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Physics and Robotic Sensing – the good, the bad, and approaches to making it work

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All of the technological advances that have benefited consumer electronics have direct application to robotics. Technological advances have resulted in the dramatic reduction in size, cost, and weight of computing systems, while simultaneously doubling computational speed every eighteen months. The same manufacturing advancements that have enabled this rapid increase in computational power are now being leveraged to produce small, powerful and cost-effective sensing technologies applicable for use in mobile robotics applications. Despite the increase in computing and sensing resources available to today's robotic systems developers, there are sensing problems typically found in unstructured environments that continue to frustrate the widespread use of robotics and unmanned systems. This talk presents how physics has contributed to the creation of the technologies that are making modern robotics possible. The talk discusses theoretical approaches to robotic sensing that appear to suffer when they are deployed in the real world. Finally the author presents methods being used to make robotic sensing more robust.