Programmed versus Nonprogrammed Decisions

Programmed decisions
- Structured situations with well-defined relationships
- Quantifiable
- Management information system

Nonprogrammed decisions
- Ill-structured situations with vague or changing relationships between variables
- Not easily quantifiable in advance
- Decision support systems

Problem Solving Approaches
- Optimization: find the best solution
- Satisficing: find a good solution
- Heuristics: use rules of thumb
An Overview of Management Information Systems
Characteristics of an MIS

- Fixed format, standard reports
- Hard-copy or soft-copy reports
- Uses internal data
- User-developed reports
- Users must request formal reports from IS department
Functional Aspects of the MIS

Functional MIS Systems
- Manufacturing
- Marketing
- Human Resources
- Accounting
- GIS

An Overview of Decision Support Systems
Characteristics of Decision Support Systems

- Handle lots of data from various sources
- Support drill down analysis
- Complex analysis, statistics, and forecasting
- Optimization, satisficing, heuristics
  - Simulation
  - What-if analysis
  - Goal-seeking analysis

Examples of a DSS

- Meal Planning
- Web-Based Decision Support
Components of a DSS

The Model Base

- Financial models
  - Cash flow
  - Internal rate of return
- Statistical analysis models
  - Averages, standard deviations
  - Correlations
  - Regression analysis
- Graphical models
- Project management models
Characteristics of a GDSS

- Ease of use
- Flexibility
- Decision-making support
- Anonymous input
- Reduction of negative group behavior
- Parallel communication
- Automated record keeping
Executive Support Systems
Executive Support Systems (ESS) in Perspective

- Tailored to individual executives
- Easy to use
- Drill down capabilities
- Access to external data
- Can help when uncertainty is high

An Overview of Artificial Intelligence

The Nature of Intelligence

- Learn from experience & apply the knowledge
- Handle complex situations
- Solve problems when important information is missing
- Determine what is important
The Nature of Intelligence

- React quickly & correctly to new situations
- Understand visual images
- Process & manipulate symbols
- Be creative & imaginative
- Use heuristics

Figure 11.1

Table 11.1

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Natural Intelligence ( Humans )</th>
<th>Artificial Intelligence ( Machines )</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ability to learn new things, react, think, &amp; verbalize</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>The ability to handle novel situations</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>The ability to have fun experiencing</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>The ability to adapt</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>The ability to solve the cost of acquiring intelligence</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>The ability to use a series of intermediate results</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>The ability to carry out a series of commands</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>The ability to store complex information</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>The ability to instruct others</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>The ability to take a series of instructions at a go of it</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

A Comparison of Natural and Artificial Intelligence
The Major Branches of Artificial Intelligence

- Vision systems
- Natural Language Processing
- Learning systems
- Neural networks
- Robotics

An Overview of Expert Systems

Characteristics of an Expert System

- Can explain reasoning
- Can provide portable knowledge
- Can display “intelligent” behavior
- Can draw conclusions from complex relationships
- Can deal with uncertainty
Limitations of Expert Systems

- Limited to narrow problems
- Hard to use
- Cannot easily deal with "mixed" knowledge
- Cannot refine own knowledge base
- Hard to maintain
- Possible high development costs
- Raise legal & ethical concerns

When to Use Expert Systems

- High payoff
- Preserve scarce expertise
- Distribute expertise
- Provide more consistency than humans
- Faster solutions than humans
- Training expertise

![Components of an Expert System](image-url)
Components of Expert Systems

The Knowledge Base
- Rules
- Cases
- Fuzzy Logic

Inference Engines
- Backward chaining
- Forward chaining

Advantages of Expert Systems Shells and Products
- Easy to develop & modify
- Use of satisficing
- Use of heuristics
- Development by knowledge engineers & users
### Applications of Expert Systems & AI

- Credit granting
- Shipping
- Information management & retrieval
- Embedded systems
- Help desks & assistance
- Medical diagnosis
- **Whale Identification**