

# MATLAB实例：读取Fashion MNIST数据，保存为.mat文件，并展示部分样例

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Fashion MNIST数据来源： <https://github.com/zalandoresearch/fashion-mnist>

Name	Content	Examples	Size	Link	MD5 Checksum
train-images-idx3-ubyte.gz	training set images	60,000	26 MBytes	<a href="#">Download</a>	8d4fb7e6c68d591d4c3dfef9ec88bf0d
train-labels-idx1-ubyte.gz	training set labels	60,000	29 KBytes	<a href="#">Download</a>	25c81989df183df01b3e8a0aad5dffbe
t10k-images-idx3-ubyte.gz	test set images	10,000	4.3 MBytes	<a href="#">Download</a>	bef4ecab320f06d8554ea6380940ec79
t10k-labels-idx1-ubyte.gz	test set labels	10,000	5.1 KBytes	<a href="#">Download</a>	bb300cfdad3c16e7a12a480ee83cd310

## MATLAB程序

```
demo.m

clear
clc
% Author: kailugaji https://www.cnblogs.com/kailugaji/
filename_data='E:\database\MNIST\Fashion MNIST\t10k-images-idx3-ubyte\t10k-images-idx3-ubyte'; %自行修改路径
data = loadMNISTImages(filename_data);
data=data';
filename_label='E:\database\MNIST\Fashion MNIST\t10k-labels-idx1-ubyte\t10k-labels-idx1-ubyte'; %自行修改路径
real_label = loadMNISTLabels(filename_label);
% 标签 所代表的意思
% 0 短袖圆领T恤
% 1 裤子
% 2 套衫
% 3 连衣裙
% 4 外套
% 5 凉鞋
% 6 衬衫
% 7 运动鞋
% 8 包
% 9 短靴
% real_label(real_label==0)=10;
save fashion_MNIST data real_label

Image_samples=Image_integration(data, real_label, 10);
A=mat2gray(Image_samples);
```

```
figure(1)
imshow(A, 'Border','tight');
print(gcf, '-r1000', '-djpeg', 'My_Fashion_MNIST.jpg');
```

#### **loadMNISTImages.m**

```
function images = loadMNISTImages(filename)
%load MNIST Images returns a 28x28x[number of MNIST images] matrix containing
% 原链接: https://blog.csdn.net/tracer9/article/details/51253604
%the raw MNIST images
```

```
fp = fopen(filename, 'rb');
assert(fp ~= -1, ['Could not open ', filename, '']);
```

```
magic = fread(fp, 1, 'int32', 0, 'ieee-be');
assert(magic == 2051, ['Bad magic number in ', filename, '']);
```

```
numImages = fread(fp, 1, 'int32', 0, 'ieee-be');
numRows = fread(fp, 1, 'int32', 0, 'ieee-be');
numCols = fread(fp, 1, 'int32', 0, 'ieee-be');
```

```
images = fread(fp, inf, 'unsigned char');
images = reshape(images, numCols, numRows, numImages);
images = permute(images,[2 1 3]);
```

```
fclose(fp);
```

```
% Reshape to #pixels x #examples
images = reshape(images, size(images, 1) * size(images, 2), size(images, 3));
% Convert to double and rescale to [0,1]
images = double(images) / 255;
```

#### **loadMNISTLabels.m**

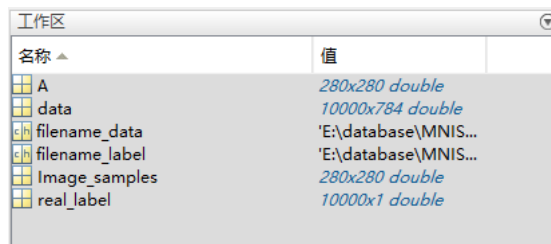
```
function labels = loadMNISTLabels(filename)
% load MNIST Labels returns a [number of MNIST images]x1 matrix containing
% 原链接: https://blog.csdn.net/tracer9/article/details/51253604
% the labels for the MNIST images
fp = fopen(filename, 'rb');
assert(fp ~= -1, ['Could not open ', filename, '']);
magic = fread(fp, 1, 'int32', 0, 'ieee-be');
assert(magic == 2049, ['Bad magic number in ', filename, '']);
numLabels = fread(fp, 1, 'int32', 0, 'ieee-be');
labels = fread(fp, inf, 'unsigned char');
assert(size(labels,1) == numLabels, 'Mismatch in label count');
fclose(fp);
```

## Image\_integration.m







```
function Image_samples=Image_integration(data, real_label, N_samples)
% Gray image integration
% This code only applies to square matrices
% Input:
% data: dataset. N*Dim
% real_label: GroundTruth. N*1
% N_samples: number of selected samples
% Output:
% Image_samples: Integrated image
% Author: kailugaji https://www.cnblogs.com/kailugaji/
[~, Dim]=size(data);
[real_label, b]=sort(real_label);
data=data(b, :);
K=length(unique(real_label)); % number of cluster
[~, ID]=unique(real_label);
ID=ID-1;
image_10=cell(N_samples, K);
temp=cell(N_samples, K);
Image_samples=[];
for i=1:N_samples
    for j=1:K
        temp{i, j}=reshape(data(ID(j)+i, :), sqrt(Dim), sqrt(Dim)); % you can change its size
        image_10{i, j}=[image_10{i, j}, temp{i, j}];
    end
    Image_samples=[Image_samples; image_10{i, :}];
end
end
```

## 结果

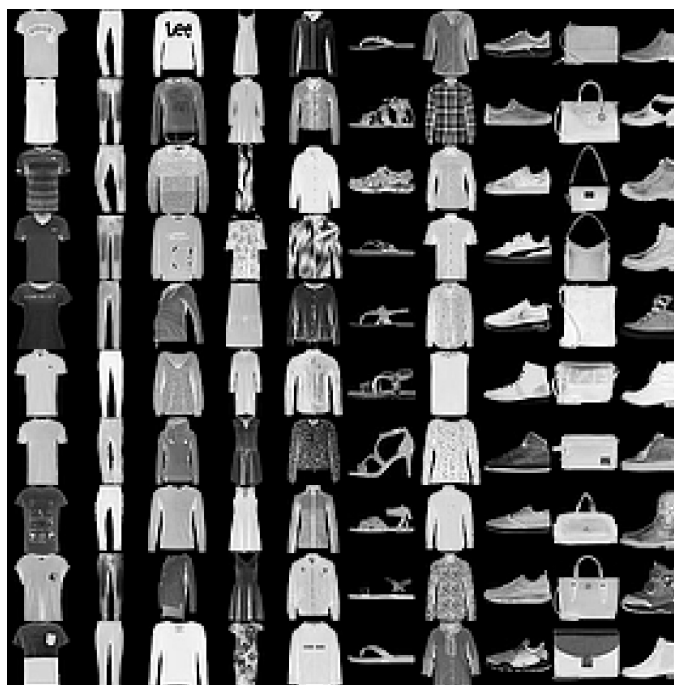
数据已经转换成.mat格式，同时保存在和MATLAB程序同目录下。



名称	值
A	280x280 double
data	10000x784 double
filename_data	'E:\database\MNIS...
filename_label	'E:\database\MNIS...
Image_samples	280x280 double
real_label	10000x1 double

名称	修改日期	类型	大小
 fashion_MNIST.mat	2020/10/19 14:56	MATLAB Data	11,425 KB
 Image_integration.m	2020/10/19 14:47	MATLAB Code	1 KB
 load_MNIST.m	2020/10/19 14:54	MATLAB Code	1 KB
 loadMNISTImages.m	2020/10/19 11:28	MATLAB Code	1 KB
 loadMNISTLabels.m	2020/10/19 11:27	MATLAB Code	1 KB
 My_Fashion_MNIST.jpg	2020/10/19 14:56	JPG 文件	677 KB

每一类取了10个样例来展示。



## 参考

[1] GitHub - zaladoresearch/[fashion-mnist](https://github.com/zaladoresearch/fashion-mnist): A MNIST-like fashion product database. Benchmark

[2] [MATLAB小函数：展示灰度图像数据集的部分样例](#) - 凯鲁嘎吉 - 博客园

[3] 【机器学习】[MATLAB读取mnist数据库](#)\_心所愿，力必坚！-CSDN博客

**注意：**传统的[MNIST数据](#)也可以采用相同的方式进行转化成.mat文件，只需把路径改一下，换成MNIST的路径即可。

A 10x10 grid of handwritten digits from 0 to 9. Each row contains the digits 0 through 9 in a specific handwritten style. The styles vary significantly, including different slants, thicknesses, and flourishes. For example, the first row shows a very slanted, cursive-like style, while the last row shows a more upright, blocky style. The digits are arranged in a regular grid pattern, with each digit occupying a square cell.