

# Primary Introduction

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Project  
**Dynamic Modeling of  
Context in Control**

By:

Ramin Mehran

Advisors:

Professor Caro Lucas

Dr. Alireza Fatehi

# Contents

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- **What is the Context?**
- **Context-based systems**
  - Inspired from human mind
  - Communications, AI, and control?
    - Knowledge-based systems
- **Tools available**
  - BBS, RL, EL
- **Test-bed**

## Context: Definition

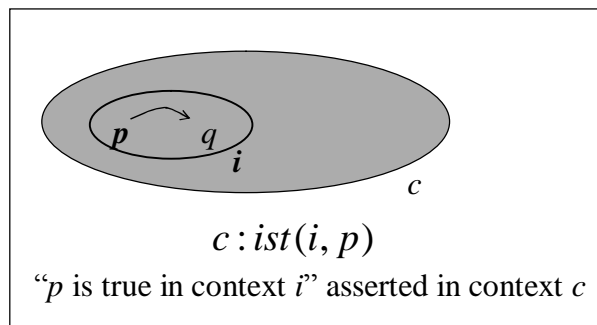
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- Concept from
  - Linguistics
    - Different meanings of a word
  - Cognitive Science
    - Unconscious
  - AI
    - Medical diagnosis
  - Machine Learning
    - Concept shift
  - Communications
    - Mobile phones

## Context: AI Definition (Cont.)

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- McCarthy's formulation (1972)
- Dartmouth Conference (1956)



## Context In Control

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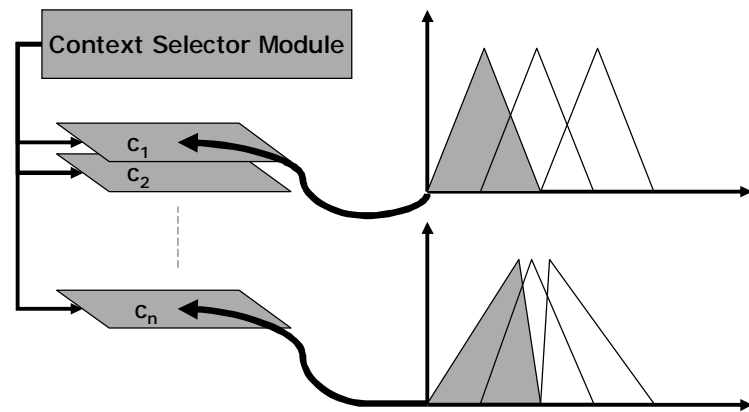
- Similar to Machine Learning
- Control changes as situations change
  - Supervisory control, Hybrid control
- Context-dependent fuzzy systems
- Context-based BBS
- Context main factors
  - Position
  - View point
  - Environment

## Control Architectures

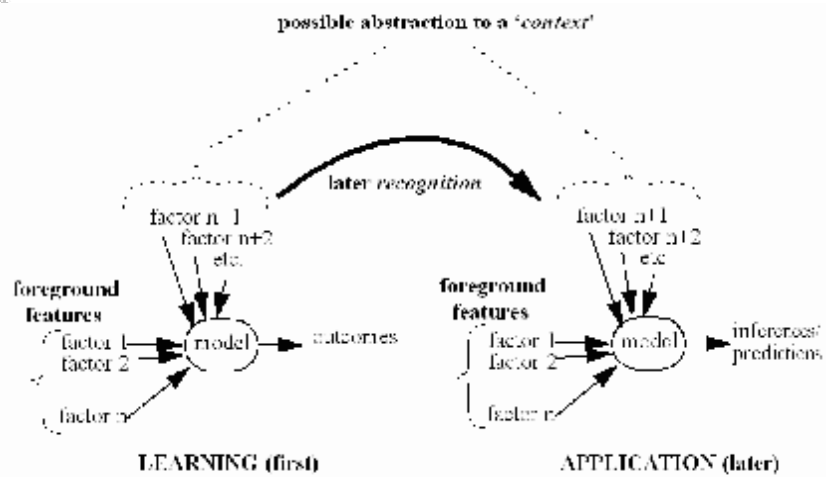
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- Static Context
  - First Learn then act accordingly
- Dynamic context
  - Learn, Categorize, Forget

## Fuzzy plus Context

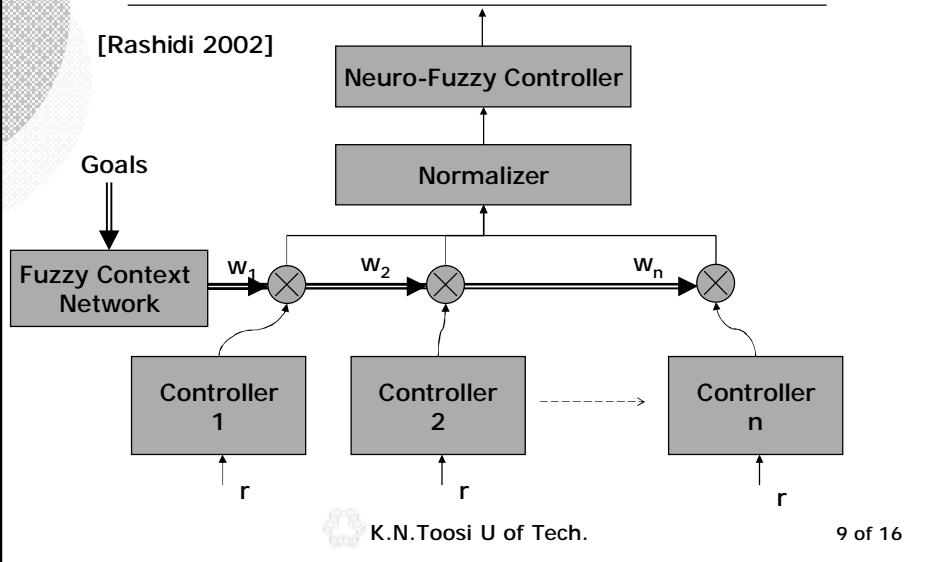


## Agent Based Context

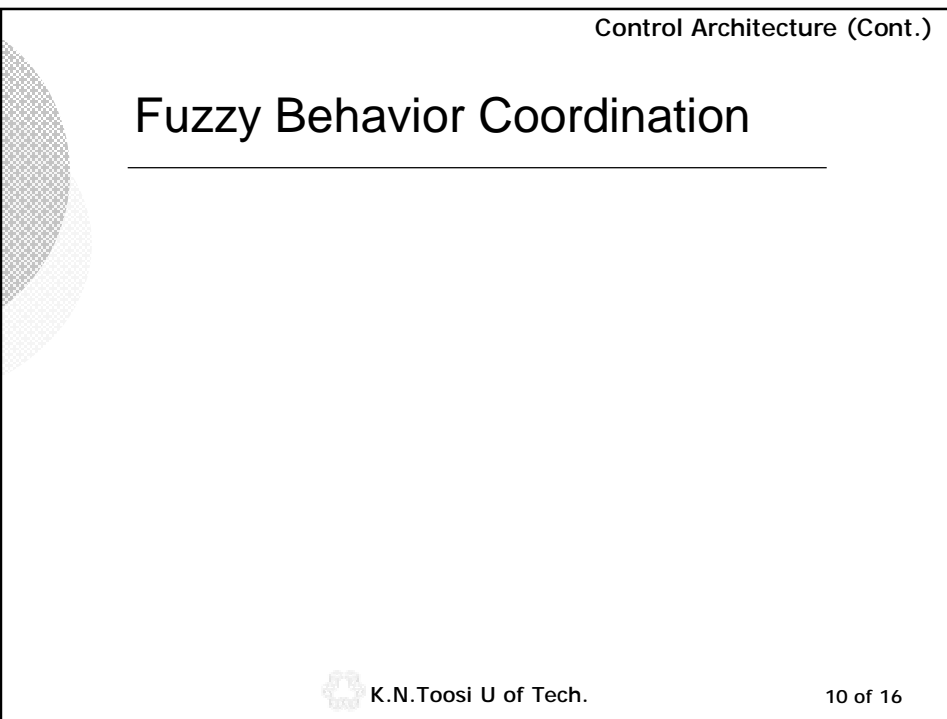


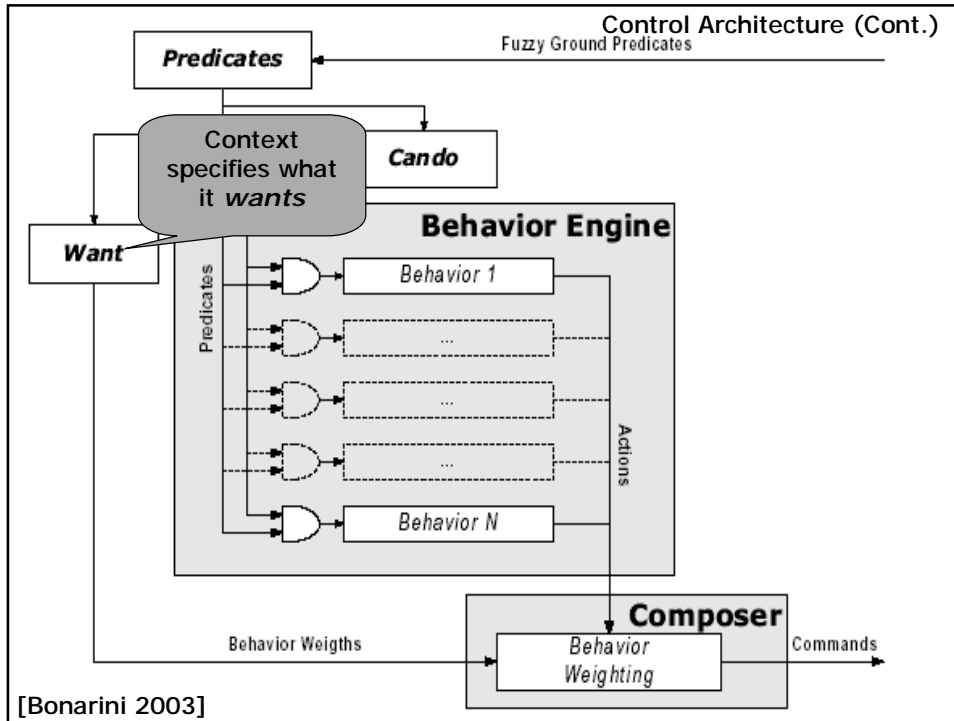
## Context-based Reinforcement Learning

[Rashidi 2002]



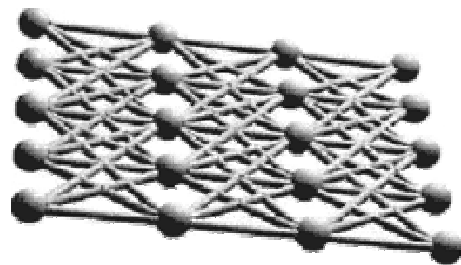
## Fuzzy Behavior Coordination





## Dynamic Context

- Genesis of context
- Classification in large space
- Connectionism Approach



## Tools

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- Reinforcement Learning
- Emotional learning
  - Cognitive model

## Test-Bed

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- Context main factors (recap)
  - Position
  - View point
  - Environment
- Multi-robot environment
  - Robocup simulation
  - Box pushing
  - Lifting
  - Foraging

## Summary

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- Context in control
- Dynamic context is the key
- Behavior based approach is the needed new paradigm
- Reinforcement and emotional learning as tools
- Multi robot simulation for evaluation

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**Thank you!**