

ISTeam, a personality-driven team and
RA₃DM, a 3D monitor for the
RoboCup Simulation League

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Outline

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 - Overview
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ISTeam

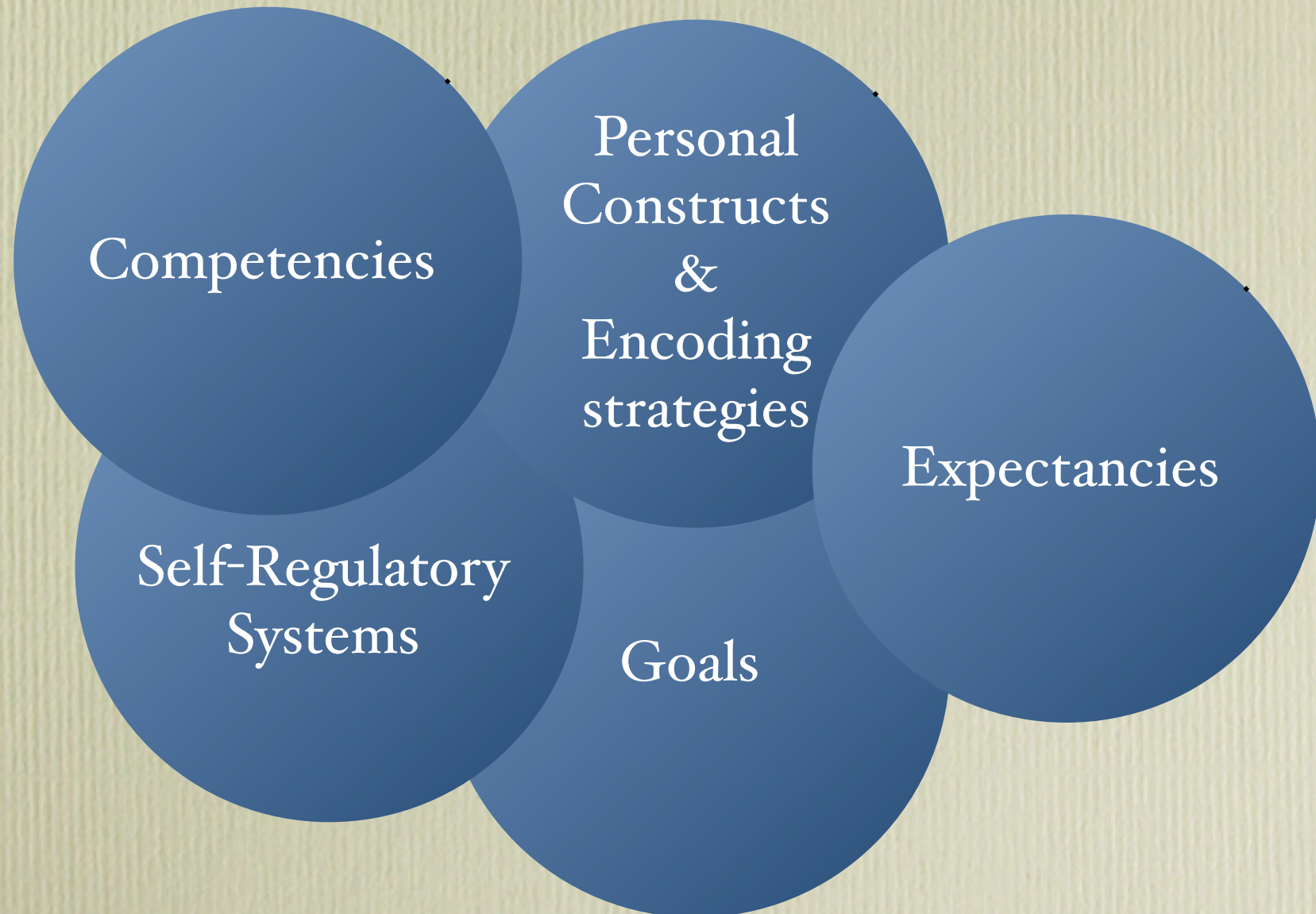
Overview

- ISTeam = Intelligent Soccer Team
- **Goal:** Development of a multi-agent architecture applied to the RoboCup Simulation League
 - Personality
 - Learning Cooperation
 - Multi-Agent Modelling (On-line Coach)
- RoboCup Advanced 3D Monitor (RA₃DM)

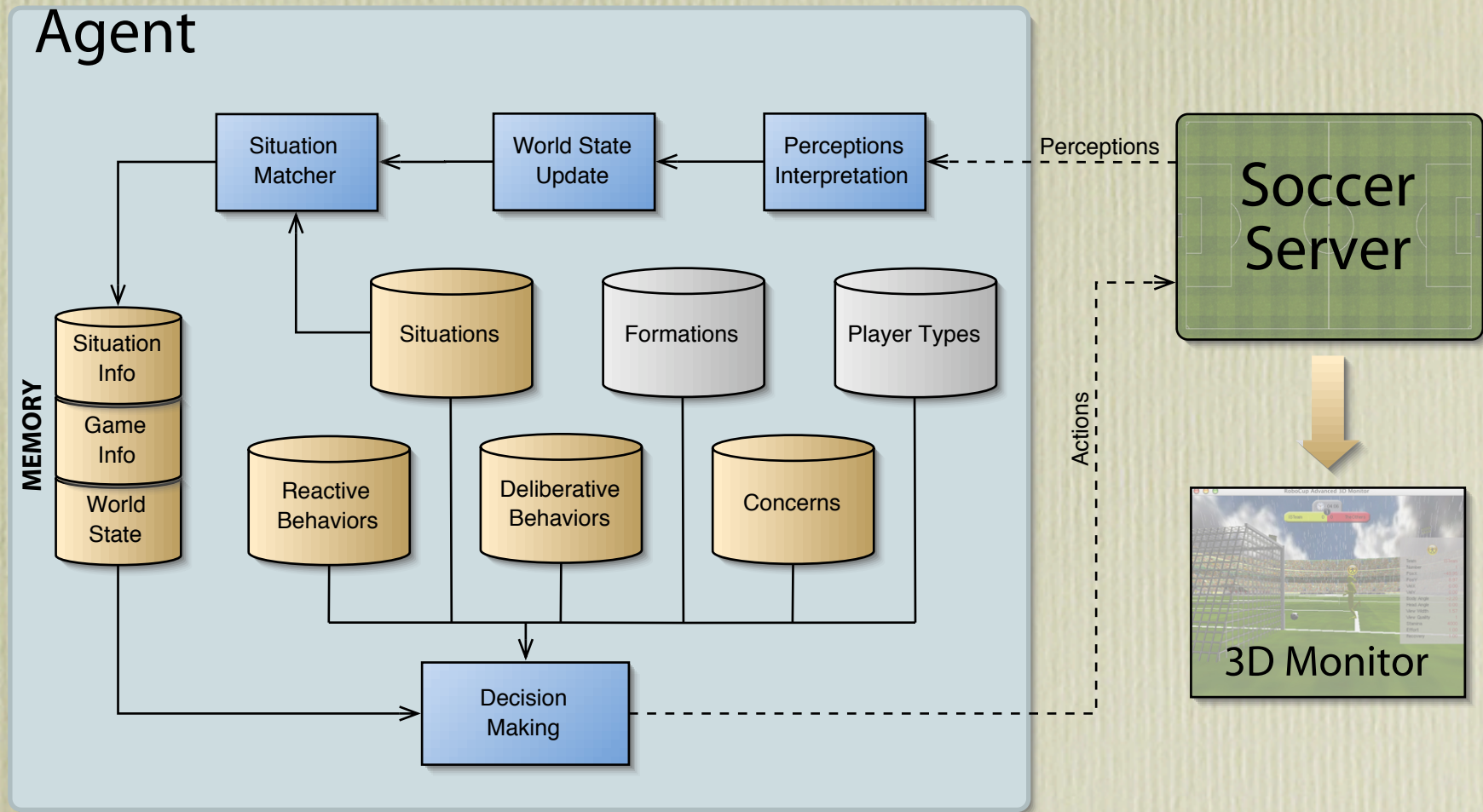
Cognitive Social Learning Theory

- Situational Specificity
- Situation → Personality → Behavior
- “Strong” and “Weak” Situations
- Reciprocal Determinism
 - cognitive AND situational variables
- Adaptation
 - rewards and punishments

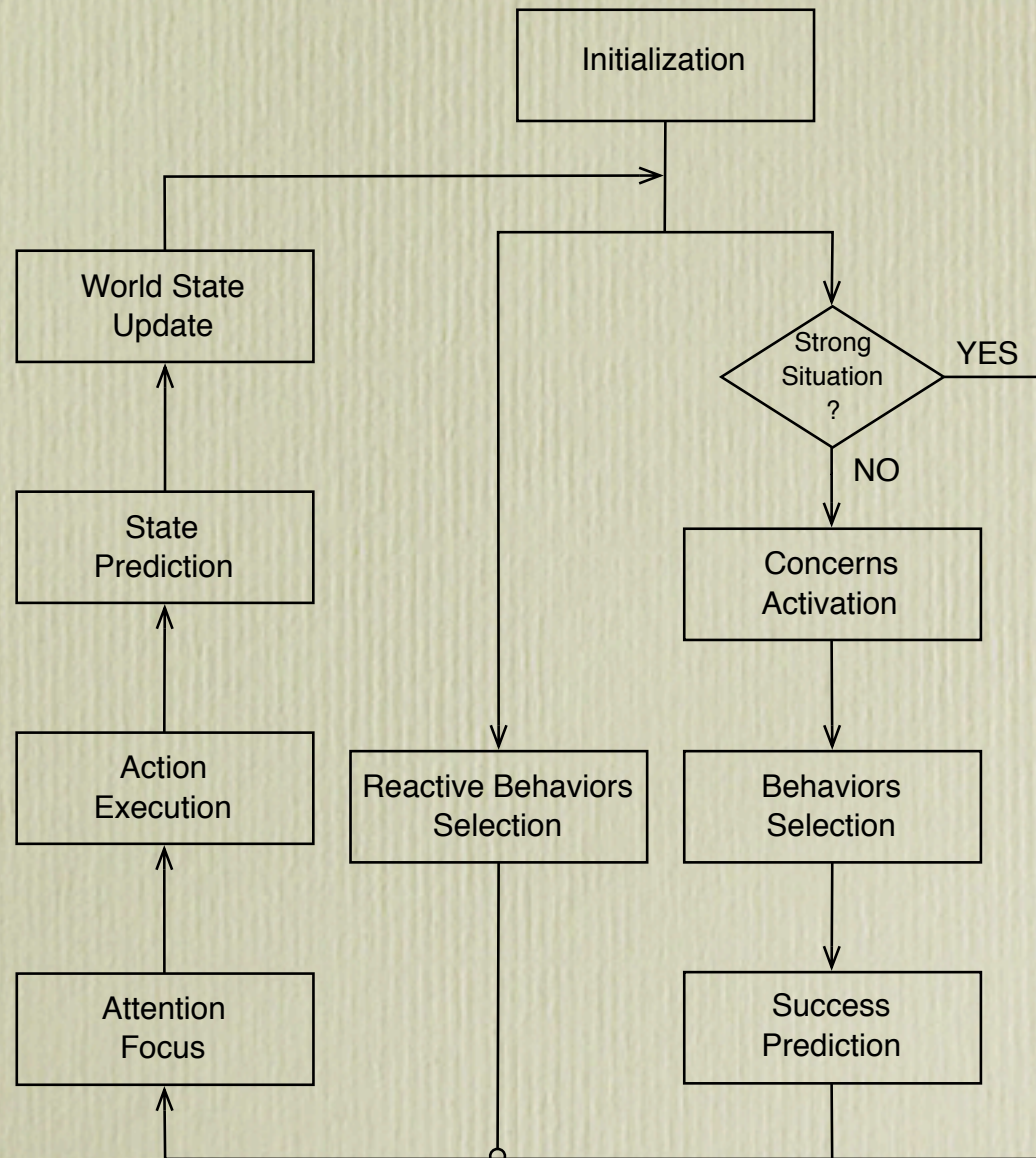
Cognitive Variables



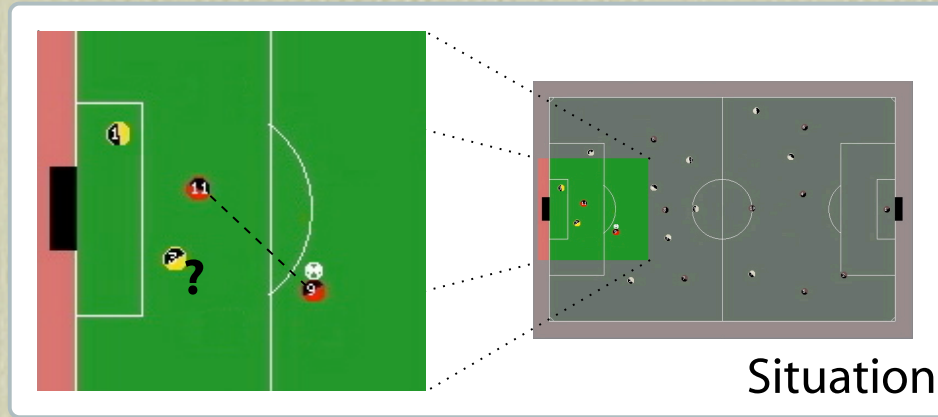
Operational Architecture



Decision Making




Example



Player 3a

	CONCERNS	IMP.
●	IHaveBall	33
●	MyTeamHasBall	24
●	DistBasePosition > d_{min}	7
●	Stamina > s_{min}	0
	...	


DELIBERATIVE BEHAVIORS	UTIL.
CutPassLine	3
MarkOpponentWithBall	2
ThreatInterception	1



Player 3b

	CONCERNS	IMP.
●	Stamina > s_{min}	27
●	MyTeamHasBall	23
●	DistBasePosition > d_{min}	17
●	IHaveBall	10
	...	

DELIBERATIVE BEHAVIORS	UTIL.
DefendMyGoal	3
MarkMostDangerousOpponent	2
ThreatInterception	1



Personality in ISTEam



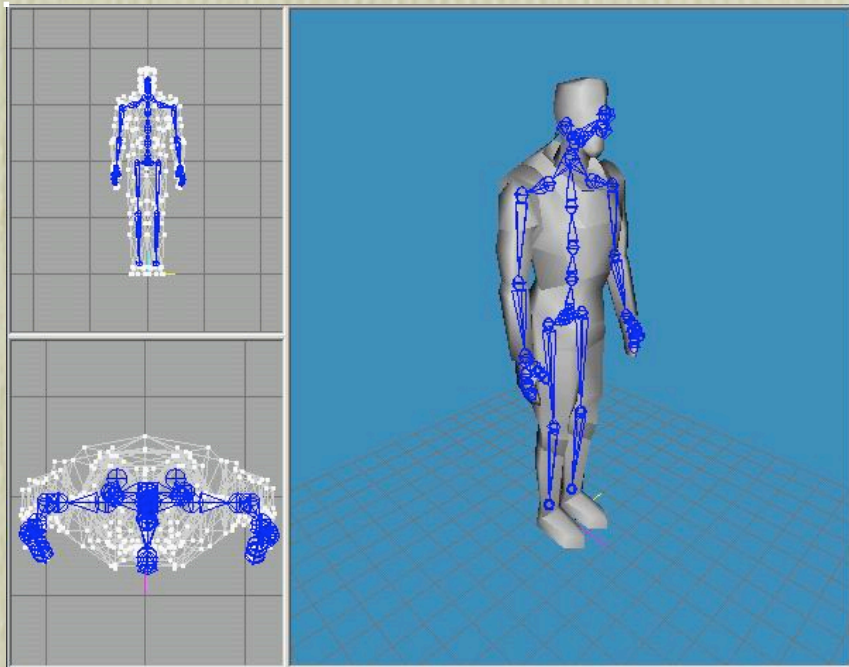
RA₃DM

Overview

- Implementation in OpenGL
- Realistic animation features
- Impressive special effects
- High-speed rendering
- Applications
 - Sensor fusion
 - Markov localization

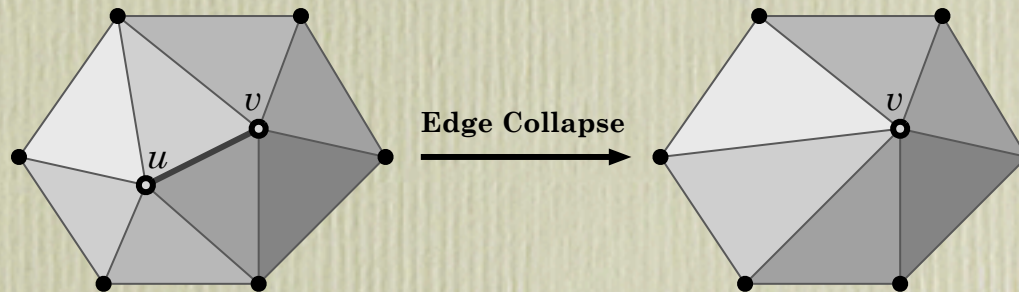
Player

- Skeletal animation system
- Player can walk, run and kick
- Keyframe interpolation techniques



Levels of Detail

- Polygon simplification based on Hughes Hoppe's progressive mesh work
- Operator vertex collapse



- Player

	Vertices	Triangles	Joints
Original model	347	639	42
Simplified model	68	130	42

Lens Flare



Particle Systems



Conclusions and Future Work

- ISTeam
 - Finish the implementation of the presented architecture
 - Incorporate some ideas from *Emotion Theories*
- RA₃DM
 - Sound effects
 - Record games
 - Commenting system
 - Windows version