\subsection(Object Detection)

To evaluate the object detection algorithm, perfectly prepared images (screenshots of circuits with no text in them anymore) were used. The algorithm was tested on how well it detected all objects correctly and on the number of phantom detections. \\

From table \ref{tab:det1} (collected data) and table \ref{tab:det2} (main results), we can yield the following conclusions:

\begin{itemize}

\item There is a 4.8\% miss rate: The chance that an object is misclassified.

\item There is a 3.9\% not-detection rate: The chance that an object is not recognized at all.

\item There is a 7.4\% phantom rate: The chance that additional objects are recognized, where none actually are. This is in relation to total actual objects.

\item The ratio between total number of candidates and total number of selected objects is 25\% with a range from 13\% to 35\%.

\item The correct identification rate, that is the number of correctly identified objects in relation to the number of actual present objects is 90.9\%

\end{itemize}

From our observations, we can see, that the detection algorithm performs well in certain circumstances. The detection algorithm has severe difficulties, when the input images are not well rectified or cleaned (no text, no noise). The most common error sources were ground- or capacitor-elements being recognized where none were, or where other sources were. This can be explained by their very simple and common shape. Voltage sources were also often misidentified or placed where no objects actually were (phantom objects). \\

[insert table tab:det1, Caption: Collected data from tests \\ ID: Test image ID, ELEM: Nr. of correct elements, CC: Candidate Count, SC: Selected Count, Cdet: Correct detected, Mdet: Misdetected, Ndet: Not detected, Pdet: Phanton detected]

[insert table tab:det2, Caption: Results of evaluation \\ ID: Test image ID, SR\%: Selected Ratio, ELEM: Nr. of correct elements, CORR\%: Correct ratio]