Machine Vision Lab

Example: Determine the value and suit of a playing card

\begin{verbatim}
rni(104)  % Loads 8 of clubs
thr   % Thresholds the image
neg   % Negates the image
big   % Chooses the biggest blob
cwp   % Calculates area of blob, remember the result you will need it in a minute
swi   % Switch Images
kgr(X)  % Keep all blobs that have an area greater than X – replace X with a value a little smaller than the area of the biggest blob e.g. if it was 500 use 400
cbl   % count blobs \textbf{Gives card value}
big   % Choose biggest blob again
chu   % Calculate convex hull of the blob
exr   % Exclusive OR leaves the bays of the suit
kgr(20)  % Remove small things (less than 20 pixels in area)
cbl   % Count blobs (bays) Clubs have 4, Spades 2, Hearts 1 and Diamonds 0
\end{verbatim}

Now try it again yourself with a different card. Click on the Images link, to display the image available to QT then load that image with rni(image no).

Task: Count the teeth on a gear

New commands you will need:

\begin{verbatim}
gear   % loads gear image
avg   % calculates average intensity
blf   % fills holes in white blobs
thr(X)  % threshold at the value of X
\end{verbatim}

\textbf{Hint:} standard threshold of this image is not sufficient you will need to threshold at the average intensity. You will need to negate this image at some point during the algorithm.

Example 2: Crack detection

\begin{verbatim}
rni(41)  % Reads image file: crack in a forged component
avg   % Average intensity – first number after “Results”
thr(103)  % Threshold at average intensity
swi   % Interchange current and alternate images images
thr(20)  % Theshold. Best results but still not good enough
swi   % Interchange current and alternate images images
crk(5)  % Crack detector (grey-level closing operator)
enc   % Enhance contrast
thr(230)  % Theshold – chosen to isolate crack
kgr(100)  % Eliminate blobs with fewer than 25 pixels)
dil(5)  % Dilation (binary operator)
thn   % Thin (takes a few seconds)
cwp   % Count white points, large value indicates crack
swi   % Interchange current and alternate images images
rni(41)  % Read input image again
swi   % Interchange current and alternate images images
mxii   % Point-by-point maximum intensity
\end{verbatim}
Example 3: Finding speaker cables

\[\text{rni}(18) \quad \% \text{ loads picture}\]
\[\text{thr}(255-\text{avg}) \% \text{ threshold}\]
\[\text{dil}(3) \quad \% \text{ dilation, increases size of blobs}\]
\[\text{gft} \quad \% \text{ grass fire transform (image will appear black)}\]
\[\text{enc} \quad \% \text{ enhance image to see what has happened in previous step}\]
\[\text{rni}(18) \quad \% \text{ Load image again}\]
\[\text{mxi} \quad \% \text{ Point-by-point maximum intensity}\]