

Contents

1	Introduction to Intelligent Decision Support Systems	1
1.1	Introduction	1
1.2	Development of Intelligent Decision Support Systems: Based on Artificial Intelligence Methods with Special Emphasis on Technology	4
1.3	Intelligent User Interface	7
1.4	Integration of Artificial Intelligent and DBMS Technologies	14
	References	25
2	Intelligent Decision Support Systems	31
2.1	Recommender, Advisory and Expert Systems and Their Integration with Decision Support Systems	31
2.2	Text Analytics and Mining Based DSSs	35
2.3	Data Mining as an Important Component of Intelligent Decision Support Systems	42
2.4	Integration of Data Analytics and Decision Support Systems	48
2.5	Artificial Neural Networks in Decision Support Systems and Biometrics	50
2.6	Integration of Remote Sensing into a Decision Support Systems	56
2.7	Biometrics-Based Decision Support Systems	58
2.7.1	Voice Recognition Decision Support Systems	58
2.7.2	Speech Recognition and Understanding Decision Support Systems	59
2.7.3	Adaptive Biometrics-Based Decision Support Systems	60
2.7.4	Other Biometrics-Based Decision Support Systems	61
2.8	Ambient Intelligence and the Internet of a Things-Based Decision Support Systems	62
2.9	Other Intelligent Decision Support Systems	68
2.9.1	GA-Based Decision Support Systems	68
2.9.2	Fuzzy Sets IDSS	69

2.9.3	Rough Sets	69
2.9.4	Intelligent Agent-Assisted Decision Support Systems.	70
2.9.5	Process Mining Integration to Decision Support	72
2.9.6	Adaptive Decision Support Systems	73
2.9.7	Computer Vision Based DSS	75
2.9.8	Sensory Decision Support Systems	75
2.9.9	Robotic Decision Support Systems	76
	References	76
3	Passive House Model for Quantitative and Qualitative	
	Analyses and Its Intelligent System.	87
3.1	Introduction	87
3.2	Passive House Model for Quantitative and Qualitative	
	Analyses and Illustration of Its Several Stages	88
3.2.1	Passive House Model for Quantitative	
	and Qualitative Analyses	88
3.2.2	Passive House Socio-cultural Aspects	90
3.2.3	Self-expression Values, Environmentalism,	
	Global Warming and the Passive House.	96
3.2.4	Low Energy Dwelling Weaknesses in Lithuania	101
3.3	The Intelligent Passive House Design System	103
3.4	Case Study	106
	References	110
4	Biometric and Intelligent Self-Assessment of Student	
	Progress System.	113
4.1	Introduction	113
4.2	Reliability of Self-Assessment.	115
4.3	Biometric and Intelligent Self-Assessment of Student	
	Progress (BISASP) System	117
4.4	Self-Assessment Integrated Grading Model	121
4.5	Self-Assessment Integrated Grading Adjustment Model	123
4.6	Case Studies	124
4.6.1	Case Study 1: Analysis on the Interdependencies	
	Between Microtremors, Stress and Student Marks	125
4.6.2	Case Study 2: Comparison of Marks Assigned	
	to Students During the Psychological Examination,	
	Prior to the e-Test and During the e-Test	129
	References	134

5	Web-based Biometric Computer Mouse Advisory System to Analyze a User's Emotions and Work Productivity.	137
5.1	Introduction	138
5.2	Dependency of Human Blood Pressures, Heart Rate, Skin Conductance and Temperature on Experienced Stress and Emotions	139
5.2.1	Effect of Experienced Emotions on Blood Pressure, Heart Rate, Skin Conductance and Body Temperature	141
5.2.2	Dependence of Blood Pressures and Heart Rate on a Person's Experienced Stress	144
5.3	Web-based Biometric Computer Mouse Advisory System to Analyze a User's Emotions and Work Productivity	145
5.3.1	e-Self-assessment Subsystem.	146
5.3.2	Biometric Computer Mouse	147
5.3.3	Mouse Events Capture, Collection and Feature Extraction Subsystem.	152
5.3.4	Biometric Finger	154
5.3.5	User's Biometric Database	155
5.3.6	Maslow's Pyramid Tables.	156
5.3.7	Model-Base Management System and Model Base.	158
5.4	Case Study: Determining Stress Level and Providing Recommendations	161
5.5	Scenario Used to Test and Validate the Advisory System and Its Composite Parts	166
5.5.1	Statistical Analysis of Average Temperature Dependency on Anxiety	168
5.6	Calculating Reliability of Stress Dependencies on Diastolic and Systolic Blood Pressures and Finger Temperature by Analyzing the Entire User's Biometric Database	169
	References	170
6	Student Progress Assessment with the Help of an Intelligent Pupil Analysis System	175
6.1	Introduction	175
6.2	Intelligent Pupil Analysis System	177
6.2.1	Database Management System and Intelligent Database.	178
6.2.2	Model-base Management Subsystem and Model-bases.	179
6.2.3	Student's Answer Correctness Estimate per Pupillary Response Model	183
6.3	Case Studies	187
6.3.1	Case Study 1: A Sample of IPA System's Recommendations to a Tutor	187

6.3.2	Case Study 2: Study of the Dependence Linking a Student's Pupil Size to the Student's Psychological and Emotional State During an Examination	188
	References	191
7	Recommender System to Analyze Student's Academic Performance	195
7.1	Introduction	195
7.2	Analysis of the Interdependence Linking Physiological Parameters of Students to Their Learning Productivity and Interest in Learning	198
7.3	Recommender System to Analyze Student's Academic Performance	203
7.3.1	Introduction	203
7.3.2	Equipment Subsystem	203
7.3.3	Intelligent Database and Database Management System	204
7.3.4	Model-base Management System and Model Base	210
7.4	Development of Learning Materials on a Students' Learning Productivity and the Level of Interestingness	210
7.5	Case Study: The Recommender System as a Means to Increase Student Productivity in Learning and to Improve Their Achievements	212
7.6	Reliability Analysis of the Influence of Physiological Parameters on Interest in Learning Using the Entire Student's Physiological Database	215
	References	217

Biometric and Intelligent Decision Making Support

Kaklauskas, A.

2015, XII, 220 p. 47 illus., 8 illus. in color., Hardcover

ISBN: 978-3-319-13658-5