In The Name of God

Introduction to Control Theory and Applications

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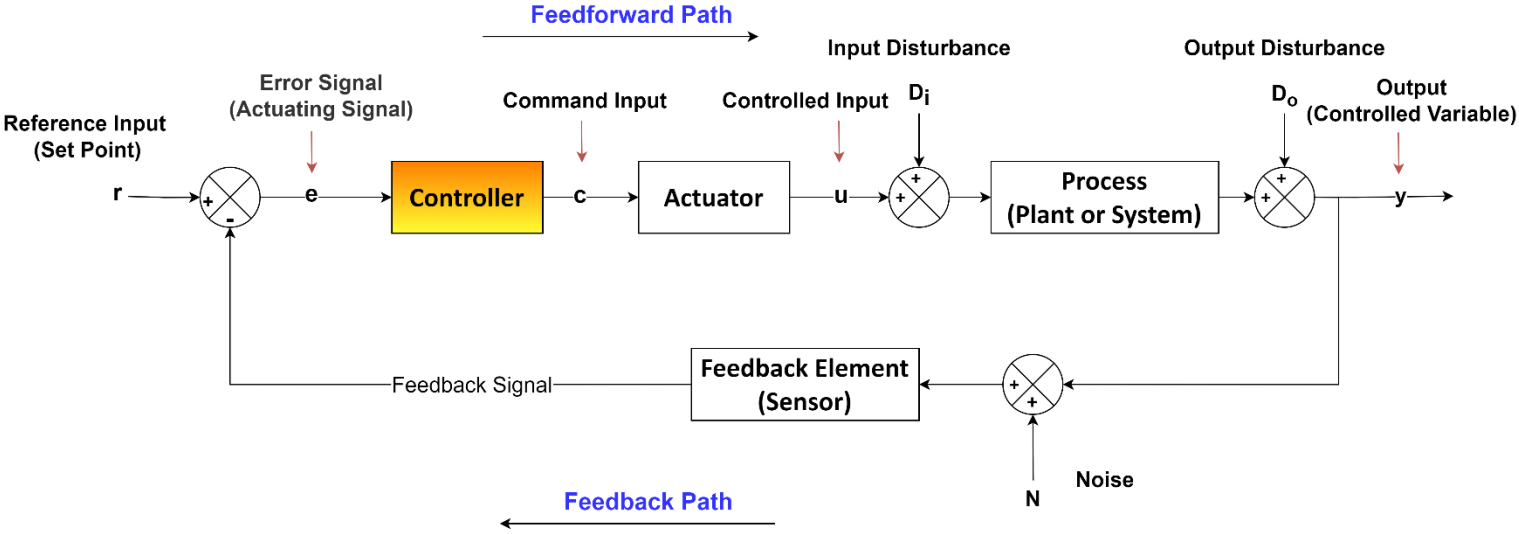
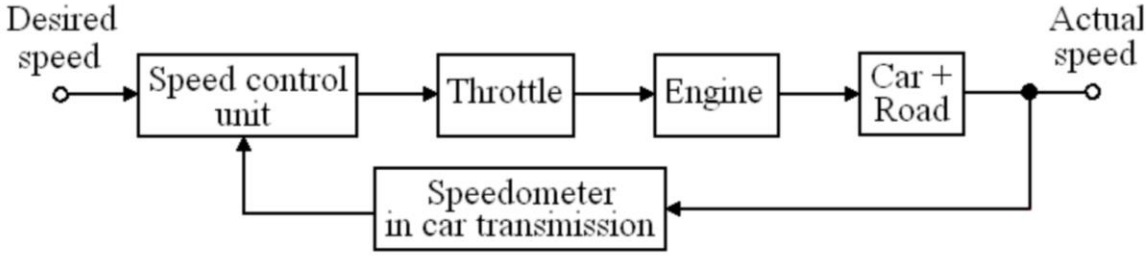
Fall 2024

Control System

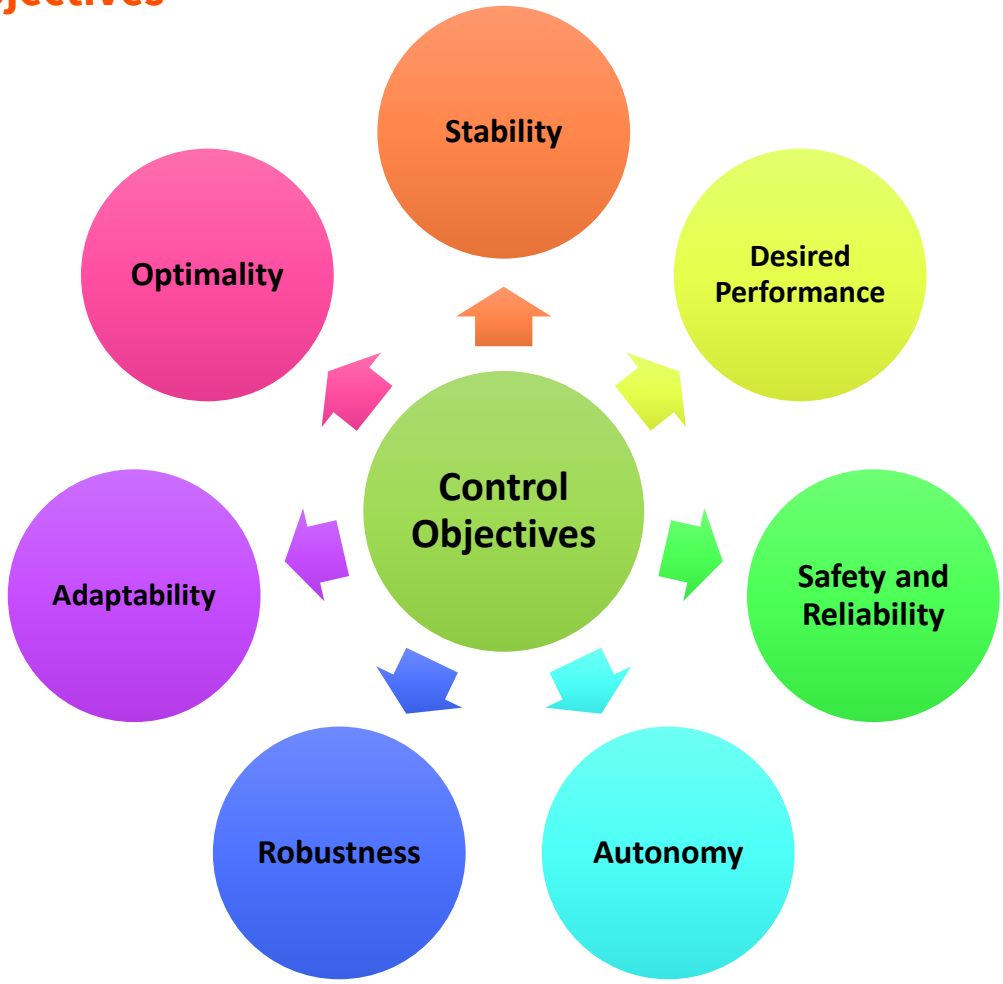
Closed-loop (feedback) Control System



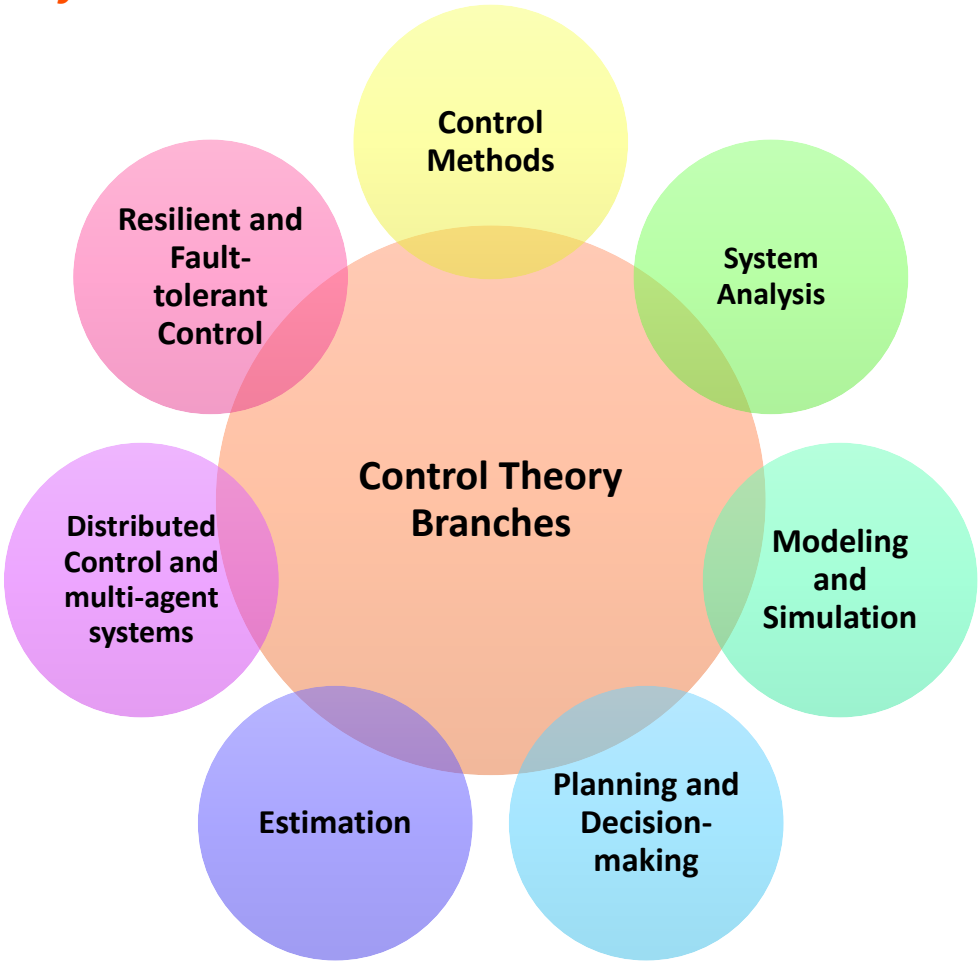
❑Car Cruise Control Example:



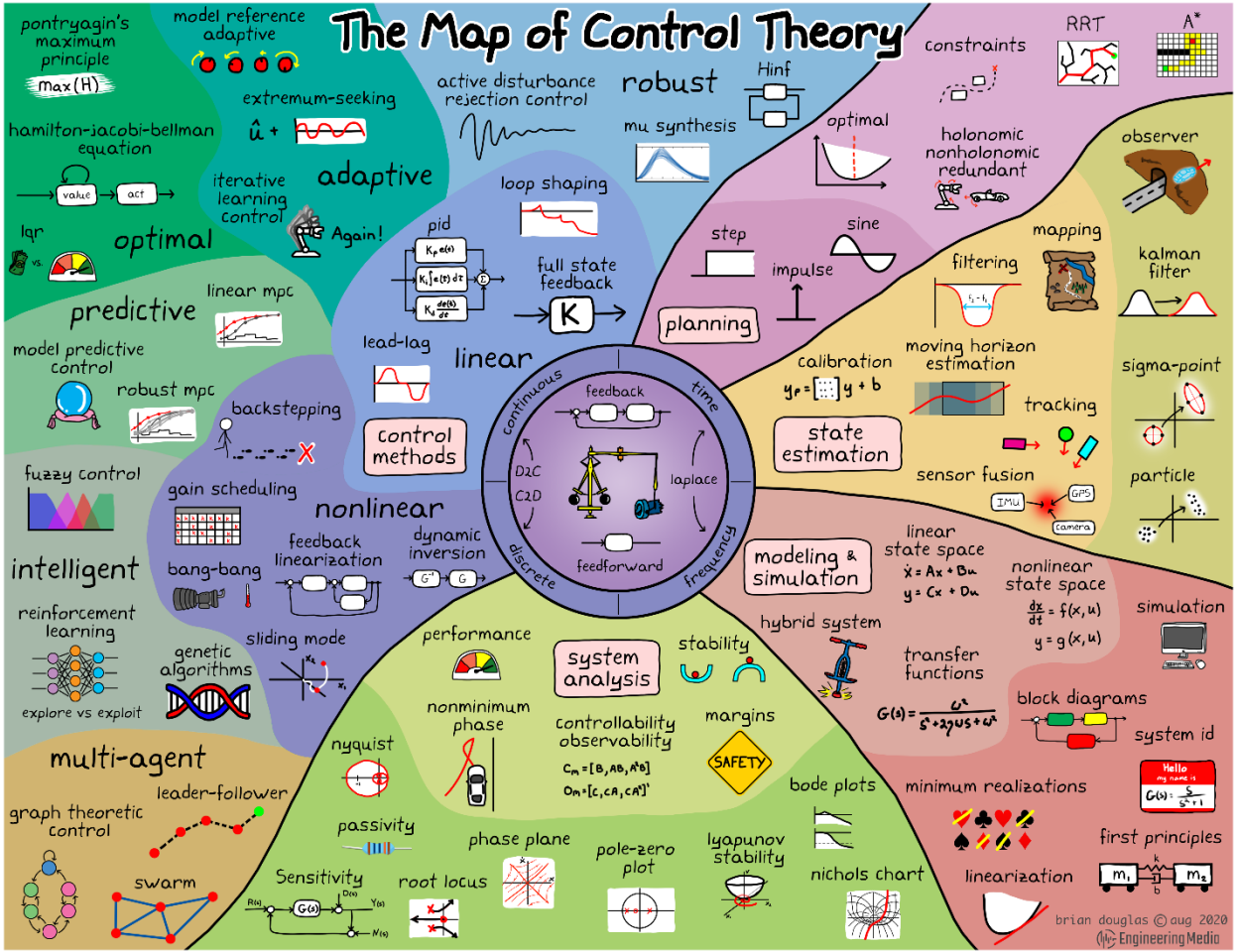
Control Objectives



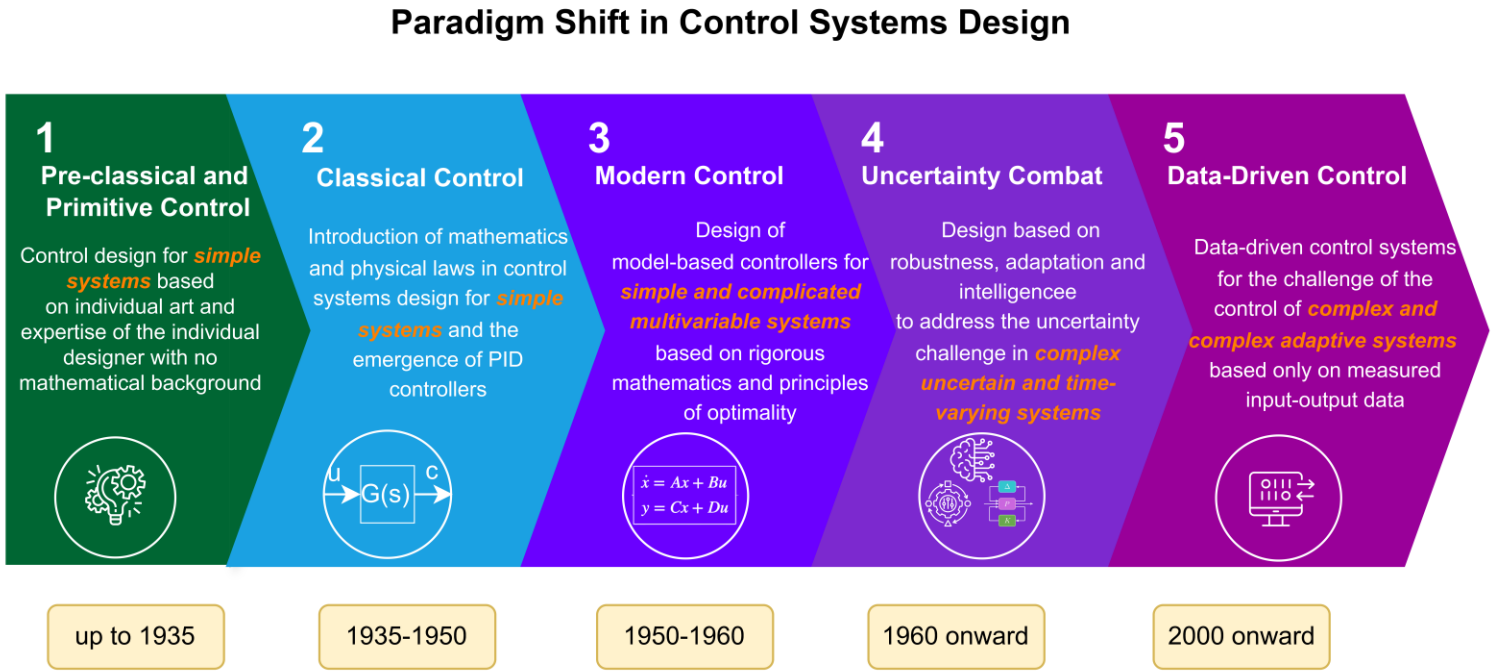
Control Theory Branches



The Map of Control Theory

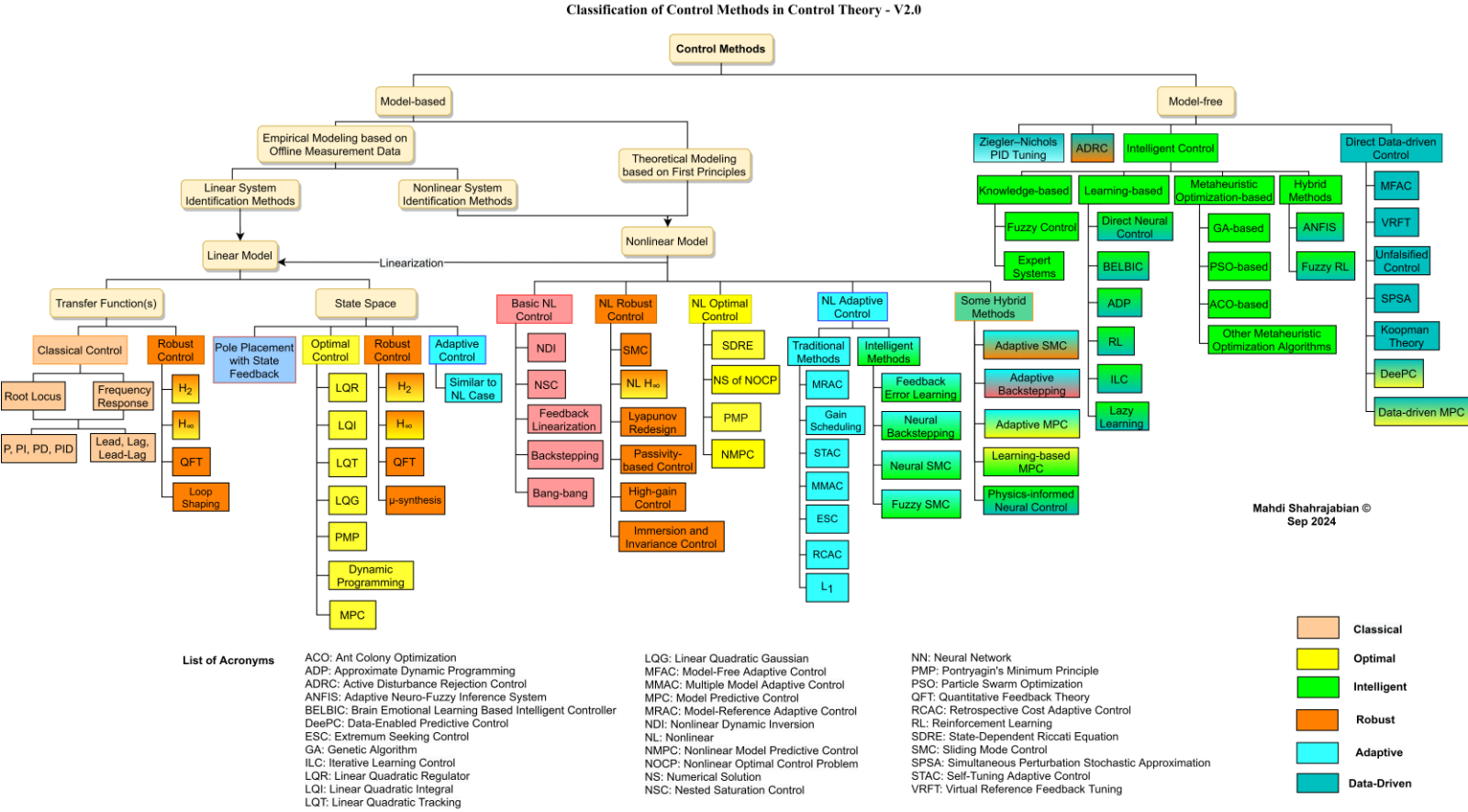


Paradigm Shift in Control Systems Design



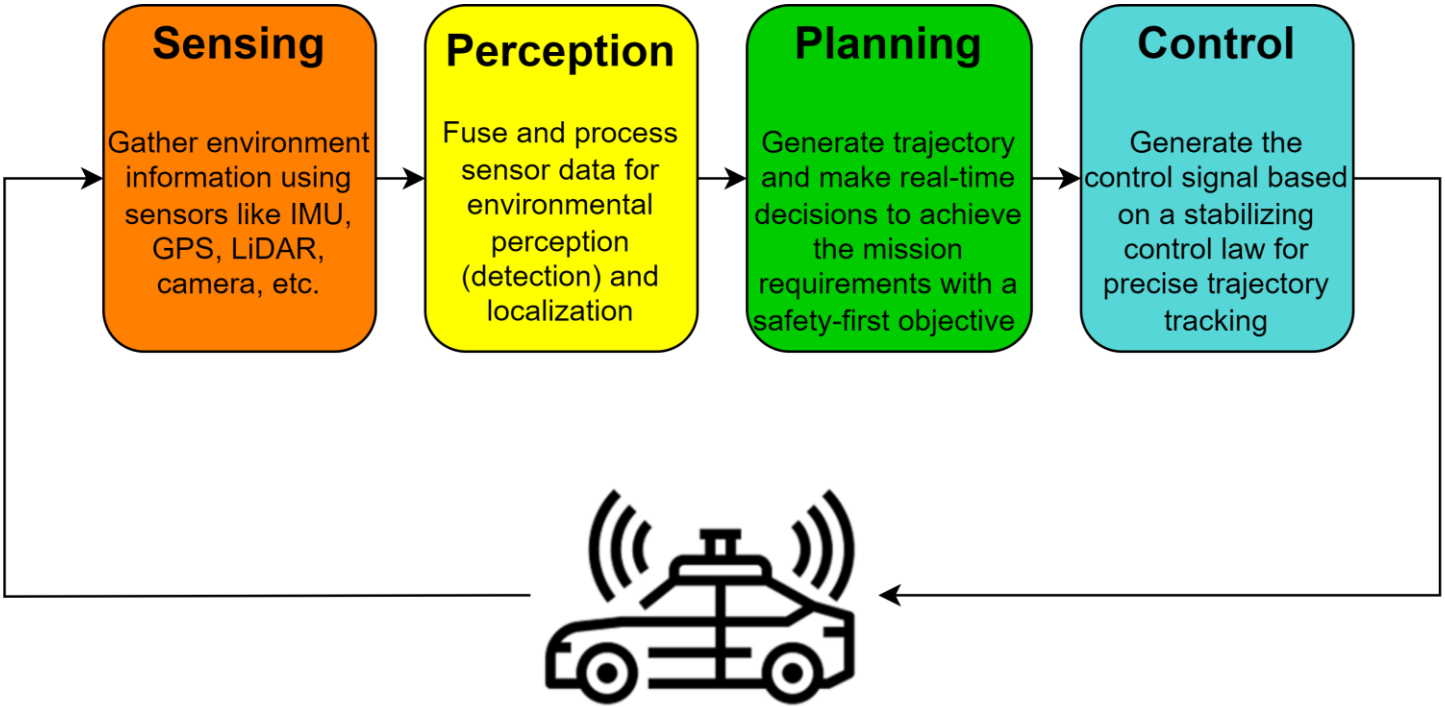
This diagram is inspired by the concepts in: Khaki-Sedigh, Ali. *An Introduction to Data-Driven Control Systems*. John Wiley & Sons, 2023.

Classification of Control Methods in Control Theory



Autonomous Systems

The continuing goal of control systems is to provide extensive flexibility and a high level of autonomy.



Automation vs Autonomy

Automation

The use or introduction of automatic equipment in a manufacturing or other process or facility.

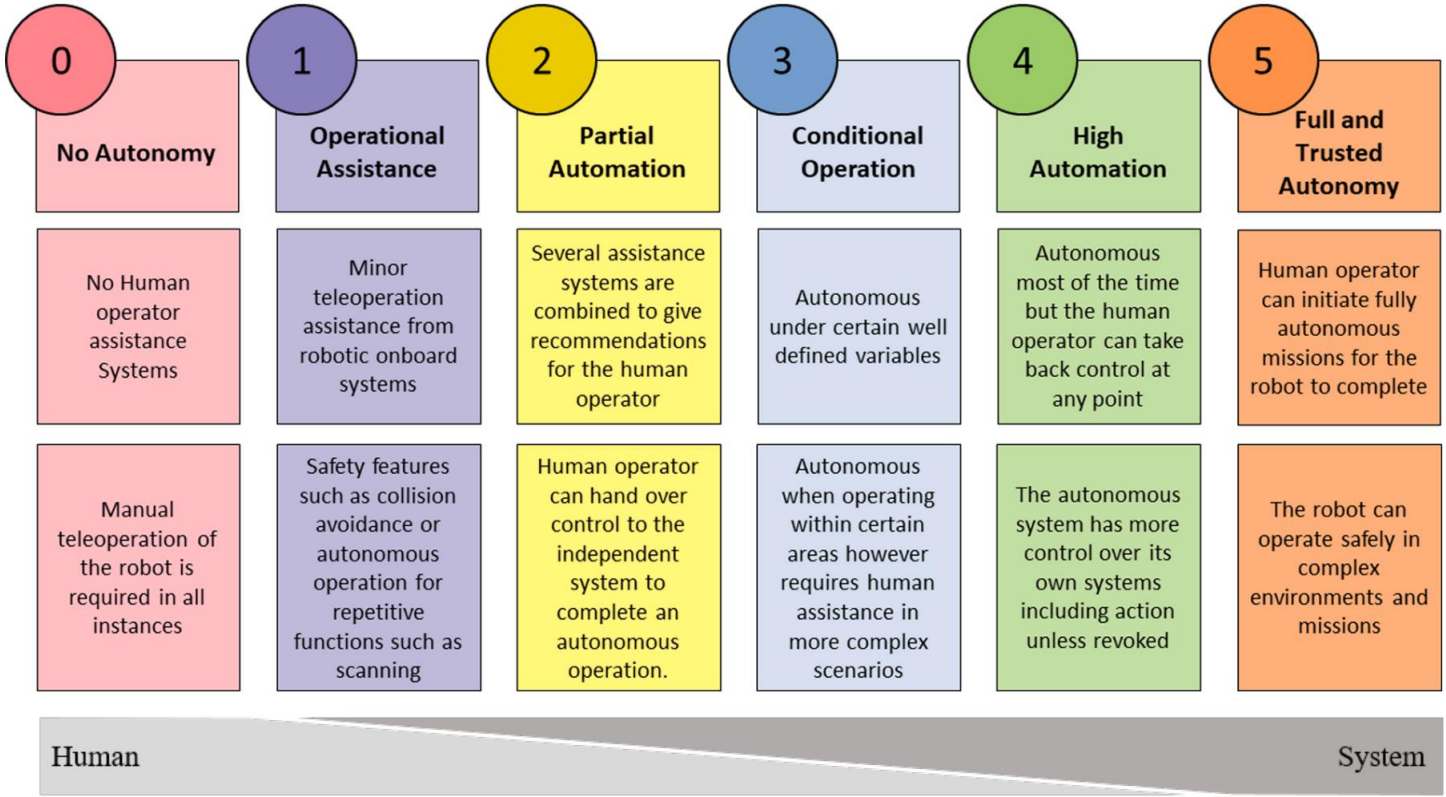
How automated a drone is always comes down to how much automatic equipment is involved and how much manual intervention it requires. An automated drone follows orders about destination and route but cannot make decisions.

Autonomy

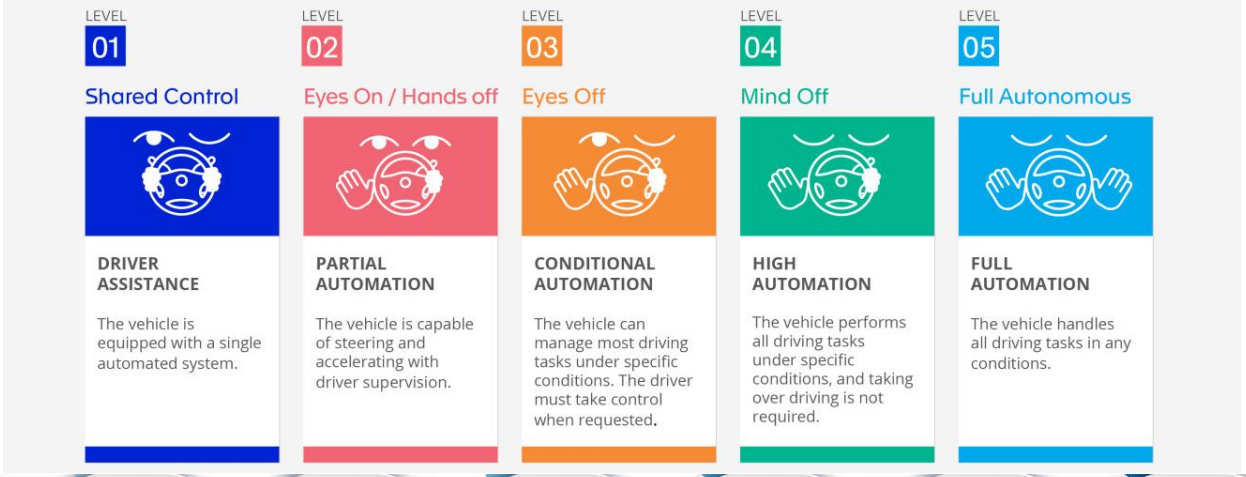
Freedom from external control or influence; independence.

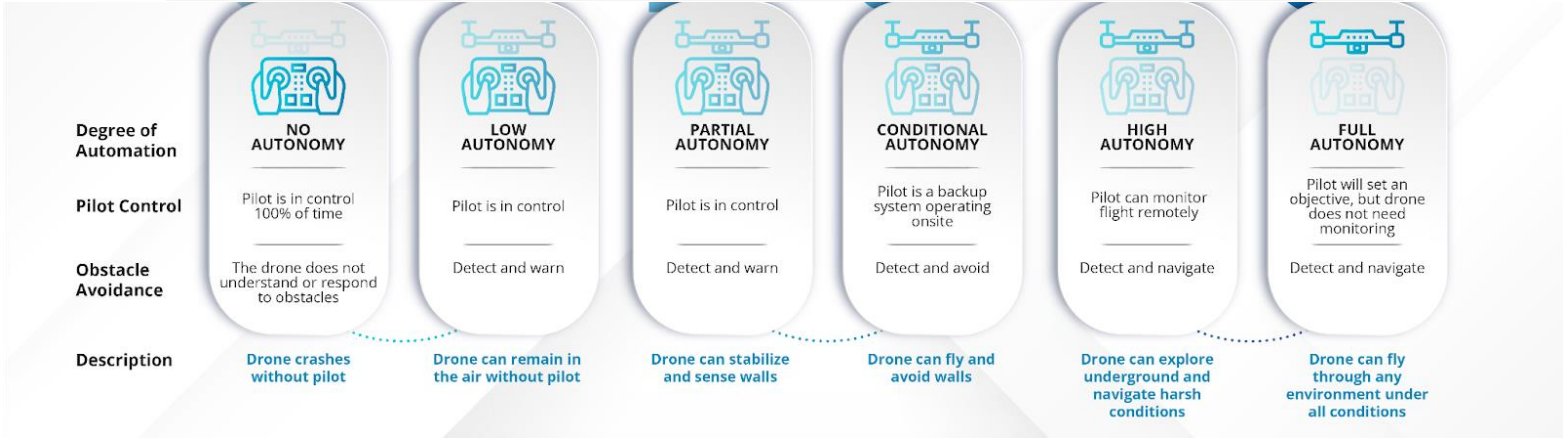
How autonomous a drone is must always be a measurement of how independent the platform and its workflow are. A truly autonomous drone would *decide* on destination and route as well as control in the air.

Levels of Autonomy

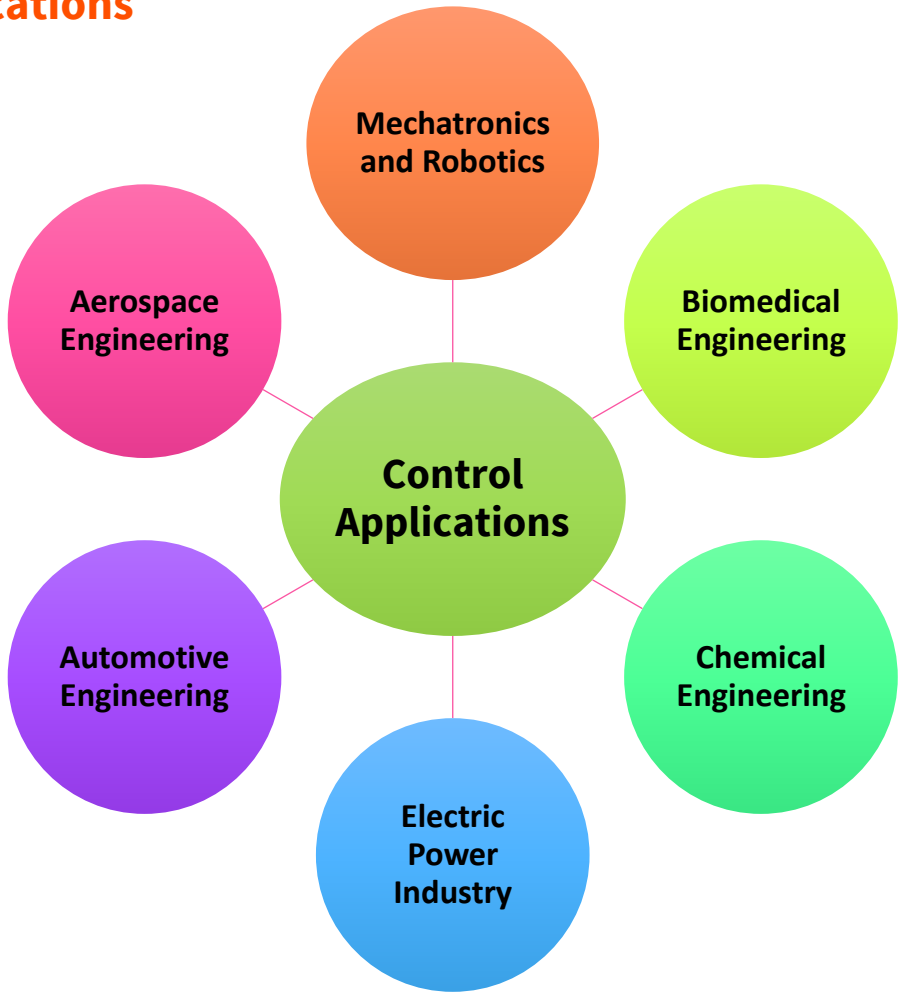


Levels of Autonomy





Control Applications



Control Applications

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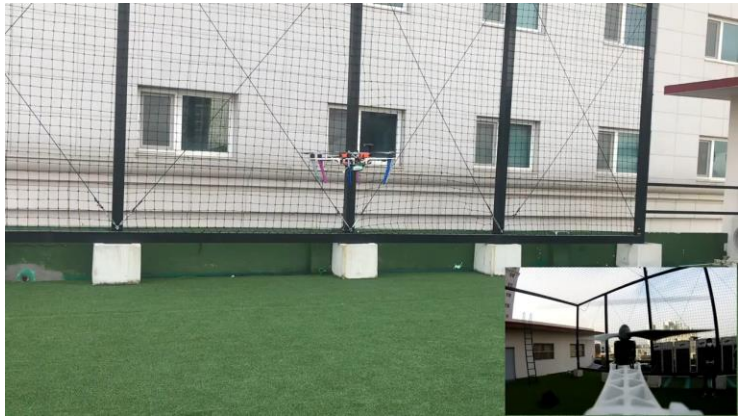

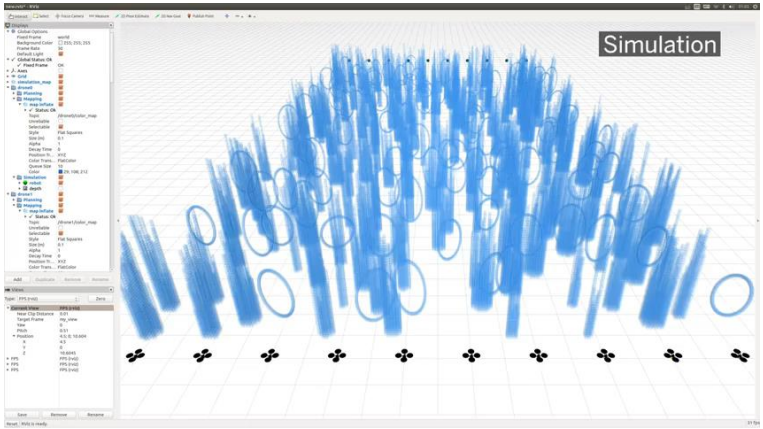

Any Question?