DECENTRALISING THE CODIFICATION OF RULES IN A DECISION SUPPORT EXPERT KNOWLEDGE BASE

by

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Abstract

Title:	Decentralising the codification of rules in a decision support expert knowledge base
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The paradigm of Decision Support Systems (DSS) is to support decision-making, while an Expert System's (ES) major objective is to provide expert advice in specialised situations. Knowledge-Based DSS (KB-DSS), also called Intelligent Decision Support Systems (IDSS), integrate traditional DSS with the advances of ES. A KB-DSS' knowledge base usually contains knowledge expressed by an expert and captured by a knowledge engineer. The indirect transfer between the domain expert and the knowledge base through a knowledge engineer may lead to a long and inefficient knowledge acquisition process.

This thesis compares 11 DSS packages in search of a (KB-) DSS generator where domain experts can specify and maintain a Specific Decision Support System (SDSS) to assist users in making decisions. The proposed (KB-) DSS-generator is tested with a university and study-program prototype. Since course and study plan programs change intermittently, the (KB-) DSS' knowledge base enables domain experts to set and maintain their course and study plan rules without the assistance of a knowledge engineer. Criteria are set to govern the (KB-) DSS generator search process. Example knowledge base rules are inspected to determine if domain experts will be able to maintain a set of production rules used in a student registration advice system. By developing a prototype and inspecting knowledge base rules, it was found that domain experts would be able to maintain their knowledge in the decentralised knowledge base, on condition that the objects and attributes used in the rule base were first specified by a builder/programmer.

Keywords:

Decision Support, Decision Support Systems, Expert Systems, Knowledge-Based Decision Support Systems, Intelligent Decision Support Systems, Knowledge Management, Knowledge Representation, Decision Support Generator, Rule-Based Systems, Knowledge base

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List of acronyms

4GL	Fourth Generation Languages
AHP	Analytical Hierarchy Process
AI	Artificial Intelligence
API	Application Programming Interface
BAL	Business Action Language
BOM	Business Object Model
BRS	Business Rule Studio
CBIS	Computer Based Information Systems
CBR	Case Based Reasoning
CDSS	Customer Decision Support Systems
COM	Component Object Model
CSF	Critical Success Factors
DB	Databases
DBMS	Database Management System
DGMS	Dialogue Generation Management Software
DLL	Dynamic Link Library
DSS	Decision Support Systems
DTD	Document Type Definition
EC	Electronic Commerce
EDI	Electronic Data Interchange
EIS	Executive Information Systems
ES	Expert Systems
GDSS	Group Decision Support Systems
GSS	Group Systems Support
GUI	Graphical User Interface
IA	Intelligent Agents
IDDS	Intelligent Decision Support Systems
IRD	Information Requirement Definition
IRS	Information Reporting Systems
IS	Information Systems
ISP	Internet Service Provider
ISS	Intelligent Support Systems
IT	Information Technology
JESS	Java Expert System Shell
JVM	Java Virtual Machine
K-T method	Kepner-Tregoe method/process
KB	Knowledge Base
KB-DSS	Knowledge-based Decision Support Systems

LAN	Local Area Network
LHS	Left-hand-side
MBMS	Model Base Management Software
MINTS	Management Intelligent Systems
MIS	Management Information Systems
MSS	Management Support Systems
NL	Natural Language
NLP	Natural Language Processing
PIM	Personal Information Systems
OAV	Object Attribute Values
OCX	ActiveX control
ODBC	Open Database Connectivity
OIS	Office Information Systems
OLAP	Online analytical Processing
OLE	Object Linking and Embedding
OOSM	Object-Oriented Structured Modelling
OOSML	Object-Oriented Structured Modelling Language
PRL	Production Rule Language
R&D	Research-and-Development
RDBMS	Relational Database Management Systems
SDLC	Systems Development Life Cycle
SDSS	Specific Decision Support System
SGML	Standard Generalised Mark-up Language
SIS	Storage Information Systems
SM	Structured Modelling
SQL	Structured Query Language
TD	Approval of Dean
TDH	Approval of Head of Department
TPS	Transaction Processing Systems
RAD	Rapid Application Development
RBR	Rule-Based Reasoning
RMI	Remote Method Invocation
RWE	Real world Example
UIMS	User Interface Management System
URL	Uniform Resource Link
VRS	Visual Rule Studio
WA	Work Area
Web	World Wide Web
WM	Working memory
XML	Extensible Mark-up Language