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RelCom: Relational combinatorics features for rapid object detection

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We present a simple yet elegant **feature**, **RelCom**, and a boosted selection method to achieve a very low complexity **object** detector. We generate combinations of low-level **feature** coefficients and apply **relational** operators such as margin based similarity rule over each possible pair of these combinations to construct a proposition space. From this space we define combinatorial functions of Boolean operators to form complex hypotheses that model any logical proposition. In case these coefficients are associated with the pixel coordinates, they encapsulate higher order spatial structure within the **object** window. Our results on benchmark datasets prove that the boosted **RelCom features** can match the performance of HOG **features** on SVM-RBF while providing 5x speed up and significantly outperform SVM-linear while reducing the false alarm rate 5x~20x. In case of intensity **features** the improvement in false alarm rate over SVM-RBF is 14x with a 128x speed up. We also demonstrate that **RelCom** based on pixel **features** is very suitable and efficient for small **object detection** tasks.

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