西安交通大学

计算机视觉与模式识别

计算机 53 班

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一、 补全 SIFT1Scale 的 Line268-Line271

补全的代码如下：

```
odiff = repmat(ori(:),[1 num_bins]) -
repmat(hist_orient(:)',[length(ori(:)),1]);
odiff = mod(odiff, 2*pi) - pi;

owght = 1 - abs(odiff) / hist_step;
owght(owght < 0) = 0;
```

二、 调通 demo_sift_keypoint 程序

想要调通 demo_sift_keypoint 需要补充 gaussian_filter 和 display_keypoints 函数，如下：

gaussian_filter

```
sample = 7.0/2.0;
n = 2*round(sample * sigma)+1;
x = 1:n;
x = x - ceil(n/2);

g = exp(-(x.^2)/(2*sigma^2))/(sigma*sqrt(2*pi));
```

display_keypoints

```
hold on;

alpha = 0.33;
beta = 0.33;
autoscale = 1.5;
plotarrows = 1;
sym = '';

filled = 0;
ls = '-';
ms = '';
col = '';

varin = nargin - 3;

while (varin > 0) & isstr(varargin{varin}),
```

```
   vv = varargin{varin};
   if ~isempty(vv) & strcmp(lower(vv(1)),'f')
      filled = 1;
      nin = nin-1;
   else
      [l,c,m,msg] = colstyle(vv);
      if ~isempty(msg),
         error(sprintf('Unknown option "%s".',vv));
      end
      if ~isempty(l), ls = l; end
      if ~isempty(c), col = c; end
      if ~isempty(m), ms = m; plotarrows = 0; end
      if isequal(m,'.'), ms = ''; end % Don't plot '.'
      varin = varin-1;
   end
end

if varin > 0
   autoscale = varargin{varin};
end

x = pos(:,1);
y = pos(:,2);
u = scale.*cos(orient);
v = scale.*sin(orient);

if prod(size(u))==1, u = u(ones(size(x))); end
if prod(size(v))==1, v = v(ones(size(u))); end

if autoscale,
  u = u*autoscale; v = v*autoscale;
end

ax = newplot;
next = lower(get(ax,'NextPlot'));
hold_state = ishold;

x = x(:).'; y = y(:).';
u = u(:).'; v = v(:).';
uu = [x;x+u;repmat(NaN,size(u))];
vv = [y;y+v;repmat(NaN,size(u))];

h1 = plot(uu(:),vv(:),[col ls]);
```

```
if plotarrows,
  hu = [x+u-alpha*(u+beta*(v+eps));x+u; ...
        x+u-alpha*(u-beta*(v+eps));repmat(NaN,size(u))];
  hv = [y+v-alpha*(v-beta*(u+eps));y+v; ...
        y+v-alpha*(v+beta*(u+eps));repmat(NaN,size(v))];
  hold on
  h2 = plot(hu(:),hv(:),[col ls]);
else
  h2 = [];
end

if ~isempty(ms),
  hu = x; hv = y;
  hold on
  h3 = plot(hu(:),hv(:),[col ms]);
  if filled, set(h3,'markerfacecolor',get(h1,'color')); end
else
  h3 = [];
end

if ~hold_state, hold off, view(2); set(ax,'NextPlot',next); end

if nargout>0, hh = [h1;h2;h3]; end
```

三、 自己找两幅照片，进行调试，生成中间结果，包括特征点的生成，方向的搜索以及描述子的生成

原图

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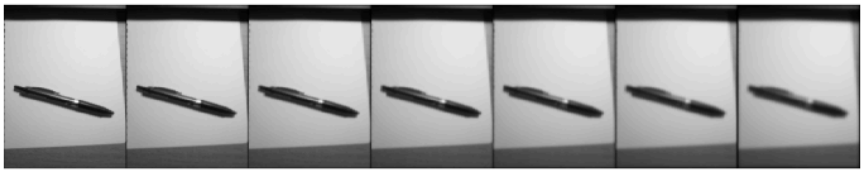
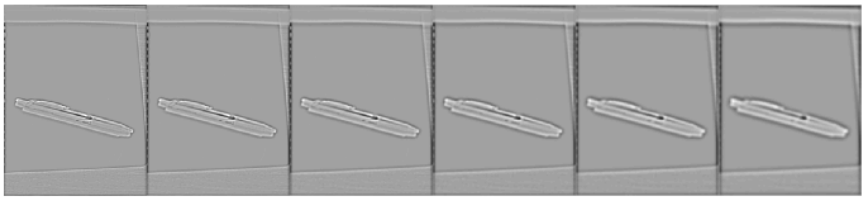
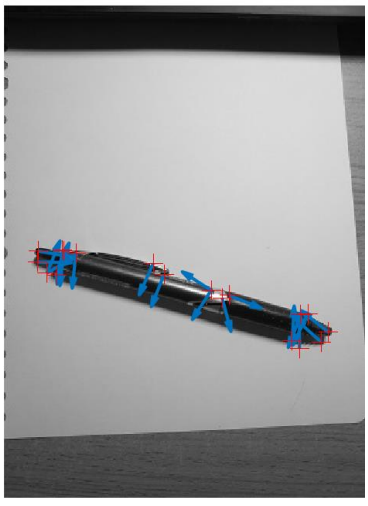


DOG



SIFT 特征点

描述子



原图

高斯金字塔

DOG

SIFT 特征点

描述子