.00	1.00	20	blackgram	0.84	1.00	0.91	21	chickpea	1.00	1.00	1.00	22	coconut	1.00	1.00	1.00	20	coffee	1.00	1.00	1.00	24	cotton	1.00	1.00	1.00	20	grapes	1.00	1.00	1.00	20	jute	0.89	0.94	0.92	18	kidneybeans	1.00	1.00	1.00	19	lentil	0.92	0.92	0.92	25	maize	1.00	1.00	1.00	20	mango	1.00	1.00	1.00	17	mothbeans	1.00	0.71	0.83	14	mungbean	1.00	1.00	1.00	20	muskmelon	1.00	1.00	1.00	18	orange	1.00	1.00	1.00	24	papaya	1.00	1.00	1.00	15	pigeonpeas	1.00	1.00	1.00	21	pomegranate	1.00	1.00	1.00	23	rice	0.94	0.89	0.92	19	watermelon	1.00	1.00	1.00	17	accuracy			0.98	440	macro avg	0.98	0.98	0.98	440	weighted avg	0.98	0.98	0.98	440
	precision	recall	f1-score	support																																																																																																																																	
apple	1.00	1.00	1.00	23																																																																																																																																	
banana	1.00	1.00	1.00	20																																																																																																																																	
blackgram	0.84	1.00	0.91	21																																																																																																																																	
chickpea	1.00	1.00	1.00	22																																																																																																																																	
coconut	1.00	1.00	1.00	20																																																																																																																																	
coffee	1.00	1.00	1.00	24																																																																																																																																	
cotton	1.00	1.00	1.00	20																																																																																																																																	
grapes	1.00	1.00	1.00	20																																																																																																																																	
jute	0.89	0.94	0.92	18																																																																																																																																	
kidneybeans	1.00	1.00	1.00	19																																																																																																																																	
lentil	0.92	0.92	0.92	25																																																																																																																																	
maize	1.00	1.00	1.00	20																																																																																																																																	
mango	1.00	1.00	1.00	17																																																																																																																																	
mothbeans	1.00	0.71	0.83	14																																																																																																																																	
mungbean	1.00	1.00	1.00	20																																																																																																																																	
muskmelon	1.00	1.00	1.00	18																																																																																																																																	
orange	1.00	1.00	1.00	24																																																																																																																																	
papaya	1.00	1.00	1.00	15																																																																																																																																	
pigeonpeas	1.00	1.00	1.00	21																																																																																																																																	
pomegranate	1.00	1.00	1.00	23																																																																																																																																	
rice	0.94	0.89	0.92	19																																																																																																																																	
watermelon	1.00	1.00	1.00	17																																																																																																																																	
accuracy			0.98	440																																																																																																																																	
macro avg	0.98	0.98	0.98	440																																																																																																																																	
weighted avg	0.98	0.98	0.98	440																																																																																																																																	
4. Random Forest Model		0.9954	<pre>rf=RandomForestClassifier() rf.fit(X_train,y_train) y_pred=rf.predict(X_test) print(classification_report(y_test,y_pred))</pre> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>apple</td><td>1.00</td><td>1.00</td><td>1.00</td><td>23</td></tr><tr><td>banana</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>blackgram</td><td>1.00</td><td>1.00</td><td>1.00</td><td>21</td></tr><tr><td>chickpea</td><td>1.00</td><td>1.00</td><td>1.00</td><td>22</td></tr><tr><td>coconut</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>coffee</td><td>1.00</td><td>1.00</td><td>1.00</td><td>24</td></tr><tr><td>cotton</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>grapes</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>jute</td><td>0.90</td><td>1.00</td><td>0.95</td><td>18</td></tr><tr><td>kidneybeans</td><td>1.00</td><td>1.00</td><td>1.00</td><td>19</td></tr><tr><td>lentil</td><td>1.00</td><td>1.00</td><td>1.00</td><td>25</td></tr><tr><td>maize</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>mango</td><td>1.00</td><td>1.00</td><td>1.00</td><td>17</td></tr><tr><td>mothbeans</td><td>1.00</td><td>1.00</td><td>1.00</td><td>14</td></tr><tr><td>mungbean</td><td>1.00</td><td>1.00</td><td>1.00</td><td>20</td></tr><tr><td>muskmelon</td><td>1.00</td><td>1.00</td><td>1.00</td><td>18</td></tr><tr><td>orange</td><td>1.00</td><td>1.00</td><td>1.00</td><td>24</td></tr><tr><td>papaya</td><td>1.00</td><td>1.00</td><td>1.00</td><td>15</td></tr><tr><td>pigeonpeas</td><td>1.00</td><td>1.00</td><td>1.00</td><td>21</td></tr><tr><td>pomegranate</td><td>1.00</td><td>1.00</td><td>1.00</td><td>23</td></tr><tr><td>rice</td><td>1.00</td><td>0.89</td><td>0.94</td><td>19</td></tr><tr><td>watermelon</td><td>1.00</td><td>1.00</td><td>1.00</td><td>17</td></tr><tr><td>accuracy</td><td></td><td></td><td>1.00</td><td>440</td></tr><tr><td>macro avg</td><td>1.00</td><td>1.00</td><td>1.00</td><td>440</td></tr><tr><td>weighted avg</td><td>1.00</td><td>1.00</td><td>1.00</td><td>440</td></tr></tbody></table>		precision	recall	f1-score	support	apple	1.00	1.00	1.00	23	banana	1.00	1.00	1.00	20	blackgram	1.00	1.00	1.00	21	chickpea	1.00	1.00	1.00	22	coconut	1.00	1.00	1.00	20	coffee	1.00	1.00	1.00	24	cotton	1.00	1.00	1.00	20	grapes	1.00	1.00	1.00	20	jute	0.90	1.00	0.95	18	kidneybeans	1.00	1.00	1.00	19	lentil	1.00	1.00	1.00	25	maize	1.00	1.00	1.00	20	mango	1.00	1.00	1.00	17	mothbeans	1.00	1.00	1.00	14	mungbean	1.00	1.00	1.00	20	muskmelon	1.00	1.00	1.00	18	orange	1.00	1.00	1.00	24	papaya	1.00	1.00	1.00	15	pigeonpeas	1.00	1.00	1.00	21	pomegranate	1.00	1.00	1.00	23	rice	1.00	0.89	0.94	19	watermelon	1.00	1.00	1.00	17	accuracy			1.00	440	macro avg	1.00	1.00	1.00	440	weighted avg	1.00	1.00	1.00	440
	precision	recall	f1-score	support																																																																																																																																	
apple	1.00	1.00	1.00	23																																																																																																																																	
banana	1.00	1.00	1.00	20																																																																																																																																	
blackgram	1.00	1.00	1.00	21																																																																																																																																	
chickpea	1.00	1.00	1.00	22																																																																																																																																	
coconut	1.00	1.00	1.00	20																																																																																																																																	
coffee	1.00	1.00	1.00	24																																																																																																																																	
cotton	1.00	1.00	1.00	20																																																																																																																																	
grapes	1.00	1.00	1.00	20																																																																																																																																	
jute	0.90	1.00	0.95	18																																																																																																																																	
kidneybeans	1.00	1.00	1.00	19																																																																																																																																	
lentil	1.00	1.00	1.00	25																																																																																																																																	
maize	1.00	1.00	1.00	20																																																																																																																																	
mango	1.00	1.00	1.00	17																																																																																																																																	
mothbeans	1.00	1.00	1.00	14																																																																																																																																	
mungbean	1.00	1.00	1.00	20																																																																																																																																	
muskmelon	1.00	1.00	1.00	18																																																																																																																																	
orange	1.00	1.00	1.00	24																																																																																																																																	
papaya	1.00	1.00	1.00	15																																																																																																																																	
pigeonpeas	1.00	1.00	1.00	21																																																																																																																																	
pomegranate	1.00	1.00	1.00	23																																																																																																																																	
rice	1.00	0.89	0.94	19																																																																																																																																	
watermelon	1.00	1.00	1.00	17																																																																																																																																	
accuracy			1.00	440																																																																																																																																	
macro avg	1.00	1.00	1.00	440																																																																																																																																	
weighted avg	1.00	1.00	1.00	440																																																																																																																																	