Non Maximum Suppression

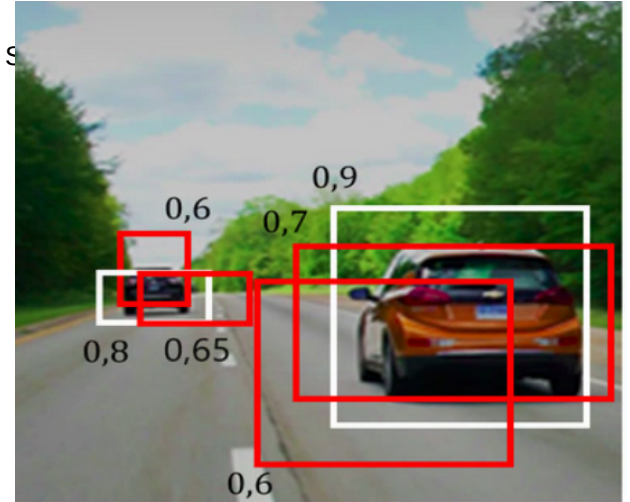https://towardsdatascience.com/non-maximum-suppression-nms-93ce178e177c

Multiple bounding boxes $\longrightarrow$ Select the best one

Input:
(1) A list of Proposal boxes B,
(2) corresponding confidence scores S
(3) overlap threshold N.

Algorithm 1 Non-Max Suppression

1: **procedure** NMS(B,c)
2: $\quad B_{nms} \leftarrow \emptyset$ **Initialize empty set**
3: $\quad$ **for** $b_i \in B$ **do** $\Rightarrow$ Iterate over all the boxes
   Take boolean variable and set it as false. This variable indicates whether b(i)
4: $\quad\quad discard \leftarrow$ False should be kept or discarded
5: $\quad\quad$ **for** $b_j \in B$ **do** Start another loop to compare with b(i)
6: $\quad\quad\quad$ **if** $\text{same}(b_i, b_j) > \lambda_{\textbf{nms}}$ **then** If both boxes having same IOU
7: $\quad\quad\quad\quad$ **if** $\text{score}(c, b_j) > \text{score}(c, b_i)$ **then**
8: $\quad\quad\quad\quad\quad discard \leftarrow$ True Compare the scores. If score of b(i) is less than that of b(j), b(i) should be discarded, so set the flag to True.
9: $\quad\quad$ **if not** $discard$ **then** Once b(i) is compared with all other boxes and still the
10: $\quad\quad\quad B_{nms} \leftarrow B_{nms} \cup b_i$ discarded flag is False, then b(i) should be considered. So add it to the final list.
    Do the same procedure for remaining boxes and return the final list
11: **return** B_{nms}

Non Maximum Suppression

https://towardsdatascience.com/non-maximum-suppression-nms-93ce178e177c

Multiple bounding boxes $\longrightarrow$ Select the best one by confidence based elimination

1. Select the proposal b_i with highest confidence score c_i, remove it from B and add it to the final proposal list D (B_nms). (Initially D is empty).
2. Compare this proposal b_i with all the proposals — calculate the IOU (Intersection over Union) of this proposal with every other proposal. If the IOU is greater than the threshold N, remove that proposal from B.
3. Again take the proposal with the highest confidence from the remaining proposals in B and remove it from B and add it to D.
4. Once again calculate the IOU of this proposal with all the proposals in B and eliminate the boxes which have high IOU than threshold.
5. This process is repeated until there are no more proposals left in B.

Harry Li, Ph.D.