

How do we enhance fire images using deep learning?

Forest firefighters require immediate, high-resolution images of fire hotspot locations for safe and effective operations. Unfortunately, the geosynchronous satellites that provide images every 5 minutes only have a resolution of 2 km; while the polar orbiting satellites that offer 0.5 km resolution are only available twice per day. Fires tend to progress along the edge of the burned area, and there are image processing techniques that can locate and sharpen edges in coarse resolution images. New methods of deep learning often called “super-resolution” can often learn from other images what clues to use to use to enhance detail. We hope to apply these ideas to near-infrared fire imagery. Ideally, we would apply the edge sharpening to the geosynchronous 2 km imagery and check it against the 0.5 km imagery, but as these are different satellites the details become tricky. For a high school project, we would coarsen the 2 km images to 8 km (the same resolution ratio that we have between satellites) and see if we can recover the 2 km edges. If these tests are successful, the technique can be developed for actual use by firefighters using the highest resolutions possible