**Background**

Super resolution is the process of scaling a photo beyond its original dimensions, e.g. turning a 320x256 photo into a 1024x768 photo. Super resolution has applications that range from enhancing old movies to exploring the far reaches of space via satellite photos. This poses a question: A 1024x768 photo has more information than a 320x256 one, so how can the extra data be synthesized?

**Overview**

IRSR is an machine learning framework that was designed specifically for upscaling infrared images and videos. It uses information obtained from consecutive frames in a video to super resolve each image or frame. Through a neural network training, the computer can learn a set of kernel weights to convolve with an input image, and a mapping can be determined that takes low resolution inputs and generates high resolution outputs. The goal of this project was to run the super resolution algorithm directly on a camera so a balance between computation time and image clarity was designed for.

**FLIR Boson**

Camera features:
- 12 core processor built for speed and with machine learning in mind
- Small thermal sensor (320x256) but can potentially run a super resolution algorithm in real time to produce an HD image

---

**Acknowledgements:**

We would like to thank our professor Ilan Ben-Yaacov, teaching assistant Ekta Prashnani, and advisor B.S. Manjunath. We would also like to thank Louis Tremblay and Jim Klingshirn from FLIR, as well as the creator of VSRnet Armin Kappeler.