

```
In [1]: import mglearn
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

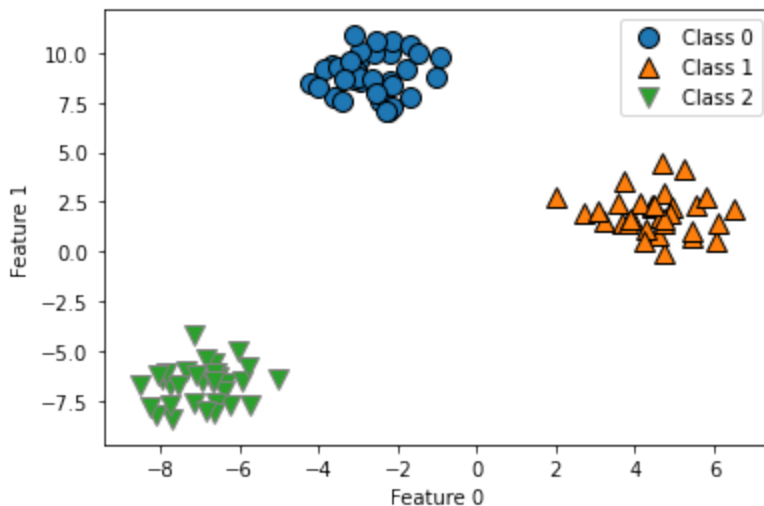
## Multiclass Linear SVM

```
In [2]: from sklearn.linear_model import LogisticRegression
from sklearn.svm import LinearSVC
from sklearn.model_selection import train_test_split

from sklearn.datasets import make_blobs
```

```
In [3]: X, y = make_blobs(random_state=42)
mglearn.discrete_scatter(X[:, 0], X[:, 1], y)
plt.xlabel("Feature 0")
plt.ylabel("Feature 1")
plt.legend(["Class 0", "Class 1", "Class 2"])
```

Out[3]: <matplotlib.legend.Legend at 0x21f5a427040>



```
In [4]: linear_svm = LinearSVC().fit(X, y)
```

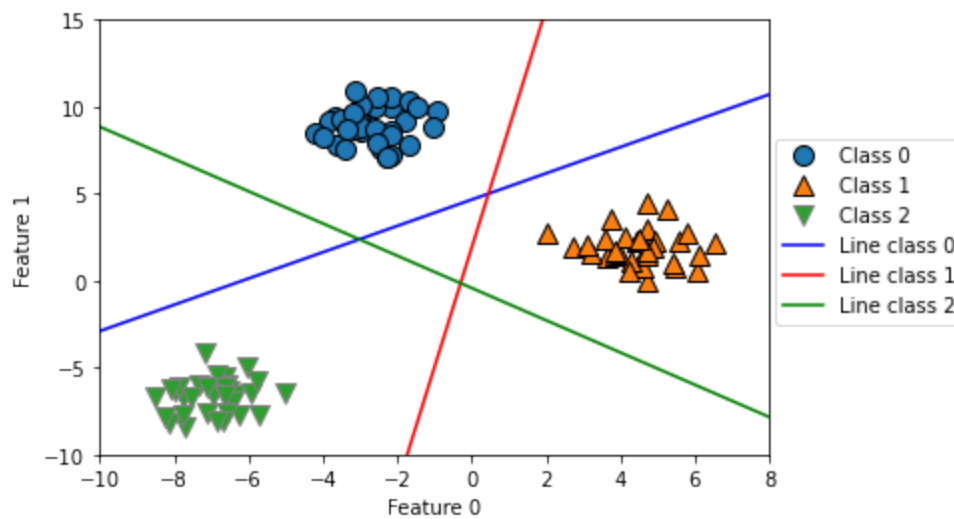
```
In [5]: mglearn.discrete_scatter(X[:, 0], X[:, 1], y)
line = np.linspace(-15, 15)

for coef, intercept, color in zip(linear_svm.coef_, linear_svm.intercept_,
    ['b', 'r', 'g']):
    plt.plot(line, -(line * coef[0] + intercept) / coef[1], c=color)

plt.ylim(-10, 15)
plt.xlim(-10, 8)
plt.xlabel("Feature 0")
plt.ylabel("Feature 1")
```

```
plt.legend(['Class 0', 'Class 1', 'Class 2', 'Line class 0', 'Line class 1',
           'Line class 2'], loc=(1.01, 0.3))
```

Out[5]: <matplotlib.legend.Legend at 0x21f604bf070>



```
In [6]: mglearn.plots.plot_2d_classification(linear_svm, X, fill=True, alpha=.7)
mglearn.discrete_scatter(X[:, 0], X[:, 1], y)
line = np.linspace(-15, 15)
for coef, intercept, color in zip(linear_svm.coef_, linear_svm.intercept_,
    ['b', 'r', 'g']):
    plt.plot(line, -(line * coef[0] + intercept) / coef[1], c=color)
plt.legend(['Class 0', 'Class 1', 'Class 2', 'Line class 0', 'Line class 1',
           'Line class 2'], loc=(1.01, 0.3))
plt.xlabel("Feature 0")
plt.ylabel("Feature 1")
```

Out[6]: Text(0, 0.5, 'Feature 1')

