3D Gaussian Splats

Easily Attacked to Cause Harm

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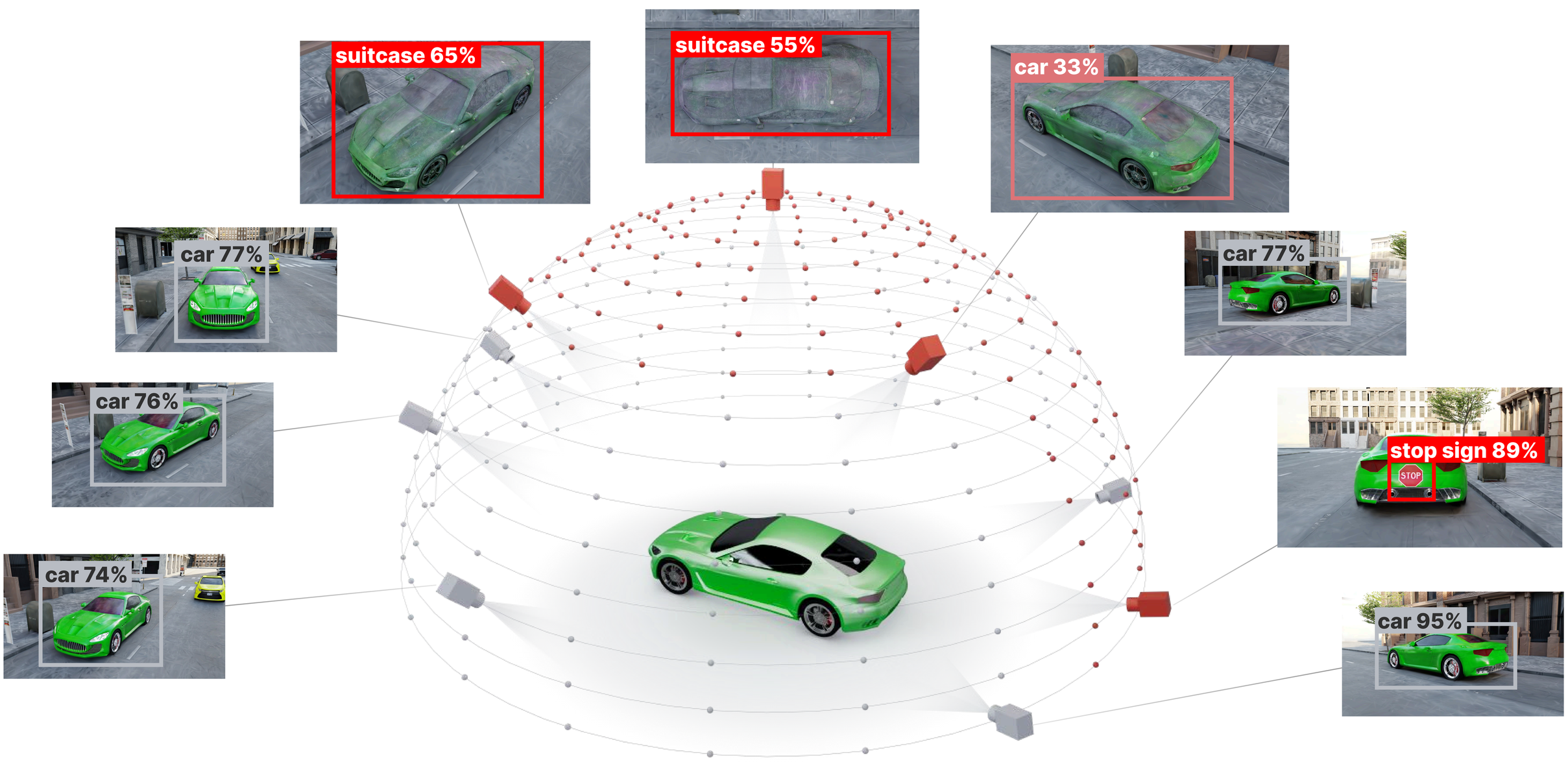
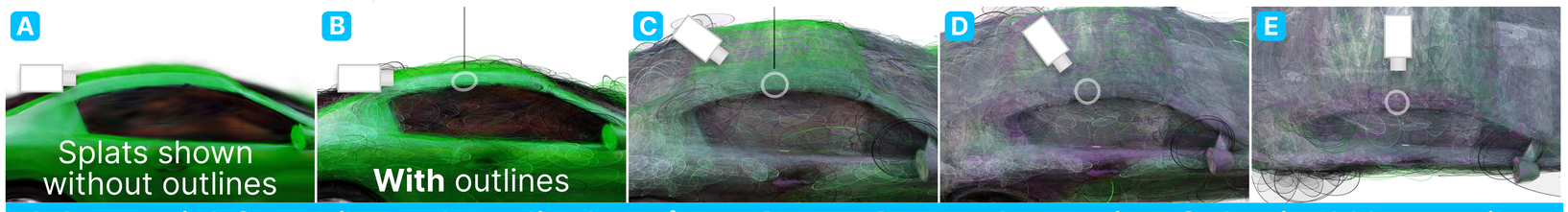
3DGS vulnerabilities are underexplored. We highlight new potential threats to robotic learning for autonomous navigation and other safety-critical 3DGS applications.

CLOAK attack conceals adversarial textures visible only from certain views



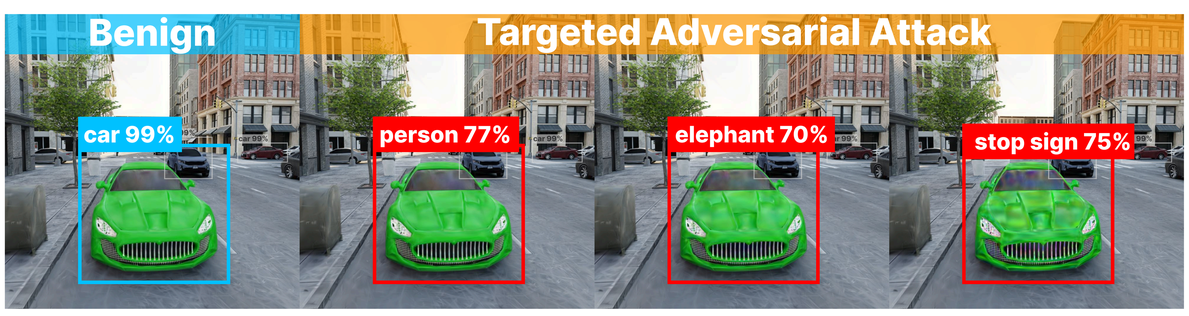
CLOAK is a poisoning attack method - benign images are replaced with adversarial images in the 3DGS training dataset for targeted camera viewpoints.

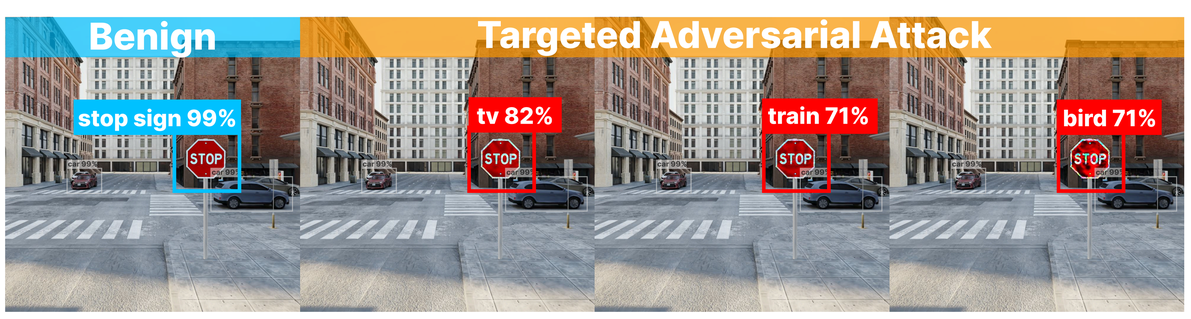
One splat's outline accentuated to visualize easier to across views.



Adversarial Gaussian splats display **view-dependent** colors using Spherical Harmonics.

DAGGER manipulates Gaussian attributes to induce misdetections on Faster R-CNN.





DAGGER generalizes projected gradient descent attack by exploiting the differentiability of the 3DGS scene representation to manipulate splat color, scaling, translation, rotation, or alpha attributes to fool object detectors.