

Table 1: FCM structures used for MDSS

Type of FCM	Type of Decision	Main characteristics of the approach/ MDSS	Learning Method	Application Field
NHL-FCM	Decision making/diagnoses, classification	Unsupervised learning; Synchronous triggering & interaction of concepts; One step approach; Demand human intervention; Problem-dependent; Classification	Non Linear Hebbian (NHL)	Radiotherapy, Tumor grading
AHL-FCM	Grade diagnostic decision, Classification	Unsupervised learning; Asynchronous Weight update; Asynchronous sequence of activation concepts; Activation Decision Concepts (ADCs)-desired outputs ; Demand human intervention Problem-dependent; Classification	Active Hebbian Learning (AHL)	tumor grading
CFCMs	Differential diagnosis, critiquing	Two main kinds of concepts: factors concepts & diagnosis concepts; One decision come up; Factor concepts: inputs Diagnosis concepts: outputs One decision come up; Competiveness Compare and lead to decision; decision based on expert knowledge and experience	Competitive	Specific Language Impairment
Augmented CFCMs Supplemented with CBR	Differential diagnosis	CFCM with CBR; Two main kinds of concepts: factors concepts & diagnosis concepts; One decision come up; CBR (store previous cases); Historical data; Not always CBR called; Nearest-neighbor retrieval technique; Competiveness; Compare and lead to decision; decision based on expert knowledge and experience	Competitive	Specific Language Impairment
Complementary CFCM – CBR enhanced	Differential diagnosis , Decision making	CFCM with CBR; Critical factor concepts; Lateral inhibition; Double check diagnosis- concept; Less search space and time; Reduction in simulation time; Simulation time reduction; Compare and lead to decision; decision based on expert knowledge and experience and tested previous cases	Competitive	Specific Language Impairment, Radiotherapy
CFCM complemented with Genetic Algorithm	Differential diagnosis, Decision making, modeling	CFCM structure; Two main kinds of concepts: factors concepts & diagnosis concepts; Not always GA called; GA ‘manipulate’ weight matrix; Reduced weight matrix; Less human intervention; Compare and lead to decision	Competitive Genetic Algorithm	Speech and language pathology, Labor modeling
Distributed m-FCMs	Differential diagnosis	Subsystems; FCM for each subsystem; Grouped factors; Communication among FCMs; Intricate web	-	Speech and language pathology
Supervisor FCM	Decision making, Treatment	Uses Distributed m-FCMs; Determine the treatment acceptance or not; Enhance simulation ability; Evolutionary algorithms for optimization; Less human intervention	NHL, PSO &(DE)	Labor, Radiotherapy
Hierarchical (m-FCM MDSS& Supervisor)	Decision making, Treatment	Supervisor FCM; Three kinds of concepts: Factor-concepts, Selector- concepts, and Output- concepts; Factor & Selector concepts (inputs);Control by the supervisor	mFCM: - Supervisor FCM: NHL,PSO &(DE)	Labor, Radiotherapy
Evolutionary based FCMs	Clinical guidelines, prediction	Experts; Eliminate human intervention; FCM from historical data; Optimization Candidate FCM;	Real Coded Genetic Algorithm	Long-term prediction of prostate cancer