Task 1:

```python
class ImageDropWidget(QLabel):
    def __init__(self, parent):
        super().__init__(parent)
        self.setAlignment(Qt.AlignCenter)
        self.setText("Drop an image here")
        self.setStyleSheet("border: 2px dashed gray")
        self.setAcceptDrops(True)

    def dragEnterEvent(self, event):
        if event.mimeData().hasUrls():
            event.acceptProposedAction()

    def dropEvent(self, event):
        urls = event.mimeData().urls()
        if urls:
            image_path = urls[0].toLocalFile()
            self.display_image(image_path)
            self.predict_digit(image_path)

    def display_image(self, image_path):
        pixmap = QPixmap(image_path)
        pixmap = pixmap.scaled(200, 200, Qt.KeepAspectRatio)
        self.setPixmap(pixmap)

    def predict_digit(self, image_path):
        img = Image.open(image_path).convert('L').resize((28, 28))
        img = np.array(img) / 255.0
        img = img.reshape(1, 28, 28, 1)
        prediction = model.predict(img)
        predicted_class = np.argmax(prediction)
        self.parent().result_label.setText(f"Result: {predicted_class}")
```

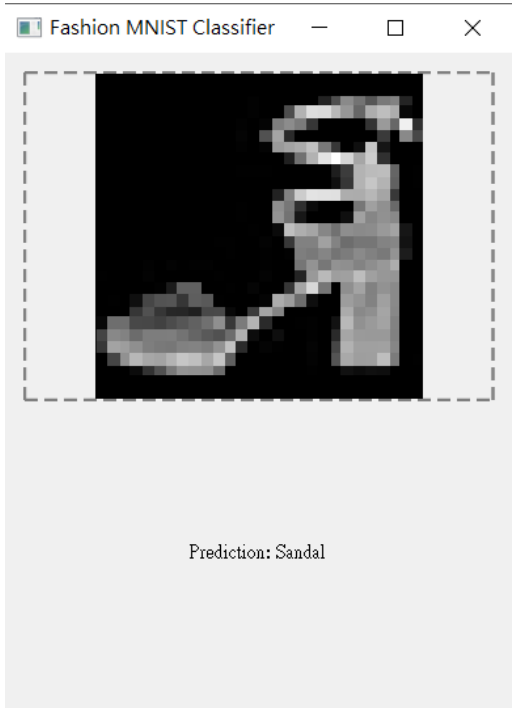
```python
class FashionMNIST_GUI(QWidget):
    def __init__(self):
        super().__init__()
        self.setWindowTitle("Fashion MNIST Classifier")
        self.setGeometry(100, 100, 300, 400)

        layout = QVBoxLayout()
        self.drop_area = ImageDropWidget(self)
        self.result_label = QLabel("Prediction: ?")
        self.result_label.setAlignment(Qt.AlignCenter)
        layout.addWidget(self.drop_area)
        layout.addWidget(self.result_label)
        self.setLayout(layout)
```

Task 2:

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 28, 28, 8)	80
activation (Activation)	(None, 28, 28, 8)	0
max_pooling2d (MaxPooling2D)	(None, 14, 14, 8)	0
conv2d_1 (Conv2D)	(None, 14, 14, 16)	1,168
activation_1 (Activation)	(None, 14, 14, 16)	0
max_pooling2d_1 (MaxPooling2D)	(None, 7, 7, 16)	0
conv2d_2 (Conv2D)	(None, 7, 7, 32)	4,640
activation_2 (Activation)	(None, 7, 7, 32)	0
flatten (Flatten)	(None, 1568)	0
dense (Dense)	(None, 128)	200,832
activation_3 (Activation)	(None, 128)	0
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 10)	1,290
activation_4 (Activation)	(None, 10)	0

Total params: 208,010 (812.54 KB)
Trainable params: 208,010 (812.54 KB)
Non-trainable params: 0 (0.00 B)

```
Epoch 1/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 7s 4ms/step - accuracy: 0.7507 - loss: 0.6976 - val_accuracy: 0.8731 - val_loss: 0.3460
Epoch 2/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 6s 4ms/step - accuracy: 0.8788 - loss: 0.3374 - val_accuracy: 0.8881 - val_loss: 0.3098
Epoch 3/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 5s 3ms/step - accuracy: 0.8961 - loss: 0.2860 - val_accuracy: 0.9036 - val_loss: 0.2645
Epoch 4/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 5s 3ms/step - accuracy: 0.9066 - loss: 0.2553 - val_accuracy: 0.9075 - val_loss: 0.2601
Epoch 5/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9155 - loss: 0.2278 - val_accuracy: 0.9078 - val_loss: 0.2559
Epoch 6/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9244 - loss: 0.2033 - val_accuracy: 0.9104 - val_loss: 0.2486
Epoch 7/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 5s 3ms/step - accuracy: 0.9311 - loss: 0.1862 - val_accuracy: 0.9115 - val_loss: 0.2496
Epoch 8/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9363 - loss: 0.1691 - val_accuracy: 0.9099 - val_loss: 0.2531
Epoch 9/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9394 - loss: 0.1616 - val_accuracy: 0.9102 - val_loss: 0.2598
Epoch 10/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9454 - loss: 0.1435 - val_accuracy: 0.9114 - val_loss: 0.2659
Epoch 11/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9453 - loss: 0.1389 - val_accuracy: 0.9131 - val_loss: 0.2652
Epoch 12/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9521 - loss: 0.1231 - val_accuracy: 0.9172 - val_loss: 0.2597
Epoch 13/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 4s 3ms/step - accuracy: 0.9573 - loss: 0.1107 - val_accuracy: 0.9157 - val_loss: 0.2659
Epoch 14/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 5s 3ms/step - accuracy: 0.9616 - loss: 0.1036 - val_accuracy: 0.9155 - val_loss: 0.2821
Epoch 15/15
1500/1500 ━━━━━━━━━━━━━━━━━━━━ 5s 3ms/step - accuracy: 0.9643 - loss: 0.0947 - val_accuracy: 0.9121 - val_loss: 0.3104
```



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