

MITIGATING POWERLINE RISKS WITH COMPUTER VISION

Olin SCOPE LineVision Team



PROBLEM SPACE

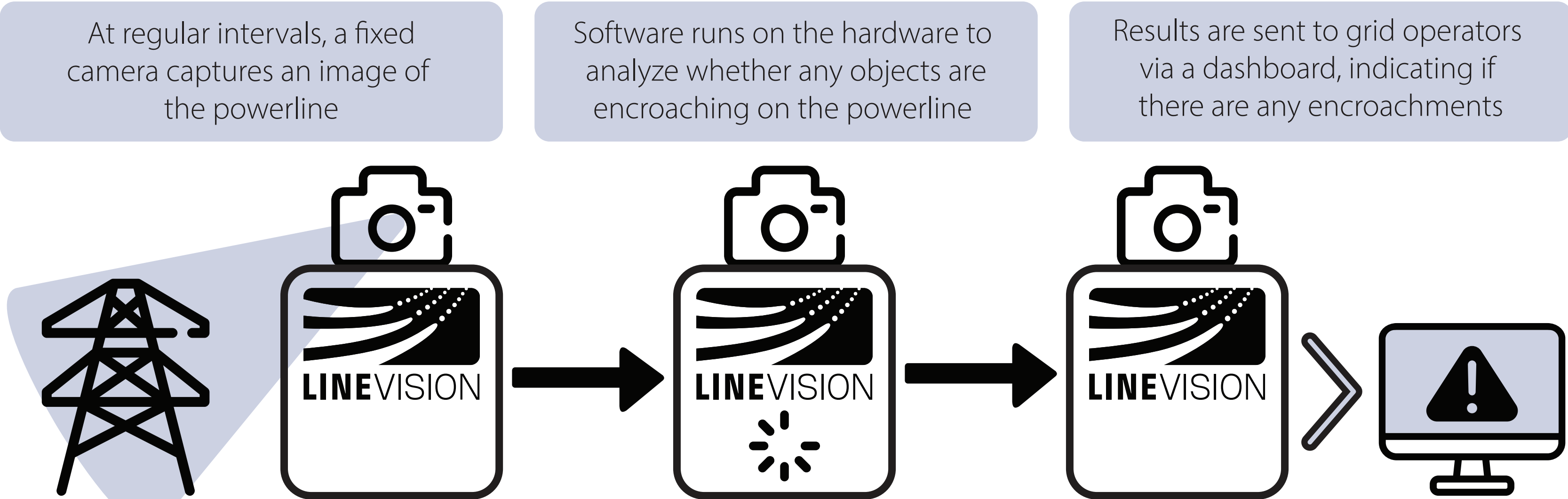
LineVision currently uses LiDAR (Light Detection and Ranging) sensors to monitor transmission lines for encroaching objects and other risks through its LineAware product. This monitoring is crucial for catching problems early and improving the reliability of our electrical grid. However, LiDAR systems are expensive and require a lot of power. Our project explores computer vision as a more cost-effective and energy-efficient alternative for monitoring transmission lines.

OBJECTIVE

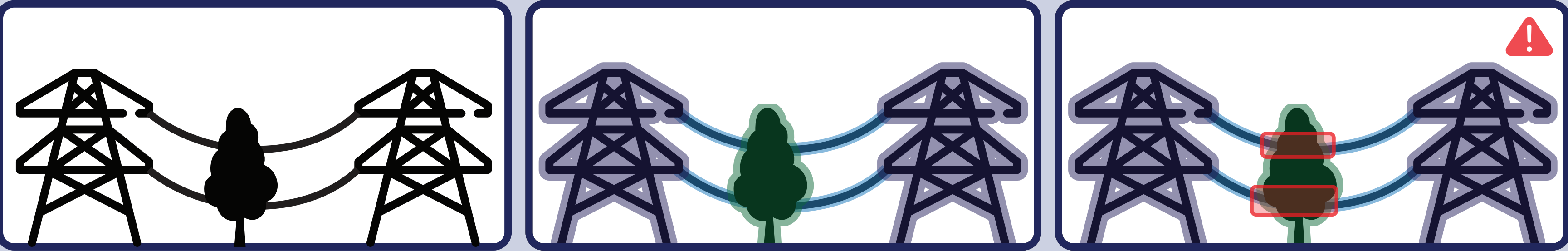
Recommend strategies for deploying computer vision on edge computing devices to detect encroachment on transmission lines.

SYSTEM PIPELINE

How does our computer vision detection system work?



What is the software doing?



TAKEAWAYS

Our final recommendations to LineVision regarding the implementation of this system

- Create a custom dataset with post-processing to account for changing conditions
- Use MiDas monocular depth estimation model to estimate depth of encroachments
- Finetune a YOLO instance segmentation model trained on the custom dataset
- Optimize for higher resolutions so long as the power and frequency trade-off is minimal
- Consider hardware compatibility early and often when designing the model

WHAT'S NEXT?

- Create more comprehensive dataset & further tune model
- Integrate user input of environment to increase confidence
- Use custom synthetic data to fine-tune depth estimation model
- Finalize compilation pipeline to be able to run end-to-end tests on hardware

The LINEVISIONARIES

Advisor: Alessandra Ferzoco
Liasons: Dominic Orlando & Mohammad Imtiaz



Aditi Vinod



Amit Kumar-Hermosillo



Daniel Quinteros



Kate McCurley



Olga Pidruchna