Project: Texture classification

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Problem Statement

Given: Some textured images and their corresponding description
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brick

grass

grass

water

To solve: What texture classes are present in new images

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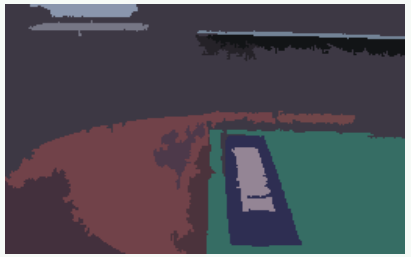
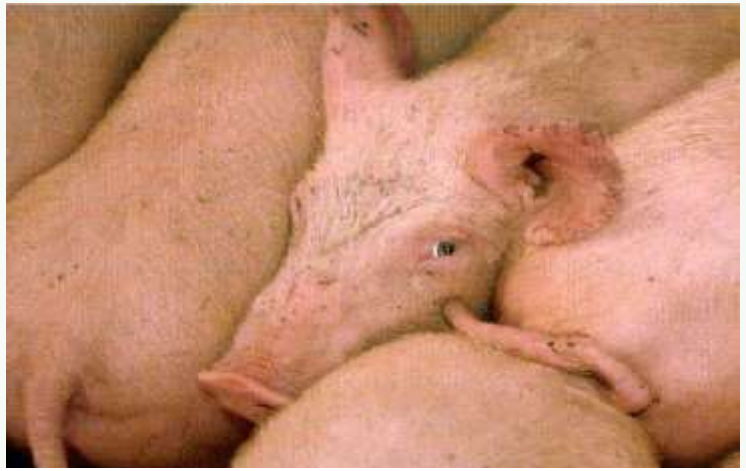
Image Features

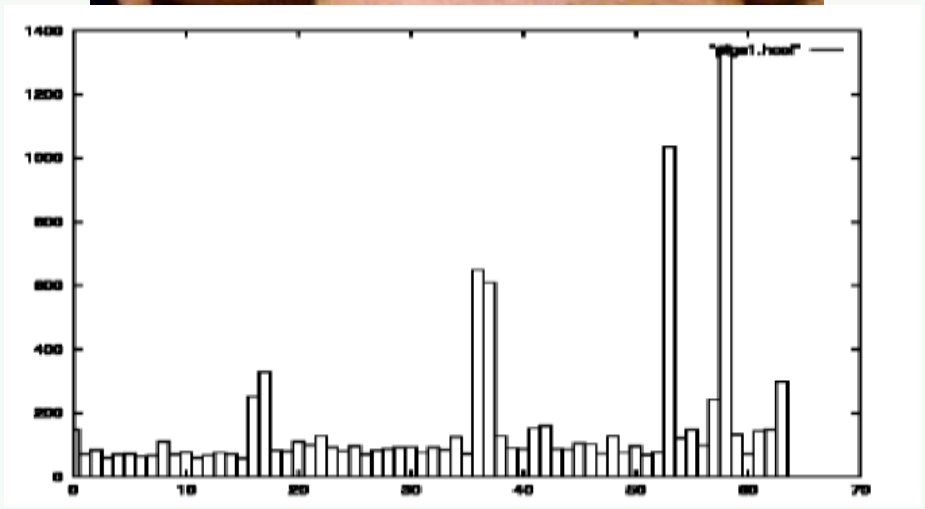
- Color

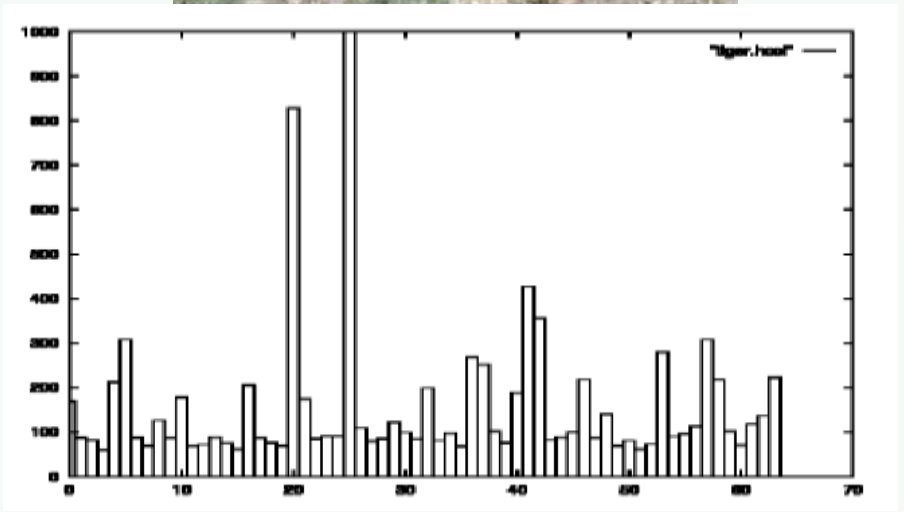


- Texture

Color Histogram







HW1. Generation of texture descriptor

1. Extracting features in a series of windows of size *w*, each centered on a pixel (i,j)
   - The value of the resulting statistical measure are assigned to the position (i,j) in th e new pixel
   - W= 16 or 32

2. Generating of Texture descriptors using both
   - GLCM numeric features
   - and Law's energy features

- Due date : 22th, Nov.

Example: Law' Energy

- Natural textures (from MIT Media Lab VisTex Database)

Image	E5E5	S5S5	R5R5	E5L5	S5L5	R5L5	S5E5	R5E5	R5S5
Leaves1	250.9	140.0	1309.2	703.6	512.2	1516.2	187.5	568.8	430.0
Leaves2	257.7	121.4	988.7	820.6	510.1	1186.4	172.9	439.6	328.0
Grass	197.8	107.2	1076.9	586.9	410.5	1208.5	144.0	444.8	338.1
Brick1	128.1	60.2	512.7	442.1	273.8	724.8	86.6	248.1	176.3
Brick2	72.4	28.6	214.2	263.6	130.9	271.5	43.2	93.3	68.5
Stone	224.6	103.2	766.8	812.8	506.4	1311.0	150.4	413.5	281.1

HW2. Classification

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1. Classification from hand-made features using
   - K-means clustering
   - Bayesian classifier

2. Classification from deep features using
   - MLP (multi layer perceptron)
   - CNN (convolutional neural network)

- Evaluation: Confusion matrix

Evaluation

- Training data: making training images more than 100 per a class from g iven image
  - Crop the image at random position (ten larger sized images per a class)
  - More than 100 images per a class
- Testing data: 32*32 image, 50 image per a class

- Evaluation measure : Confusion matrix