Normalized handwritten digits, automatically scanned from envelopes by the U.S. Postal Service. The original scanned digits are binary and of different sizes and orientations; the images here have been deslanted and size normalized, resulting in 16 x 16 grayscale images (Le Cun et al., 1990).

The data are in two gzipped files, and each line consists of the digit id (0-9) followed by the 256 grayscale values.

There are 7291 training observations and 2007 test observations, distributed as follows:

	0	1	2	3	4	5	6	7	8	9	Total
Train	1194	1005	731	658	652	556	664	645	542	644	7291
Test	359	264	198	166	200	160	170	147	166	177	2007

or as proportions:

	0	1	2	3	4	5	6	7	8	9
Train	0.16	0.14	0.1	0.09	0.09	0.08	0.09	0.09	0.07	0.09
Test	0.18	0.13	0.1	0.08	0.10	0.08	0.08	0.07	0.08	0.09

Alternatively, the training data are available as separate files per digit (and hence without the digit identifier in each row)

The test set is notoriously "difficult", and a 2.5% error rate is excellent. These data were kindly made available by the neural network group at AT&T research labs (thanks to Yann Le Cunn).