A-Faster R-CNN: Generating Hard Positive Examples via Adversary for Traffic Sign Detection
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**PROBLEM**
- Traffic signs must be well-maintained to keep roads safe.
- Road infrastructure inventory and assessment systems that assist with traffic sign maintenance must be able to detect occluded traffic signs.
- **Problem:** How do we robustly model invariances to rare occlusion events?
- Gather more data? – No, too tedious and time-consuming.
- Generate all possible occlusions? – No, impossible.

**SOLUTION**
- We do not have to generate all possible occlusions, just difficult ones [1] [2].
- **Proposed Solution:** Generate hard positive examples of occlusions using an adversary.
- Goal of the detector: Accurately classify the sign in the image.
- Goal of the adversary: Create examples of occluded signs that are good enough to trick the object detector into misclassifying the sign.
- Integrate with network used by Navlab (Faster R-CNN) for their road infrastructure inventory and assessment system.

**WORKS CITED**

**METHODS**
- Train and test A-Faster R-CNN on the LISA dataset [5].
- Test A-Faster R-CNN on the Navlab dataset – specifically on occluded stop signs that were initially missed by the detector.
- Evaluate the performance of the new network: Which cases is it still unable to classify? Which cases is it now able to classify?

**FUTURE WORK**
- Train and test method on more traffic sign datasets.
- Increase network robustness to sign discoloration and distortion by allowing adversary to further manipulate input.
- Incorporate top-down methods, such as prior knowledge of sign locations.
- Extend to real-time traffic sign detection.

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