Introduction to Sensing Technologies for Control

Sensing vs. Perception

transducers - devices that convert some physical phenomenon into electrical signals

A/D conversion - the conversion from analog signal (0-5V) into a fixed precision (typically 8-12 bits) digital representation

perception - the interpretation of signals derived from transducers in order to estimate state information required for control.

observability - if state $\vec{x}(t_0)$ can be determined given measurements $\vec{z}(t)$ in the interval between t_0 and t_1, then $\vec{x}(t_0)$ is observable. If $\vec{x}(t)$ is observable for all t, $\vec{x}$ is completely observable.

controllability - a system is controllable at time $t_1 > t_0$ if a suitable control $\vec{u}(t)$ can be found to drive the system from an arbitrary $\vec{x}(t_0)$ to another arbitrary state $\vec{x}(t_1)$.

sensory overload - in biology and in many synthetic embedded systems, often too many types of measurements (transducers) are available and are irrelevant in many contexts. Mechanisms for focusing attention on the relevant aspects of state are critical.

Copyright ©1998 by Roderic A. Grupen