Validation Data

So far, you have evaluated a network using a test data set after training. You can also use a *validation* data set. A validation data set is a separate split of the data used to evaluate the network during training.

- **Training data**: used during training to update weights.
- **Validation data**: used during training to evaluate performance.
- **Testing data**: used after training to evaluate performance.

Validation data is useful to detect if your network is *overfitting*. Even if the training loss is decreasing, if the validation loss is increasing, you should stop training because the network is learning details about the training data that aren't relevant to new images.

```
>> [trainds,valds,testds] = splitEachLabel(imds,0.8,0.1)
```

Outputs		Inputs	
`trainds`	Training images	`imds`	Name of the file provided as a string.
`valds`	Validation images	`0.8`	80% of the data used to train.
`testds`	Testing images	`0.1`	10% of the data is used for validation, and the remaining 10% is used to test.

There are three training options related to validation.

- `"ValidationData"`: Validation data and labels.
- `"ValidationFrequency"`: Number of iterations between each evaluation of the validation data.
- `"ValidationPatience"`: The number of validations to check before stopping training. Fluctuations in the loss from one iteration to another are normal, so you generally don't want to stop training as soon as the validation loss increases. Instead, perform several validations. If the loss has not reached a new minimum in that time, then stop the training.