

# Learning to Win: Case-Based Plan Selection in a Real-Time Strategy Game

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# Background

- Goal
  - Win a real time strategy game (e.g. Age of Empires).
  - WARGUS.

Menu (F10)

8,200

4,350

6,000

11/21

0



Grunt

Level 0

XP:0 Kills:0

Armor: 2

Damage: 1-9

Range: 1

Sight: 4

Speed: 10



You have 2 Grunts

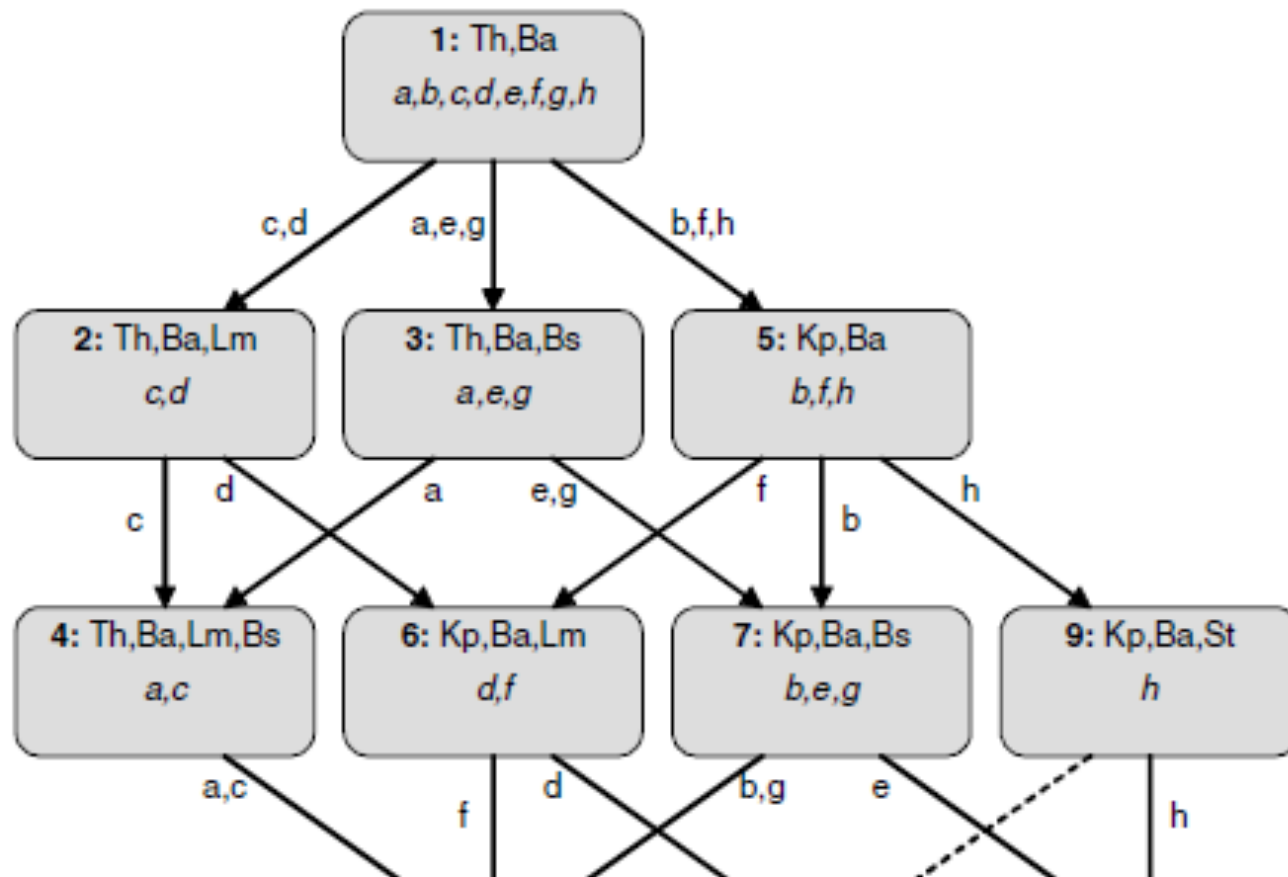
# Similar Work

- Ponsen and Spronk(2004)
  - Used genetic algorithms to create plans that can be used to play an opponent
- Assumption: **Fixed opponent**

# CAT

- Case Based Tactician
- Designed to be tolerant to opponents with differing strategies

- Retrieval
  - First: Learns by “Exploring” possible tactics
  - Then: Highest performance Cases
- Revision
  - Executes retrieved tactic in game engine
  - Evaluates results
  - Updates used cases performance after game
- Retention
  - Creates new cases
  - Doesn't delete cases



Th = Townhall  
 Ba = Barracks  
 Lm = Lumbermill  
 Bs = Blacksmith  
 Kp = Keep  
 St = Stables  
 Ca = Castle  
 Ap = Airport  
 Mt = Magetower  
 Tm = Temple

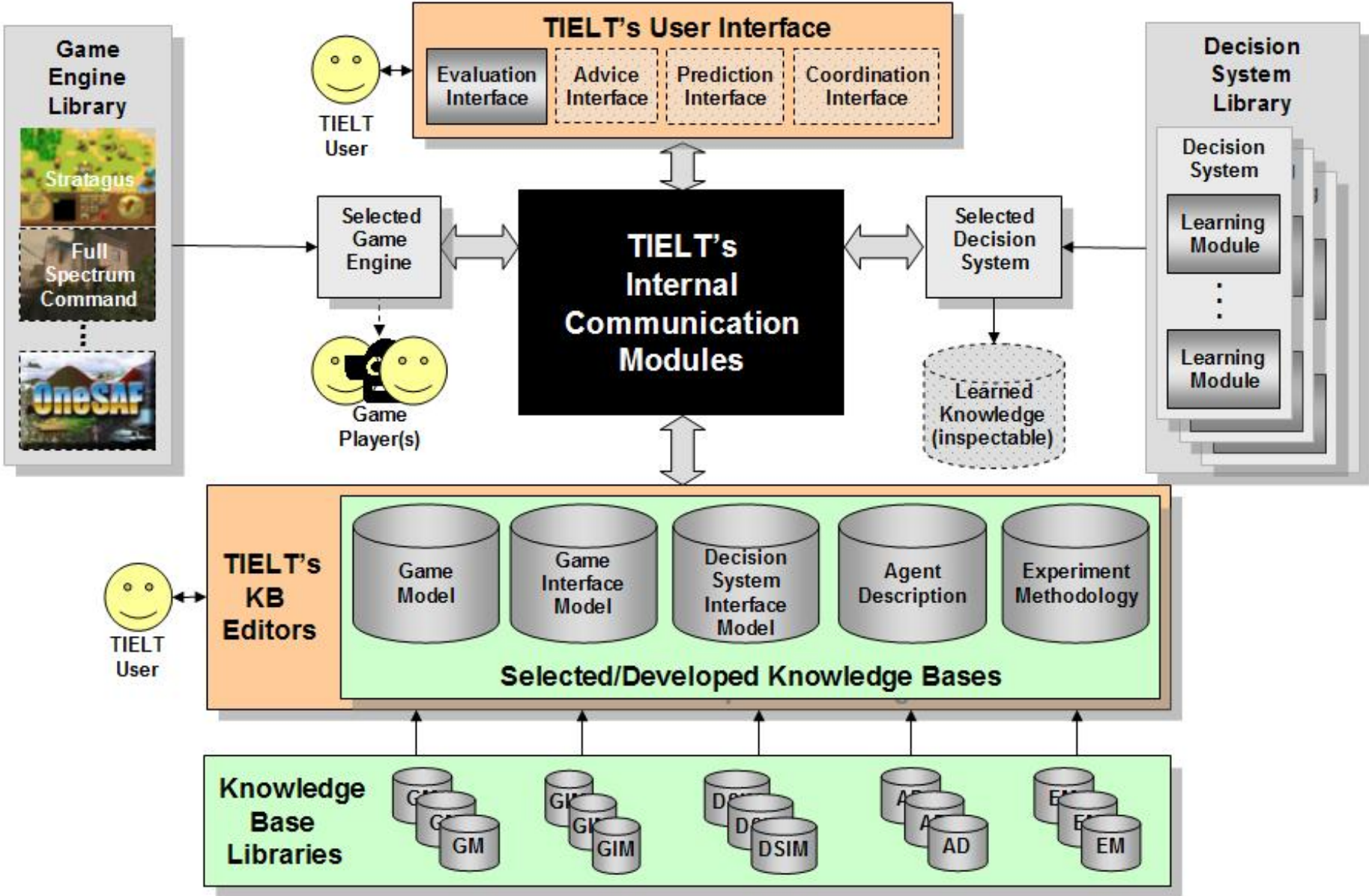
a = evolved\_SC1  
 b = evolved\_SC2  
 c = evolved\_SC3  
 d = evolved\_SC4  
 e = evolved\_SC5  
 f = evolved\_LBLA  
 g = evolved\_SR  
 h = evolved\_KR

# Game to AI Middleware

- TIELT
  - Testbed for integrating and evaluating decision systems with simulators
- Middleware



# TIELT: Integration Architecture



Average Exploration and Win Percentage (window size = 25 games)

