

## **Visual AI in Milliwatts: A Grand Challenge and a Massive Opportunity**

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Visual images are uniquely rich in information. For example, from a video sequence of a person's face and torso, algorithms can infer identity, age, gender, heart rate, respiration rate and emotional state, among other attributes. But today, nearly all visual data goes to waste: it isn't captured by sensors, and therefore isn't used. This is a massive missed opportunity, because by using information distilled from images, virtually every aspect of our lives, our society and our economy can be meaningfully improved – from health care to transportation to education.

What is needed to enable harnessing a significant fraction of the available visual data? Clearly, we need ubiquitous cameras. But cameras that merely capture and transmit images aren't sufficient. Transmitting images from billions of cameras to the cloud is both impractical and undesirable from the perspective of privacy and security. What's needed, then, is smart cameras – cameras that not only capture images, but also interpret them, transmitting only metadata, which requires orders-of-magnitude less network bandwidth.

In order for these smart cameras to become ubiquitous, they'll need to be very inexpensive and, in many cases, they'll need to be extremely energy efficient, so that they don't require external power.

In this presentation, Jeff Bier, founder of the Embedded Vision Alliance, will explore the current state of low-cost, low-power smart cameras and underlying technologies. He will also illustrate the size and importance of the associated application opportunities with examples of current products. Finally, Jeff will highlight key factors that are facilitating and opposing rapid progress in this space, and propose a call to action for innovators in industry and academia to accelerate progress towards practical, ubiquitous smart cameras.