Distributed Artificial Intelligence and Intelligent Agents (ID2209): Project assignment

KIM HAMMAR, STOCKHOLM 16446

kimham@kth.se

I. Introduction

The requirements statement is essentially just a set of articulated requirements for the system/organization to be designed, for structural reasons the requirements are divided into various related models that use different levels of detail. The system in this context is a SmartMuseum Agent Framework, as of following the GAIA methodology [1] I will from here on frequently use the *organization* metaphor when referring to the system.

II. TASK 1 - MODELING WITH GAIA METHDOLOGY

I. Analysis

I.1 Requirements Statement

I.1.1 Mission Statement

The SmartMuseum organization has the purpose of connecting different people and entities that are in some sense involved in consuming or providing services related to art. The goal of the organization is to improve the overall experience for everyone involved. The organization should make it easier for consumers to view and find interesting art, for art-curators to provide art and reach out to consumers, for tourguides to find interested consumers as well as building relevant tours and finally for artists to sell their work.

I.1.2 Organization Description

The activity of a consumer viewing an art-artifact involves atleast three, sometimes four, or five main divisions: tour-guide division, art-curator division, artist-management division, user-service division and artist-division. The activity is initiated by the consumer who contacts the user-service division and selects some type of art-service, the user-service division support the consumer in requesting/retrieving the service from either the art-curator division or tour-guide-division. In parellel to managing consumer requests the tour-guide division browses art-artifacts that is curated by the art-curator division. Further more, the art-curator divison participates in auctions for obtaining art-artifacts from the artist-management division, in parallel to managing requests from consumers and tourguides. Finally, the artist-management division initiates auctions for art-artifacts on request from artists.

The activities described above can the be modelled as an organization in the following way. The organization consists of 8 roles. The ArtConsumer who consumes arts in different forms. The UserHandler which the consumer uses to purchase and browse services for art-artifacts. The

TourGuideAdvertiser which presents and attempts to sell virtual tours. The TourGuideBuilder which constructs a virtual tour of arts by retrieving arts matching some given preferences. The ArtBuyer who buys art to include in its gallery/museum. The ArtSeller who sells art-artifacts. The ArtAdvertiser who promotes the curated artifacts to be included in virtual tours, visisted directly by consumers or sold. And finally the Artist who produces art.

I.2 Roles Model

Assumption 1-A. Roles can find each other in some way in order to communicate

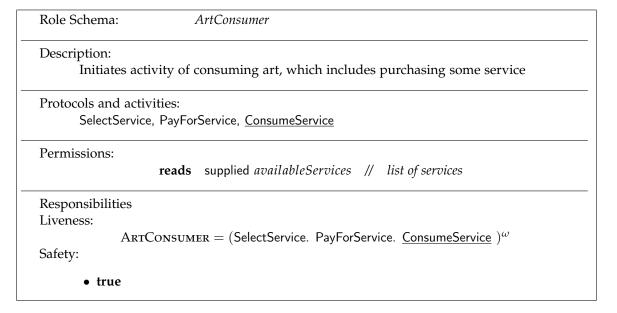


Figure 1: Schema for role ARTCONSUMER

```
UserHandler
Role Schema:
Description:
       Receives request to buy art-services from consumers and manages the process of the
       consumer purchasing and obtaining the service.
Protocols and activities:
      SelectService, PayForService, BuyArt, BuyVirtualTour, GetArtifacts,
       GetPublishedVirtualTours, GenerateListOfArtServices
Permissions:
                             available Services
                                                               // list of services
                generates
                                                                  list of published virtual tours
                reads
                             supplied publishedVirtualTours //
                             supplied artifacts
                                                              // list of art-artifacts
Responsibilities
Liveness:
              UserHandler = (All)^{\omega}
              All = (GetServices. GenerateListOfArtServices. UserInteraction. Service)^{\omega}
              UserInteraction = SelectService. PayForService
              GetServices = GetArtifacts. GetPublishedVirtualTours
              Service = BuyArt | BuyVirtualTour
Safety:
       ullet availableServices = artifacts + publishedVirtualTours
```

Figure 2: Schema for role UserHandler

```
Role Schema:
                               TourGuideAdvertiser
   Description:
          Presents virtual tours to potential buyers and sells tours.
   Protocols and activities:
          PublishVirtualTour, RetrieveVirtualTour
Permissions:
                                       publishedVirtualTour
                                                                   // published description of tour
                         generates
                         reads
                                       supplied virtualTours
                                                                   // list of virtual tours
   Responsibilities
   Liveness:
                  TourGuideAdvertiser = ([PublishVirtualTour] || RetrieveVirtualTour)^{\omega}
   Safety:
           • publishedVirtualTour \implies \exists \{x \in virtualTours \mid x \equiv publishedVirtualTour\}
```

Figure 3: Schema for role TourGuideAdvertiser

```
Role Schema:
                               TourGuideBuilder
   Description:
          Responsible for constructing virtual tours of art-artifacts. Looks up available
          artifacts at curators and then builds different types of tours.
   Protocols and activities:
          GetArtifacts, BuildVirtualTour
Permissions:
                                       virtualTour
                                                           // virtual tour of art-artifacts
                        generates
                        reads
                                       supplied artifacts // list of artifacts
   Responsibilities
   Liveness:
                  TourGuideBuilder = (GetArtifacts. BuildVirtualTour)^{\omega}
   Safety:
           • \forall virtual Tour.artifact virtual Tour.artifact \in artifacts
```

Figure 4: Schema for role TourGuideBuilder

Role Schema:	ArtBuyer	
Description: Buys art-a	rtifacts.	
Protocols and act BuyArt	ivities:	
Permissions:	generates artifacts	// list of purchased artifacts
Responsibilities Liveness: $ \text{ArtBuyer} = (\text{BuyArt}\)^{\omega} $ Safety:		
• true		

Figure 5: Schema for role ARTBUYER

Role Schema:	ArtSeller		
Description: Sells art-artifacts.			
Protocols and activities: SellArt			
Permissions: read	artifacts // list of artifacts		
Responsibilities			
Liveness: $ \text{ArtSeller} = (\text{SellArt}\)^{\omega} $ Safety:			
• true			

Figure 6: Schema for role ArtSeller

Role Schema: ArtAdvertiser

Description:
 Advertises art, responds to queries of arts

Protocols and activities:
 GetArtifacts

Permissions:

read artifacts // list of artifacts

Responsibilities
Liveness:
 GetArtifacts = (GetArtifacts)^ω

Safety:

• true

Figure 7: Schema for role ARTADVERTISER

II. Design

REFERENCES

[1] Michael Wooldridge, Nicholas R. Jennings, and David Kinny. The gaia methodology for agent-oriented analysis and design. *Autonomous Agents and Multi-Agent Systems*, 3(3):285–312, September 2000.