- **Excessive Human Control**
  - ○ Dangers: Occur when human errors lead to catastrophic outcomes.
  - ○ Mitigation Strategies: Automation controls are needed to prevent fatal human mistakes.
  - ○ Examples: Collision Avoidance Systems, Home Appliance Guards: Safety locks on self-cleaning ovens.

- Goal: Activities where human mastery, competence building, free exploration, and creativity are paramount.
- Examples: Bicycle Riding, Piano Playing, Playing with Children

High Human Control

- Goal: To achieve Reliable, Safe & Trustworthy (RST) Systems.
- Core Principles & Implementation Strategies: RST, Ethics (Fairness, Explainability)
- Examples of Successful HCAI: Patient-Controlled Analgesia (PCA)
- Challenges & Trade-offs: Interpretability vs. Accuracy , Data Bias

Low Computer Automation   **High Computer Automation**

- Characteristics: Basic, often mechanical devices with limited human interaction and minimal or no computational automation.
- Examples: Clocks, mousetraps

- Goal: Systems where rapid, automatic action is critical, no time for human intervention.
- Examples: Airbag Deployment
- Challenges: Extremely high cost of failure

- **Excessive Automation**
  - ○ Dangers: Arise when designers assume autonomous systems cannot fail, leading to a lack of user manuals or training for manual override, creating "algorithmic hubris".
  - ○ Failure Examples: Boeing 737 MAX MCAS, Tesla "Autopilot"
  - ○ Challenges: De-skilling effects (undermining human skills needed when automation fails) and the difficulty of remaining vigilant during infrequent user actions.

Low Human Control