



Role of Pattern Recognition in Computer Games

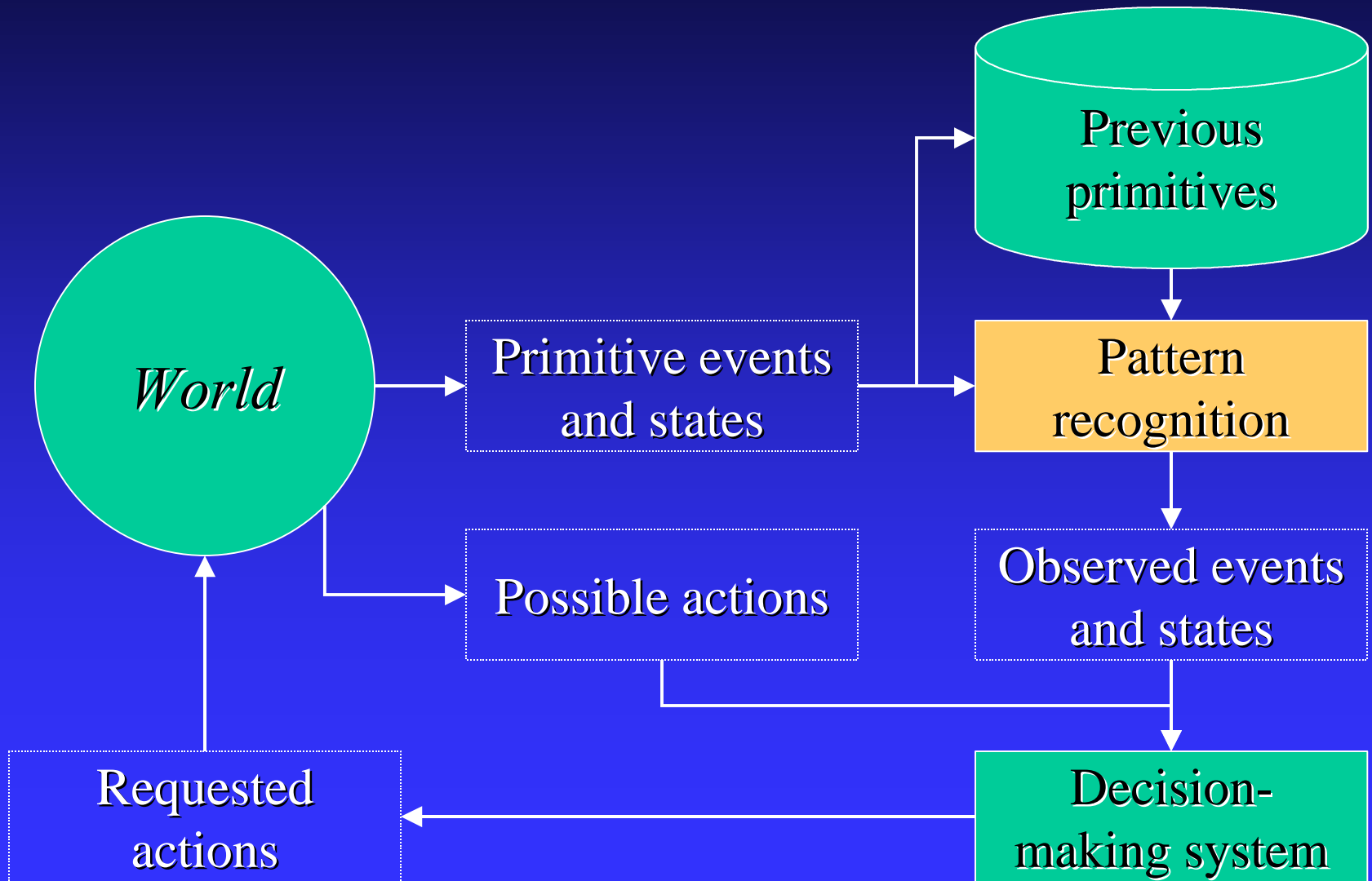
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Overview



PR = pattern recognition
CG = computer game

Views to PR in CGs

Or: A Ragbag of Ramblings

■ motivation

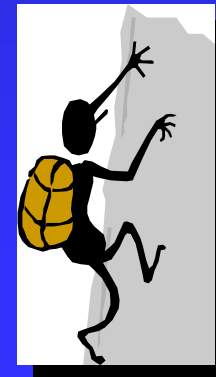
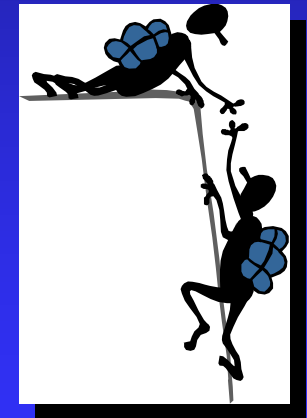
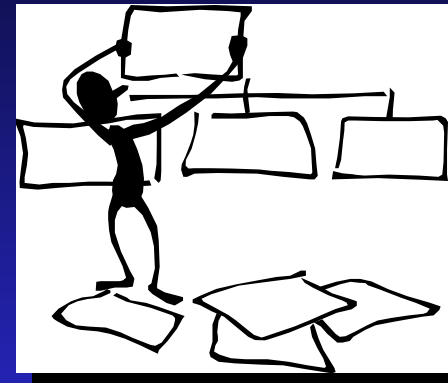
- ◆ where PR can be applied
- ◆ what are its roles
- ◆ what is expected from it

■ views

1. Level of Decision-Making
2. Stance Towards the Player
3. The Challenge of Story Generation
4. Prediction and Production

1. Level of Decision-Making

- **strategical**
 - ◆ what should be done
- **tactical**
 - ◆ how to actuate it
- **operational**
 - ◆ how to carry it out





Strategical Level

- long-term decisions
 - large amount of data, which is filtered to bring forth the essentials
 - speculative (What-If scenarios)
 - done off-line or in the background
 - the cost of a wrong decision is high
- high-quality but possibly slow PR methods



Tactical Level

- medium-term decisions
- selected set of data, which must be scrutinized
- considers a group of entities and their cooperation

→ aggregating and on-line PR methods



Operational Level

- short-term decisions
- data is concrete and closely connected to the game world
- the cost of a wrong decision is relatively low

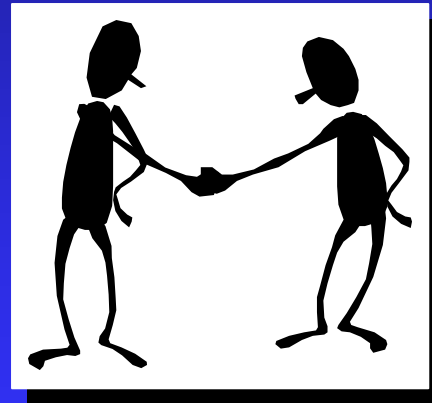
→ reactive real-time PR methods

2. Stance Towards the Player

■ enemy



■ ally



■ neutral

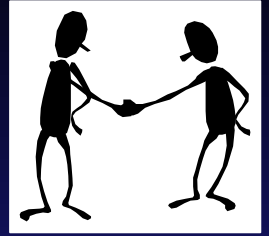


Enemy



- provides challenge
 - must demonstrate intelligent (or at least purposeful) behavior
- PR methods to aid computer's decision-making

Ally



- augmenting the user interface
 - ◆ hints and guides
- aiding the human player
 - ◆ reconnaissance officer
 - ◆ teammates

→ PR methods from the human point of view

Neutral



- commentator
 - ◆ highlighting events and providing background information
- camera director
 - ◆ choosing camera views and angles
- referee
 - ◆ judging the rule violations

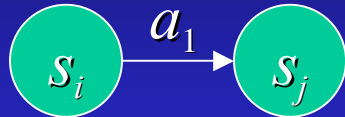
→ PR depends on the context and conventions

3. The Challenge of Story Generation

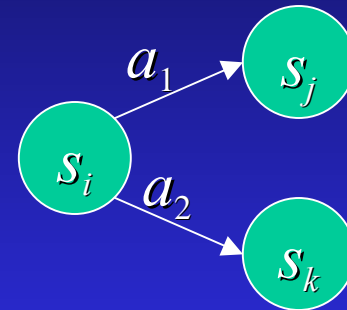
- game: in a given situation the player has a set of actions to choose from
- open game world
 - ◆ the range of possible actions is wide
 - ◆ the player can choose freely
- simulation is an obvious implementation
- however, simulation \neq game
 - ◆ games are goal-oriented!

Progression as a Graph

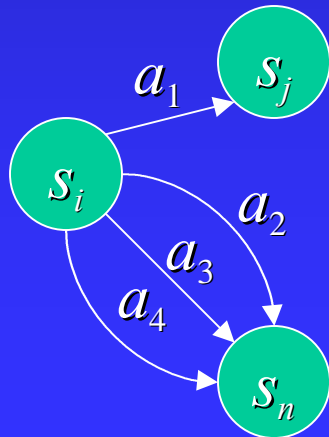
Linear



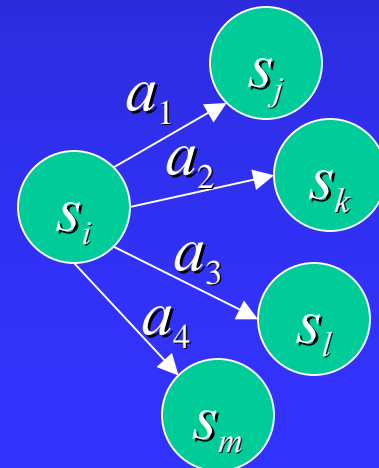
Forking



Conjoining



Unfolding

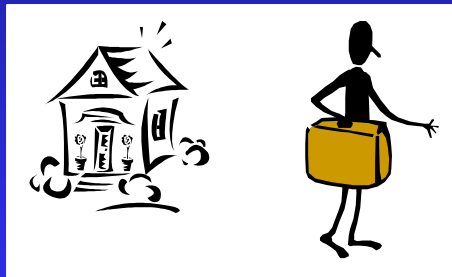


Embedding a Story into a CG

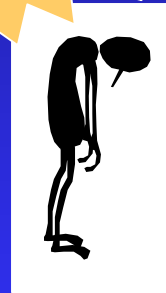
- nowadays
 - ◆ usually linear progression
 - ◆ freedom only between fixed entry points
 - story-generating program must observe
 - ◆ the current situation
 - ◆ the game history
 - ◆ the players' reactions
- hey, this is PR!

Let's Tell a Story

I have a quest.



Robbery



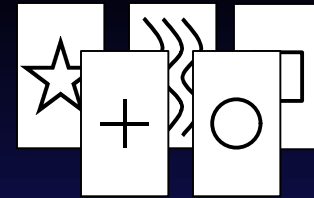
I'm lost.

Here's a hint!

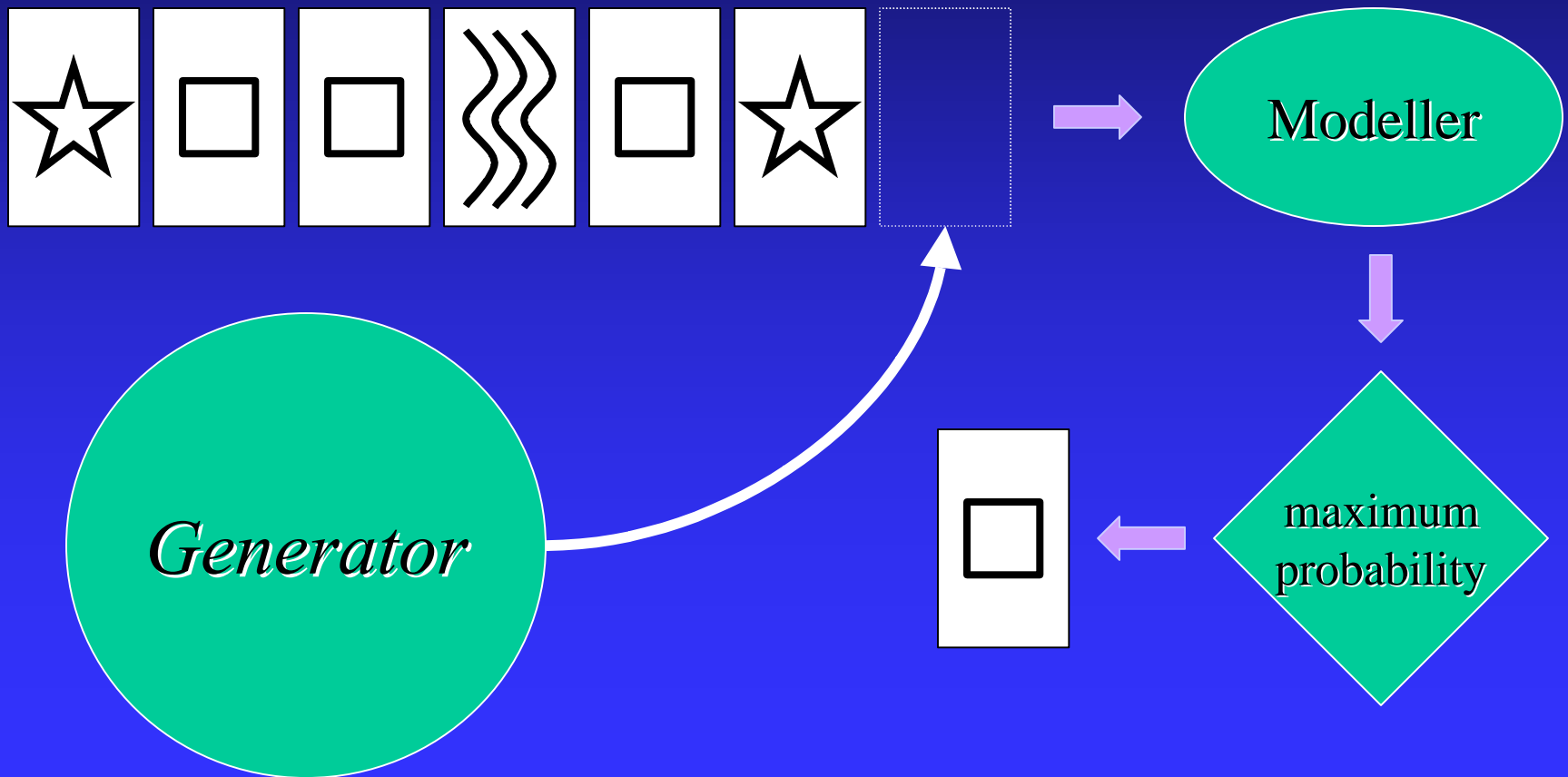


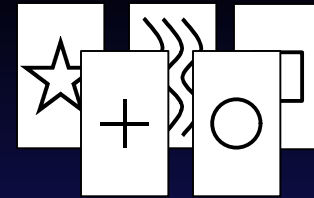
4. Prediction and Production

- time series data
- world = a generator of events and states, which can be labeled
- prediction
 - ◆ what the generator will produce next?
 - ◆ PR over time
- production
 - ◆ simulating the output of the generator
 - ◆ utilizes prediction

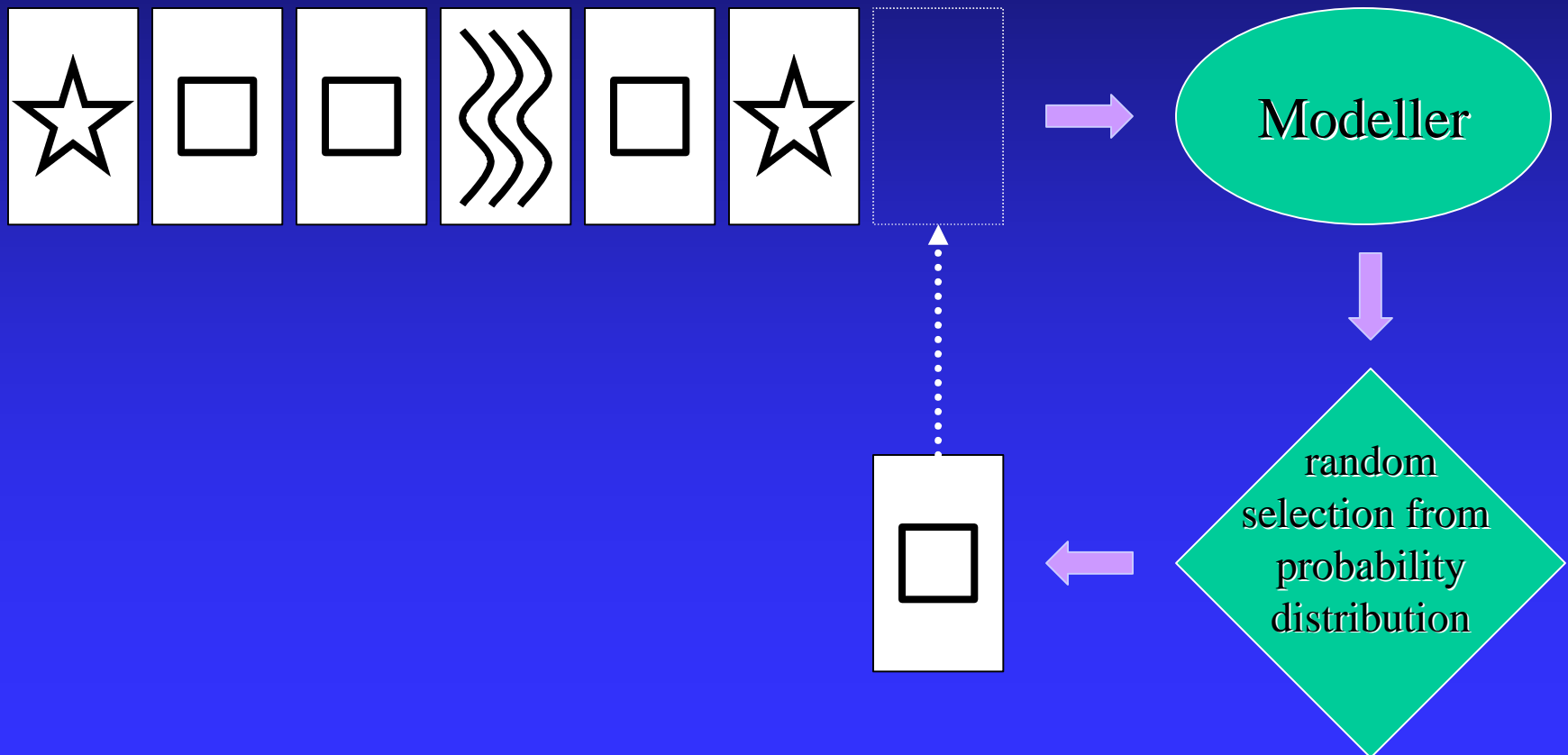


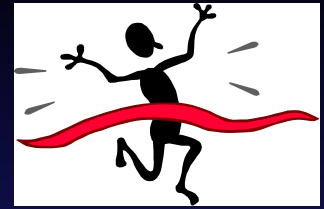
Prediction





Production





Conclusion

- this has been PR on PR
- PR has different roles in a CG
- implementation depends on the role
 - ◆ source data
 - ◆ time demand
 - ◆ quality of result
 - ◆ end-user (human or computer)
- for humans games are all about PR — why not for computers too