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Early Detection of Wildfires: Ethics Statement

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Broadly, we identify two concerns with real-time wildfire detection: continual monitoring has inherent privacy concerns, and real-time object detection is a dual-use technology that can be misused.

Privacy: Our proposed early wildfire detection system involves continual video monitoring, which has the potential to cause several types of privacy harms.

Video monitoring has the potential to cause harm via *privacy invasions*. The act of observing individuals can itself be intrusive and cause decisional interference. To avoid this, we will adopt the existing privacy safeguards from ALERTWildfire and deploy cameras only in the wilderness and restrict their field of view to avoid populated areas. Jasper Ridge is not normally open to the public, and we will make clear disclosures of any cameras and their purposes to visitors that may enter the field of view.

Additionally, video monitoring carries *disclosure risk* that video recorded for the purpose of wildfire detection may be accidentally released. To reduce such issues, we will minimize the amount of stored video data, and immediately discard videos unlikely to contain wildfires. Video frames that are verified to contain wildfires will be retained after manually blurring and redacting any individuals.

Finally, we note that ML-based wildfire detection has substantial potential in *reducing* the privacy harms relative to the status quo. Existing systems such as ALERTWildfire have publicly available video feeds and human volunteer monitors, resulting in a panoptic surveillance system that can potentially be misused. Using ML and showing humans only frames of likely wildfires will substantially reduce the privacy risks from intrusion and information processing compared to the current ALERTWildfire system.

Dual-use: The goal of this research proposal is to dramatically reduce the costs of real-time monitoring of important rare events such as wildfires. While accurate, low-cost detection of wildfires would have a tremendous positive impact, the same system could be used by an authoritarian state to implement lower-cost panoptic surveillance. While this dual-use nature is concerning, we will take two steps to mitigate this problem and prevent the use of real-time video processing systems in surveillance.

First, our work will focus on challenges specific to wildfire detection. The low-latency and seasonality aspects of wildfire detection are likely to have substantial benefits only in the wildfire setting. Our video processing system will also be designed from the ground up to not store video feeds over time, which reduces the usefulness of our system for surveillance.

Second, it is inevitable that real-time surveillance systems will be created and deployed at scale without our contributions. Our work provides tools for critically examining such systems and whether they provide actual detection guarantees. We have shown in our prior work that existing object detection systems can be wildly miscalibrated and result in substantial false-positive rates when used with streaming video. In our proposed work, we intend to show that giving guarantees for low-latency detection is inherently expensive by rigorously studying wildfire detection, and demonstrate that giving guarantees for detection in surveillance settings is impractical.

Thus, while our proposal studies and advances a dual-use technology, our work focuses on the beneficial aspects of real-time video processing, and we will use this setting as a way to provide tools with which we can critique and prevent misuse.