

Composing Business Processes with Partial Observable Problem Space in Web Services Environments

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Context

Gartner predicts that SOA will be used in some parts of more than 50% of new, mission-critical applications and business processes designed in 2007 and in more than 80% by 2010.

Web Service Composition (WSC) is a difficult and important requirement for the success of e-business.

The search space for WSC is large and the constraints for WSC are complex.

Many researches consider Web Service Composition problems as AI planning problems.

Motivating Example

- ❖ John & Sam want to travel from Fredericton to Chicago
 - Possibly leave on Saturday and return on the following Friday. (The date is flexible depending on the price of flight ticket and hotel)
 - Stay five days in a hotel in Chicago
 - Rent a car for five days in Chicago
- ❖ They are free on Thursday afternoon, so they plan to:
 - Take the boat tour together if the weather is good
 - Go to see a movie and find a restaurant for dinner if the weather is bad
- ❖ Constraints:
 - The date of booking a hotel and renting a car depends on the flight ticket
 - The order of having dinner and watching movie depends on the price of the movie
 - Choose Air Canada and Delta hotel together will get 10% discount
 - They want the total cost of all activities as low as possible

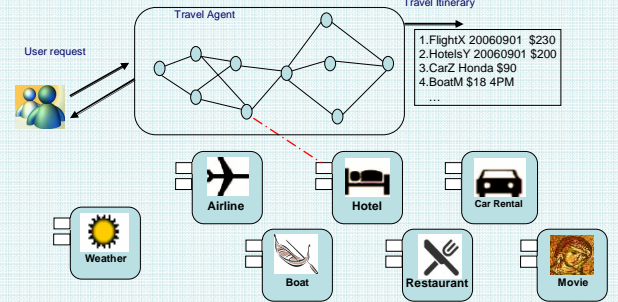
Our Approach — GA-Planner

Integrate Genetic Algorithm (GA) and AI Planning.

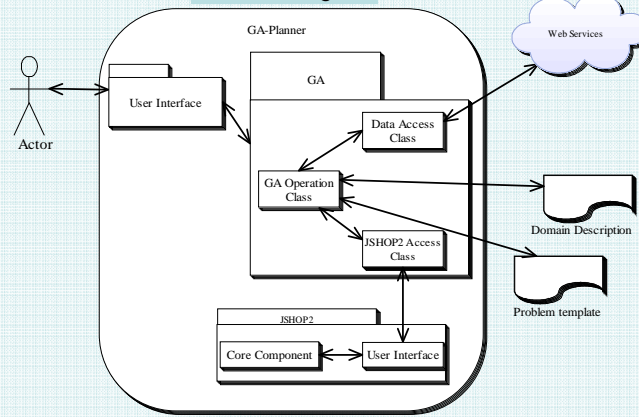
GA helps to navigate in the large search space and build sub space from the return information by querying Web services.

Planner evaluates the sub spaces, generates the solutions from the sub spaces, guides GA in the search through fitness value.

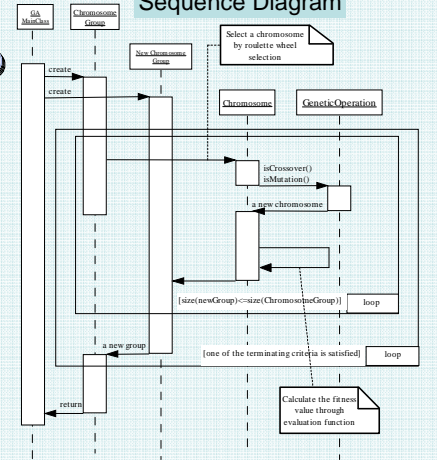
User can schedule his travel plan by an agent using Web services



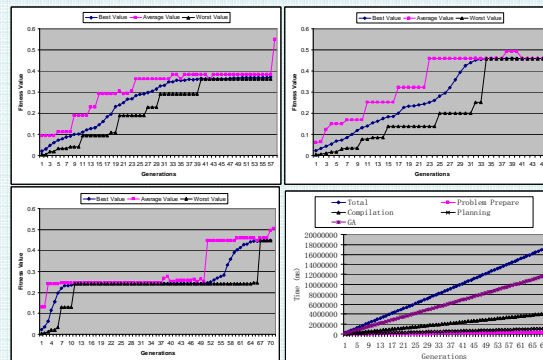
Context Diagram



Sequence Diagram



Experiment



Conclusion and Future work

- ❖ Presents a method to solve the WSC problem
 - Problem space partially observed
 - GA helps to navigate the search in the incompletely observed problem space
 - Planner as a tool to evaluate a solution
- ❖ Future work
 - Improve the search efficiency
 - Multi-Dimension fitness value
 - Map the result to an executable process