Decision Making for Different Types of Variation in a Manufacturing System

1. Research goals
   • Analyze performance of different decision-making strategies when there is common cause variation
   • Simulate how human operators may interpret common cause variation
   • Common cause variation is natural variation in the process

2. Manufacturing system
   • Example from Law, A. M. Simulation Modeling and Analysis, 4th ed.
   • 3 different job types with different routes arriving at the manufacturing system
   • The arrival time and the process time of machines are random.
   • Forklift trucks manage job requests in increasing order of the distance

3. Decision-making model
   **Shared mental RPD model**
   - Operators and production manager assess the situation according to RPD model
   - Control chart represents decision makers’ knowledge base
   - Decision-making strategies can be more or less reactive to the variation

4. Simulation Results
   - Chart showing average daily throughput
   - Comparison of different decision-making strategies

5. Contributions
   • Analyze the impacts of different decision making strategies for common cause variation
   • Provide a realistic mean to model decision made in a manufacturing setting by using shared mental RPD model
   • Embed interplay between decision team members within the decision-making model
   • Represent the knowledge base of experts in the manufacturing system through the control charts

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