

USC Ground Truth Documentation

October 6, 2018

Contents

1 Background

We use influence diagrams as the underlying graph structure for our ground truth. Here is a simple influence diagram for a simulation of two actors, showing the three types of nodes and some possible links (always directed) among them:

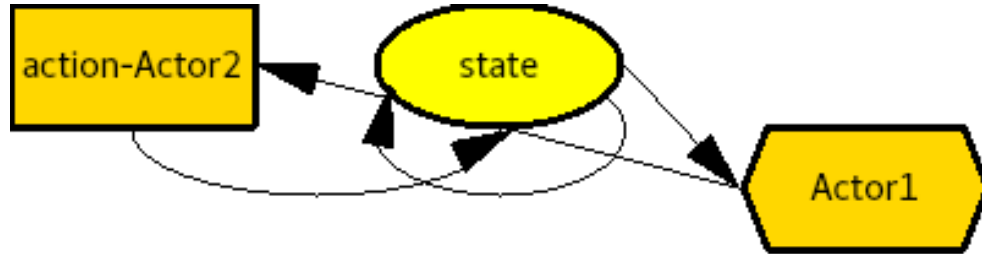


Figure 1: Simple influence diagram

- Rectangular nodes are possible actions for a particular agent (“Actor 1”, indicated by color) representing a potential behavior. They are labeled with a verb (“action”) and an optional object of the verb (“Actor2”). An action node has a binary value, indicating whether or not the action was chosen.
- Oval nodes are state variables. Their value is potentially a probability distribution over a domain of possible values. All true state variables will be certain (i.e., 100% probability for a single value), but agents’ perceptions of the true state will often be uncertain.
- Hexagonal nodes are utility or reward nodes. They represent an expected value computation by the agent (“Actor1”). The node’s value is a table with each row corresponding to a possible action choice and its expected utility.
- Links from action nodes to state nodes specify an effect that the action has on the value of the state. In the following specifications of these effects, a variable name followed by a ‘ will denote the value of the variable after the action is performed.
- Links from one state node to another specify an influence that the value of the first state node has on the effect of at least one action on the second state node.
- Links from a state node to an agent’s utility node specify that the state node is an input to the expected value calculation performed by that agent. There is a real-valued weight from $(0,1]$ on each link specifying the priority of that variable’s influence on that agent’s reward calculation (higher values mean higher priority).
- Links from utility nodes to action nodes indicate that the expected value calculation then determines whether or not that action is chosen. In the simulations described here, we use a strict maximization, so that the action choice is deterministic (i.e., the action with the highest expected value is performed, with ties broken by a pre-determined fixed order).
- Therefore, in the above simple ground truth, whether or not “Actor1” chooses to do “action” to “Actor2” influences the subsequent value of the variable “state” (link from rectangle to oval). The subsequent value of “state” also depends on its prior value (link from oval to itself). “Actor1”’s expected value of doing “action” to “Actor2” is a function of the value of “state” (link from oval to hexagon), and this expected value influences whether or not “Actor1” chooses to do so (link from hexagon to rectangle).

Any real values (e.g., initial values of variables, conditional probability table values, reward weights) will be drawn from either a set $\{0, 0.5, 1\}$ or $\{0, 0.2, 0.4, 0.6, 0.8, 1\}$, depending on the appropriate granularity needed.

2 State

2.1 Actor's age

Type: Integer

psychsim/domains/groundtruth/actor.py:66

2.2 Actor's alive

Type: Boolean

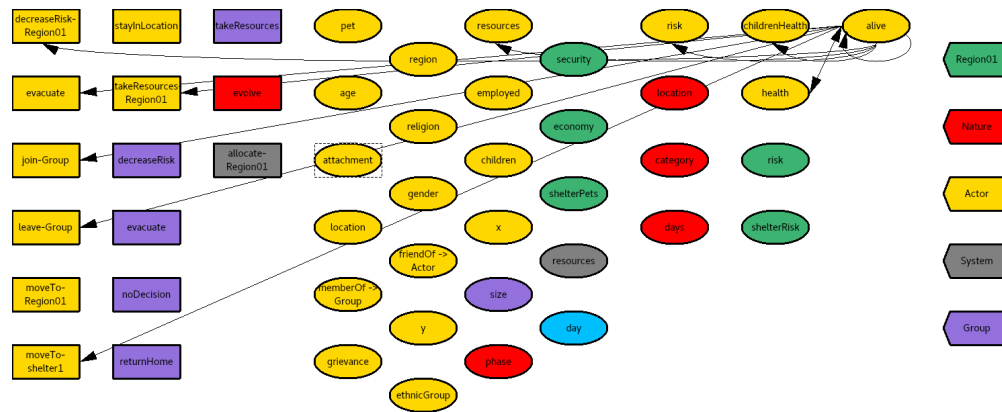


Figure 2: Ground Truth subgraph for Actor's alive

psychsim/domains/groundtruth/actor.py:190

2.2.1 Default change in Actor's alive

psychsim/domains/groundtruth/actor.py:464

IF Actor's alive

THEN : IF Actor's health' > 0.01

THEN : Actor's alive' ← true

ELSE : Actor's alive' ← false

ELSE : Actor's alive' ← Actor's alive

2.3 Actor's attachment

Attachment style

Type: String

Values: anxious, avoidant, secure

psychsim/domains/groundtruth/actor.py:101

2.4 Actor's category

Type: Integer

psychsim/agent.py:1133

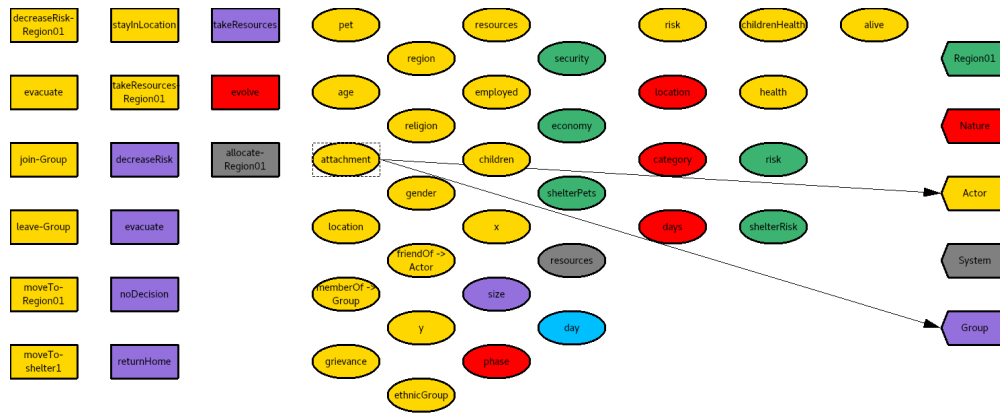


Figure 3: Ground Truth subgraph for Actor's attachment

2.5 Actor's center

Type: String

Values: Region01, none

psychsim/agent.py:1133

2.6 Actor's children

Number of children

Type: Real

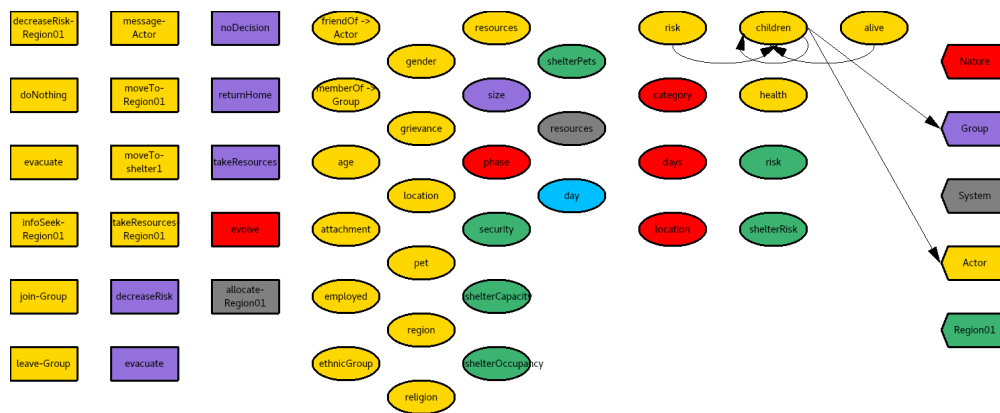


Figure 4: Ground Truth subgraph for Actor's children

psychsim/domains/groundtruth/actor.py:75

2.7 Actor's childrenHealth

Current level of children's physical wellbeing

Type: Real

psychsim/domains/groundtruth/actor.py:212

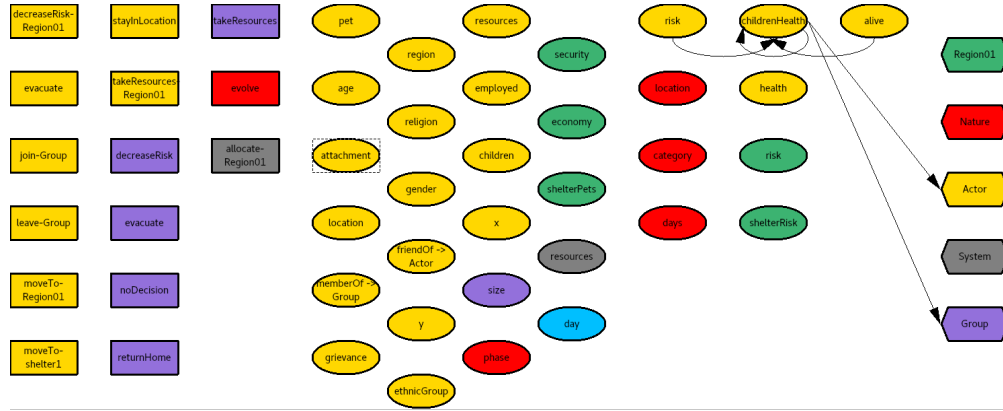


Figure 5: Ground Truth subgraph for Actor's childrenHealth

2.7.1 Default change in Actor's childrenHealth

psychsim/domains/groundtruth/actor.py:455

IF Actor's alive

THEN : IF Actor's risk' ∈

[0,0.2]: Actor's childrenHealth' ← 60%·Actor's childrenHealth+0.24

(0.2,0.4]:

20%: Actor's childrenHealth' ← 60%·Actor's childrenHealth

80%: Actor's childrenHealth' ← 60%·Actor's childrenHealth+0.24

(0.4,0.6]:

40%: Actor's childrenHealth' ← 60%·Actor's childrenHealth

60%: Actor's childrenHealth' ← 60%·Actor's childrenHealth+0.24

(0.6,0.8]:

60%: Actor's childrenHealth' ← 60%·Actor's childrenHealth

40%: Actor's childrenHealth' ← 60%·Actor's childrenHealth+0.24

(0.8,1.0]:

80%: Actor's childrenHealth' ← 60%·Actor's childrenHealth

19%: Actor's childrenHealth' ← 60%·Actor's childrenHealth+0.24

(1.0,1]:

100%: Actor's childrenHealth' ← 60%·Actor's childrenHealth

0%: Actor's childrenHealth' ← 60%·Actor's childrenHealth+0.24

ELSE : Actor's childrenHealth' ← 0.00

2.8 Actor's days

Type: Integer

psychsim/agent.py:1133

2.9 Actor's employed

Has a full-time job

Type: Boolean

psychsim/domains/groundtruth/actor.py:83

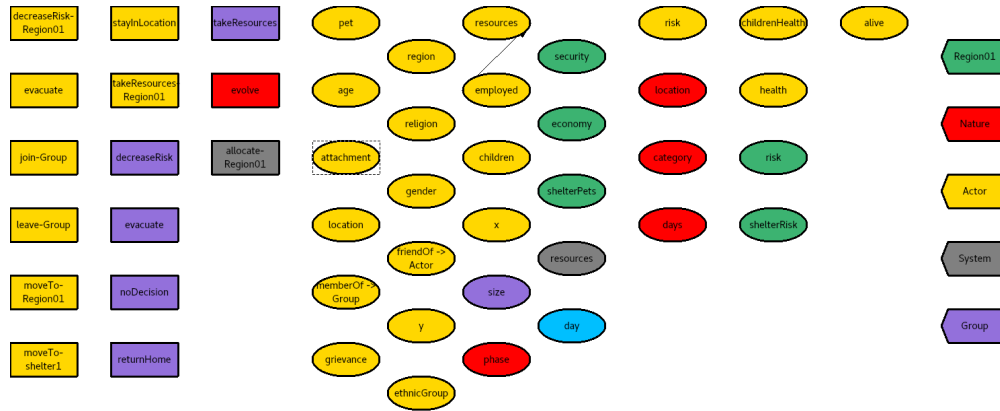


Figure 6: Ground Truth subgraph for Actor's employed

2.10 Actor's ethnicGroup

Ethnicity of actor

Type: String

Values: majority, minority

psychsim/domains/groundtruth/actor.py:39

2.11 Actor's gender

Type: String

Values: female, male

psychsim/domains/groundtruth/actor.py:58

2.12 Actor's grievance

Current level of grievance felt toward system

Type: Real

psychsim/domains/groundtruth/actor.py:248

2.13 Actor's health

Current level of physical wellbeing

Type: Real

psychsim/domains/groundtruth/actor.py:194

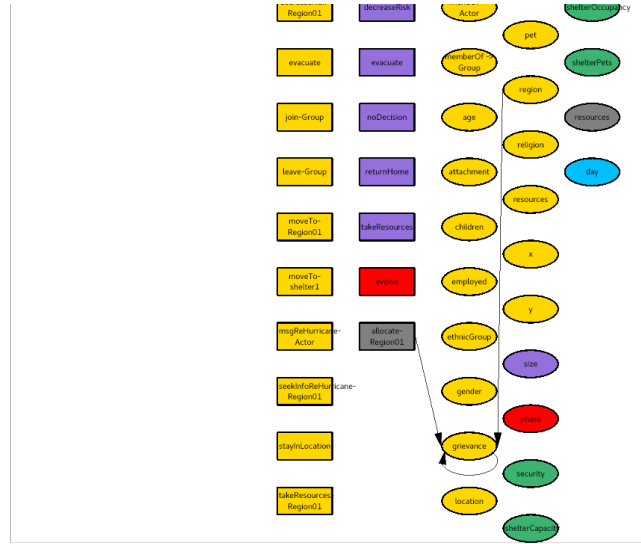


Figure 7: Ground Truth subgraph for Actor's grievance

2.13.1 Default change in Actor's health

psychsim/domains/groundtruth/actor.py:442

IF Actor's alive

THEN : IF Actor's risk' ∈

[0,0.2]: Actor's health' ← 60%·Actor's health+0.24

(0.2,0.4]:

20%: Actor's health' ← 60%·Actor's health

80%: Actor's health' ← 60%·Actor's health+0.24

(0.4,0.6]:

40%: Actor's health' ← 60%·Actor's health

60%: Actor's health' ← 60%·Actor's health+0.24

(0.6,0.8]:

60%: Actor's health' ← 60%·Actor's health

40%: Actor's health' ← 60%·Actor's health+0.24

(0.8,1.0]:

80%: Actor's health' ← 60%·Actor's health

19%: Actor's health' ← 60%·Actor's health+0.24

(1.0,1]:

100%: Actor's health' ← 60%·Actor's health

0%: Actor's health' ← 60%·Actor's health+0.24

ELSE : Actor's health' ← 0.00

2.14 Actor's location

Current location

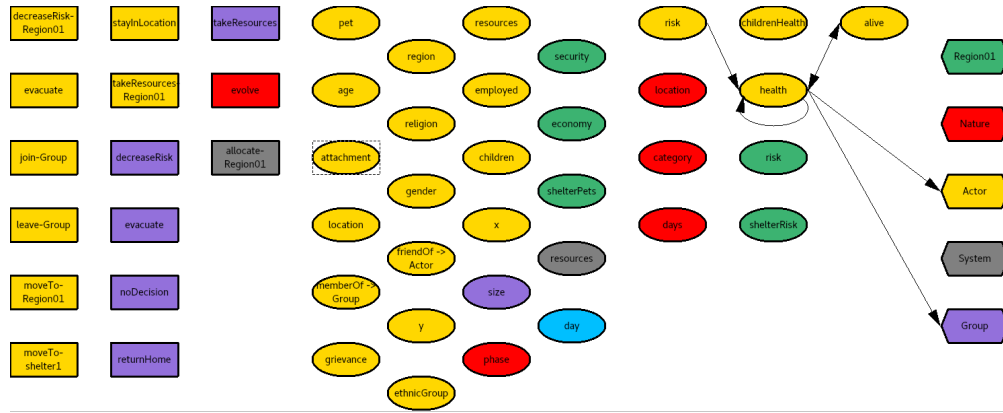


Figure 8: Ground Truth subgraph for Actor's health

Type: String

Values: Region01, evacuated, shelter1

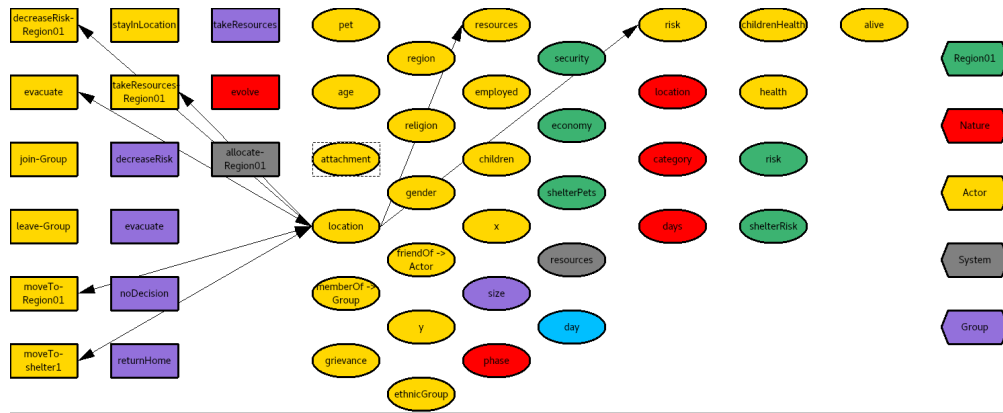


Figure 9: Ground Truth subgraph for Actor's location

psychsim/domains/groundtruth/actor.py:187

2.14.1 Effect of Actor-evacuate on Actor's location

psychsim/domains/groundtruth/actor.py:399

Actor's location' ← evacuated

2.14.2 Effect of Actor-moveTo-Region01 on Actor's location

psychsim/domains/groundtruth/actor.py:406

Actor's location' ← Region01

2.14.3 Effect of Actor-moveTo-shelter1 on Actor's location

psychsim/domains/groundtruth/actor.py:396

Actor's location' ← shelter1

2.15 Actor's perceivedChildrenHealth

Type: Real

psychsim/agent.py:1133

2.16 Actor's perceivedHealth

Type: Real

psychsim/agent.py:1133

2.17 Actor's pet

Owns a pet

Type: Boolean

psychsim/domains/groundtruth/actor.py:88

2.18 Actor's phase

Type: String

Values: active, approaching, none

psychsim/agent.py:1133

2.19 Actor's region

Region of residence

Type: String

Values: Region01

psychsim/domains/groundtruth/actor.py:150

2.20 Actor's religion

Religious affiliation of actor

Type: String

Values: majority, minority, none

psychsim/domains/groundtruth/actor.py:47

2.21 Actor's resources

Material resources (wealth) currently owned

Type: Real

psychsim/domains/groundtruth/actor.py:216

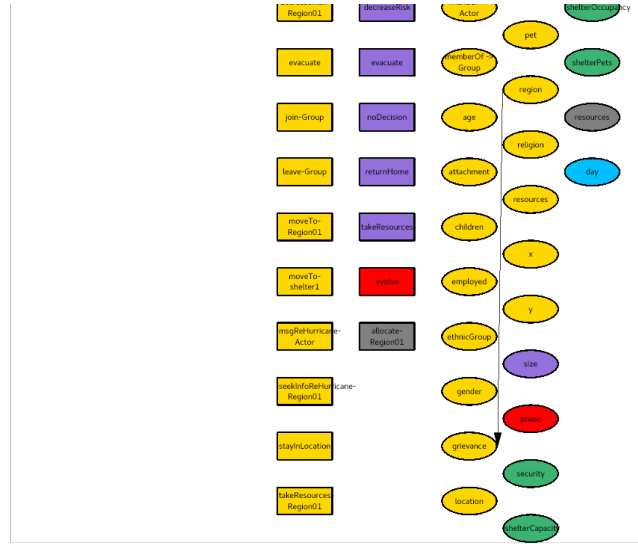


Figure 10: Ground Truth subgraph for Actor's region

2.21.1 Effect of Actor-evacuate on Actor's resources

psychsim/domains/groundtruth/actor.py:501

IF Actor's resources > 0.20

THEN : Actor's resources' \leftarrow Actor's resources - 0.20

ELSE : Actor's resources' \leftarrow 0.00

2.21.2 Effect of Actor-moveTo-Region01 on Actor's resources

psychsim/domains/groundtruth/actor.py:493

IF Actor's alive

THEN : IF Actor's employed

THEN : Actor's resources' \leftarrow 80% · Actor's resources + 0.20

ELSE : Actor's resources' \leftarrow Actor's resources

ELSE : Actor's resources' \leftarrow Actor's resources

2.21.3 Effect of Actor-stayInLocation on Actor's resources

psychsim/domains/groundtruth/actor.py:482

IF Actor's alive

THEN : IF Actor's employed

THEN : IF Actor's location = {'Region01', 'evacuated'}

THEN : Actor's resources' \leftarrow 80% · Actor's resources + 0.20

ELSE : Actor's resources' \leftarrow Actor's resources

ELSE : Actor's resources' \leftarrow Actor's resources

ELSE : Actor's resources' \leftarrow Actor's resources

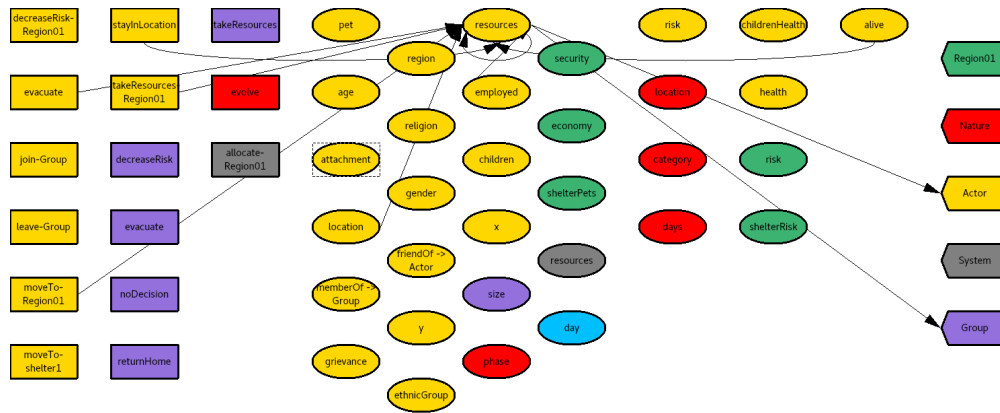


Figure 11: Ground Truth subgraph for Actor's resources

2.21.4 Effect of Actor-takeResources-Region01 on Actor's resources

psychsim/domains/groundtruth/actor.py:544

$\text{Actor's resources}' \leftarrow 80\% \cdot \text{Actor's resources} + 0.20$

2.22 Actor's risk

Current level of risk from hurricane

Type: Real

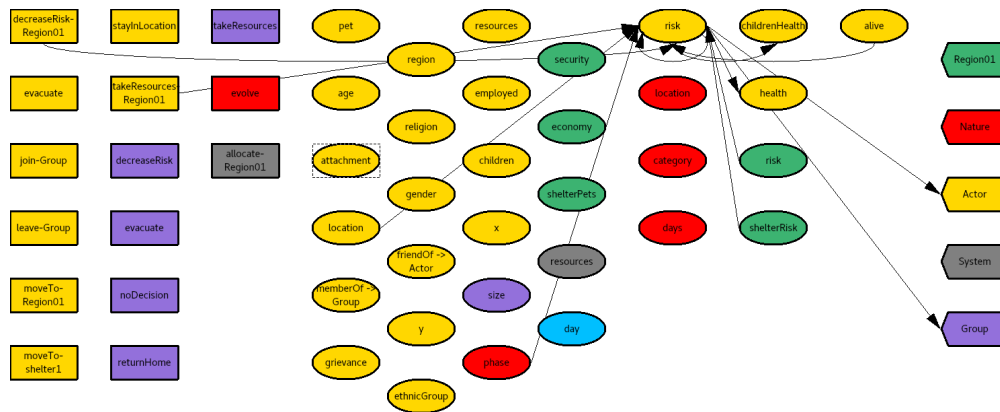


Figure 12: Ground Truth subgraph for Actor's risk

psychsim/domains/groundtruth/actor.py:236

2.22.1 Effect of Actor-decreaseRisk-Region01 on Actor's risk

psychsim/domains/groundtruth/actor.py:526

$\text{Actor's risk}' \leftarrow 80\% \cdot \text{Actor's risk} + 0.20$

2.22.2 Effect of Actor-takeResources-Region01 on Actor's risk

psychsim/domains/groundtruth/actor.py:551

IF Nature's phase=none

THEN : Actor's risk' $\leftarrow 19\% \cdot \text{Actor's risk} + 0.80$
 ELSE : Actor's risk' $\leftarrow 40\% \cdot \text{Actor's risk} + 0.60$

2.22.3 Default change in Actor's risk

psychsim/domains/groundtruth/actor.py:429

IF Actor's alive

THEN : IF Actor's location' = shelter1

THEN : Actor's risk' $\leftarrow \text{Region01's shelterRisk}$

ELSE : IF Actor's location' = evacuated

THEN : Actor's risk' $\leftarrow 9\% \cdot \text{Actor's risk}$

ELSE : Actor's risk' $\leftarrow \text{Region01's risk}$

ELSE : Actor's risk' $\leftarrow 0.00$

2.23 Actor's x

Representation of residence's longitude

Type: Real

psychsim/domains/groundtruth/actor.py:161

2.24 Actor's y

Representation of residence's latitude

Type: Real

psychsim/domains/groundtruth/actor.py:163

2.25 Group's size

Type: Integer

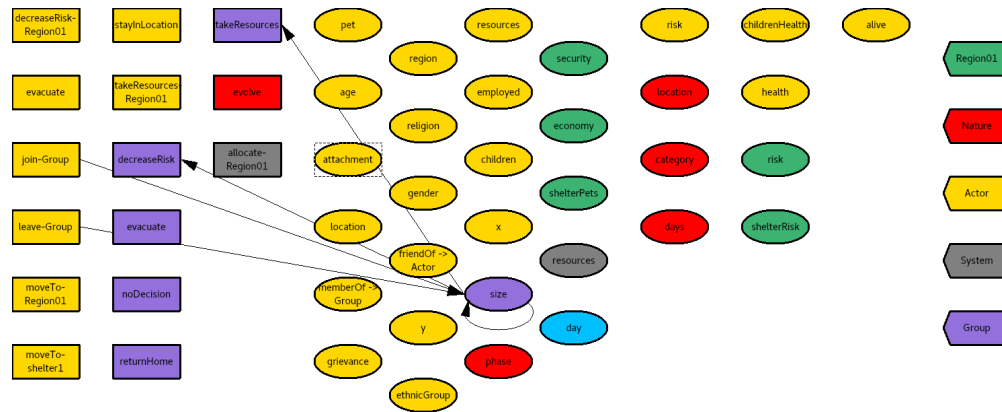


Figure 13: Ground Truth subgraph for Group's size

psychsim/domains/groundtruth/group.py:24

2.25.1 Effect of Actor-join-Group on Group's size

psychsim/domains/groundtruth/group.py:96

Group's size' $\leftarrow \text{Group's size} + 1$

2.25.2 Effect of Actor-leave-Group on Group's size

psychsim/domains/groundtruth/group.py:107

Group's size' \leftarrow Group's size - 1

2.26 Nature's category

Type: Integer

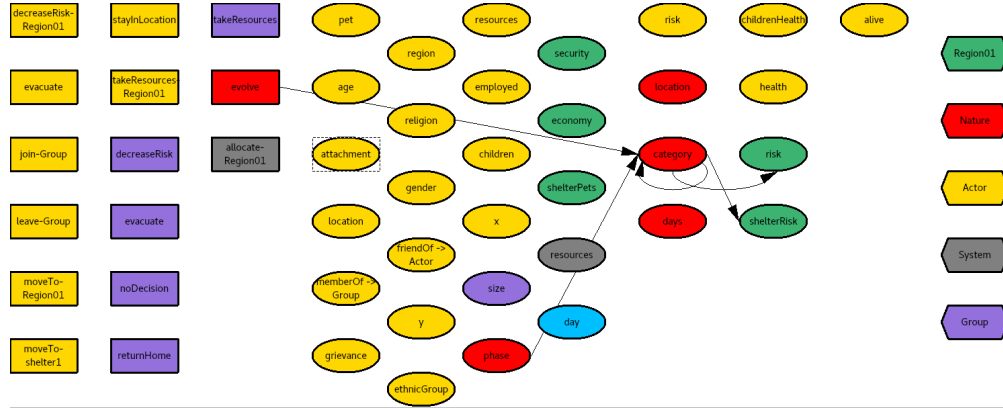


Figure 14: Ground Truth subgraph for Nature's category

psychsim/domains/groundtruth/nature.py:26

2.26.1 Effect of Nature-evolve on Nature's category

psychsim/domains/groundtruth/nature.py:80

IF Nature's phase'

= approaching: IF Nature's category=0

THEN :

20%: Nature's category' \leftarrow 1

20%: Nature's category' \leftarrow 2

20%: Nature's category' \leftarrow 3

20%: Nature's category' \leftarrow 4

20%: Nature's category' \leftarrow 5

ELSE : IF Nature's category=1

THEN :

60%: Nature's category' \leftarrow Nature's category

40%: Nature's category' \leftarrow 2

ELSE : IF Nature's category=5

THEN :

40%: Nature's category' \leftarrow 4

60%: Nature's category' \leftarrow Nature's category

ELSE :

20%: Nature's category' \leftarrow Nature's category - 1

60%: Nature's category' \leftarrow Nature's category

20%: Nature's category' \leftarrow Nature's category + 1

= active: Nature's category' \leftarrow Nature's category

= none: Nature's category' \leftarrow 0

2.27 Nature's days

Type: Integer

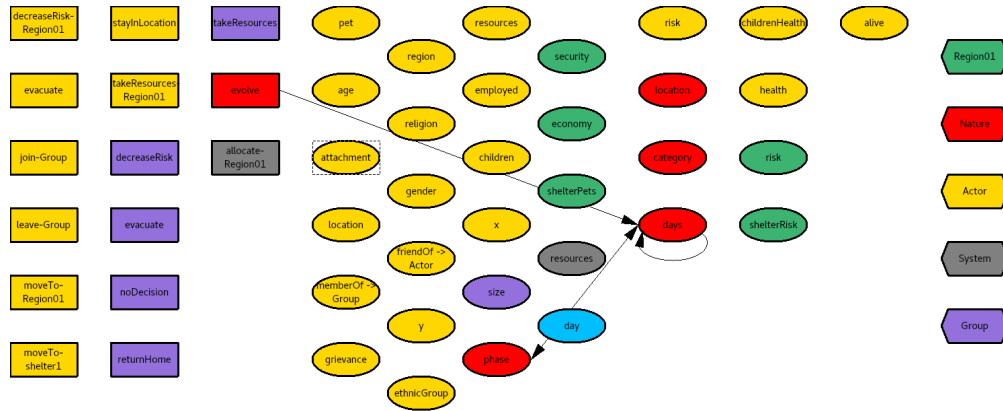


Figure 15: Ground Truth subgraph for Nature's days

psychsim/domains/groundtruth/nature.py:18

2.27.1 Effect of Nature-evolve on Nature's days

psychsim/domains/groundtruth/nature.py:54

```
IF Nature's phase=Nature's phase'
  THEN : Nature's days' ← Nature's days+1
  ELSE : Nature's days' ← 0
```

2.28 Nature's location

Type: String

Values: Region01, none

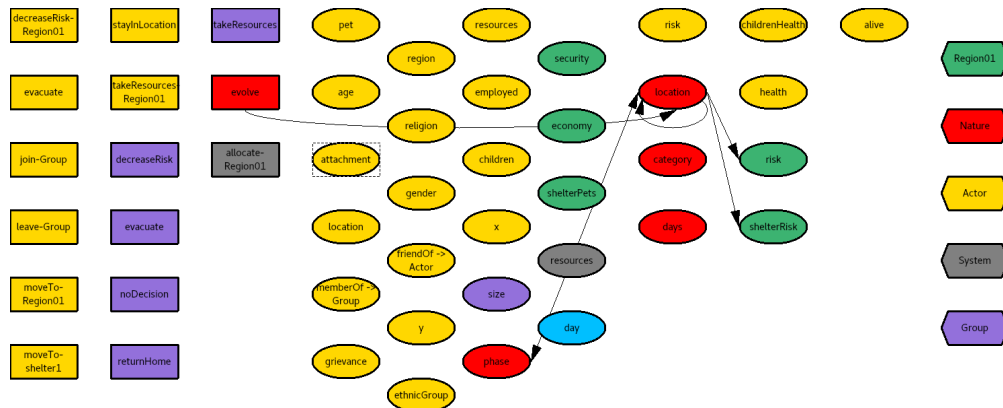


Figure 16: Ground Truth subgraph for Nature's location

psychsim/domains/groundtruth/nature.py:23

2.28.1 Effect of Nature-evolve on Nature's location

psychsim/domains/groundtruth/nature.py:111

IF Nature's phase'

```
= approaching: IF Nature's location=none
  THEN : Nature's location' ← Region01
  ELSE : Nature's location' ← Nature's location
= active: IF Nature's location
  OTHERWISE : Nature's location' ← Nature's location
  = Region01: Nature's location' ← none
= none: Nature's location' ← none
```

2.29 Nature's phase

Type: String

Values: active, approaching, none

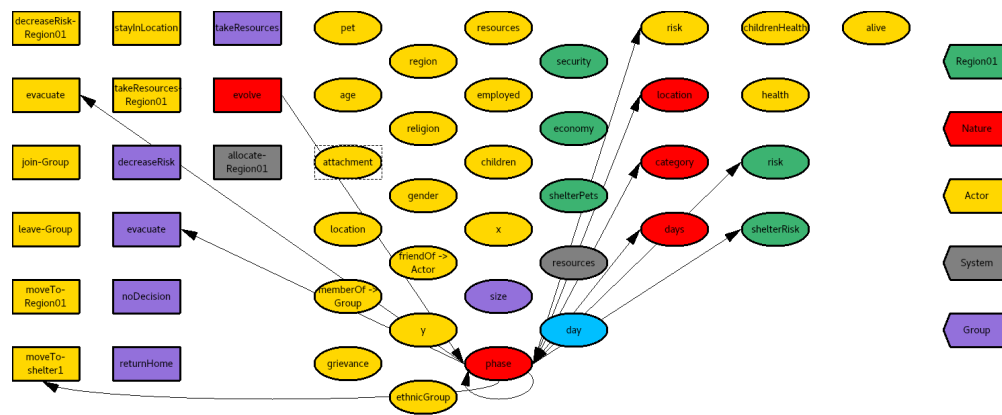


Figure 17: Ground Truth subgraph for Nature's phase

psychsim/domains/groundtruth/nature.py:16

2.29.1 Effect of Nature-evolve on Nature's phase

psychsim/domains/groundtruth/nature.py:49

IF Nature's phase

```
= none: IF Nature's days>1
  THEN :
    80%: Nature's phase' ← approaching
    19%: Nature's phase' ← none
  ELSE : Nature's phase' ← none
= approaching: IF Nature's days>1
  THEN :
    80%: Nature's phase' ← active
    19%: Nature's phase' ← approaching
  ELSE : Nature's phase' ← approaching
OTHERWISE : IF Nature's location=none
  THEN : Nature's phase' ← none
  ELSE : Nature's phase' ← active
```


2.30 Region01's economy

Current economic level of region

Type: Real

psychsim/domains/groundtruth/region.py:77

2.31 Region01's risk

Level of risk from hurricane

Type: Real

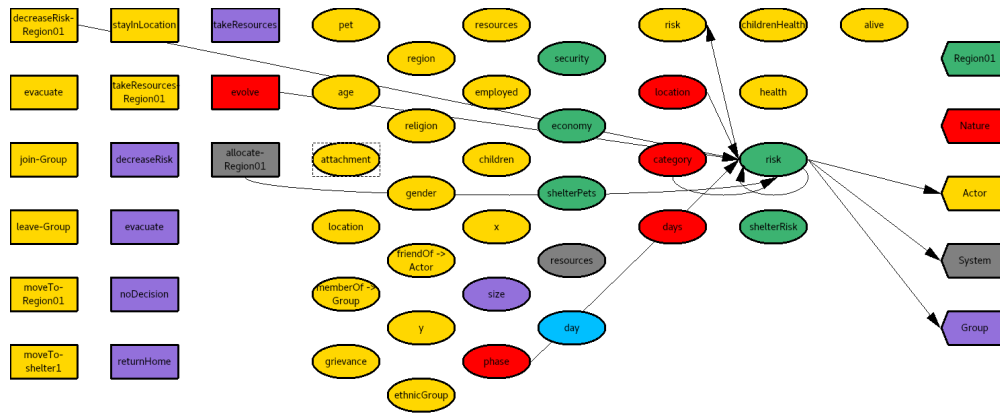


Figure 18: Ground Truth subgraph for Region01's risk

psychsim/domains/groundtruth/region.py:51

2.31.1 Effect of Actor-decreaseRisk-Region01 on Region01's risk

psychsim/domains/groundtruth/actor.py:521

Region01's risk' ← 80% · Region01's risk

2.31.2 Effect of Nature-evolve on Region01's risk

psychsim/domains/groundtruth/nature.py:129

IF Nature's phase' = active

THEN : IF Nature's location'

OTHERWISE : Region01's risk' ← 80% · Region01's risk

= Region01: IF Nature's category

= 1: Region01's risk' ← 80% · Region01's risk + 0.20

= 2: Region01's risk' ← 60% · Region01's risk + 0.40

= 3: Region01's risk' ← 39% · Region01's risk + 0.60

= 4: Region01's risk' ← 19% · Region01's risk + 0.80

= 5: Region01's risk' ← 0% · Region01's risk + 1.00

ELSE : Region01's risk' ← 80% · Region01's risk

2.31.3 Effect of System-allocate-Region01 on Region01's risk

psychsim/domains/groundtruth/system.py:43

Region01's risk' ← 80% · Region01's risk

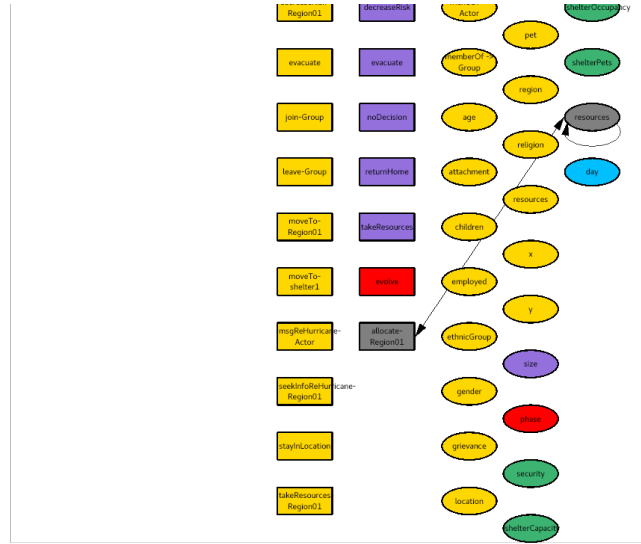


Figure 20: Ground Truth subgraph for System's resources

2.36 day

Type: Integer

2.36.1 Effect of Nature-evolve on day

psychsim/domains/groundtruth/nature.py:149
 $\text{day}' \leftarrow \text{day} + 1$

3 Relations

3.1 Actor friendOf Actor

{'codePtr': True}

Type: Boolean

3.2 Actor memberOf Group

{'codePtr': True}

Type: Boolean

3.2.1 Effect of Actor-join-Group on Actor memberOf Group

$\text{Actor memberOf Group}' \leftarrow \text{true}$

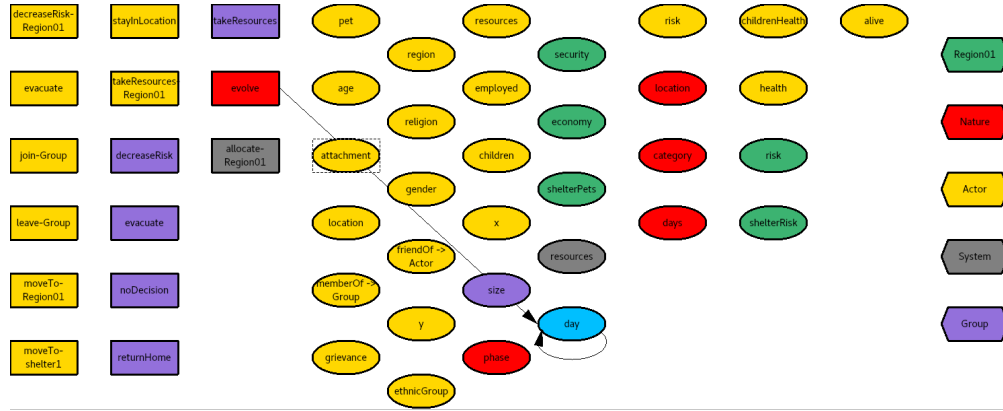


Figure 21: Ground Truth subgraph for day

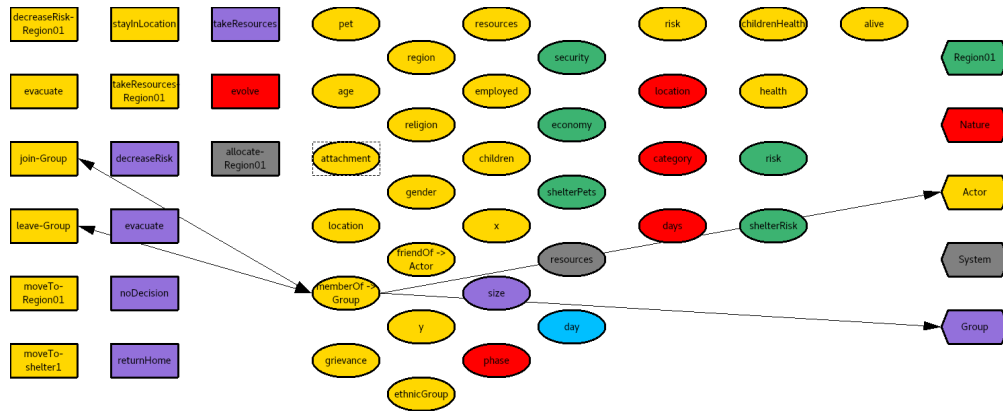


Figure 22: Ground Truth subgraph for Actor memberOf -> Group

3.2.2 Effect of Actor-leave-Group on Actor memberOf Group

Actor memberOf Group' \leftarrow false

4 Actions

4.1 Nature evolve

4.1.1 Effect on Nature's category of Nature evolve

IF Nature's phase'

= approaching: IF Nature's category=0

THEN :

20%: Nature's category' \leftarrow 1

20%: Nature's category' \leftarrow 2

20%: Nature's category' \leftarrow 3

20%: Nature's category' \leftarrow 4

20%: Nature's category' \leftarrow 5

ELSE : IF Nature's category=1

THEN :

60%: Nature's category' \leftarrow Nature's category

40%: Nature's category' \leftarrow 2

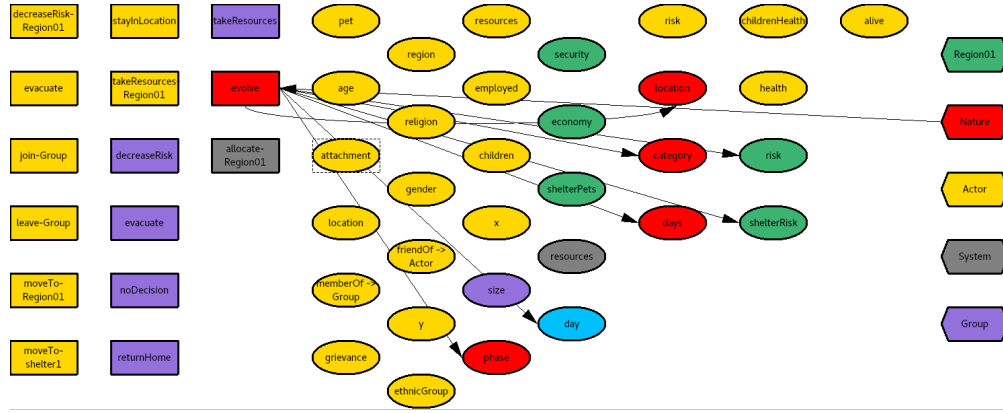


Figure 23: Ground Truth subgraph for Nature-evolve

ELSE : IF Nature's category=5
 THEN :
 40%: Nature's category' \leftarrow -4
 60%: Nature's category' \leftarrow Nature's category
 ELSE :
 20%: Nature's category' \leftarrow Nature's category - 1
 60%: Nature's category' \leftarrow Nature's category
 20%: Nature's category' \leftarrow Nature's category + 1
 = active: Nature's category' \leftarrow Nature's category
 = none: Nature's category' \leftarrow 0

4.1.2 Effect on Nature's days of Nature evolve

IF Nature's phase=Nature's phase'
 THEN : Nature's days' \leftarrow Nature's days+1
 ELSE : Nature's days' \leftarrow 0

4.1.3 Effect on Nature's location of Nature evolve

IF Nature's phase'
 = approaching: IF Nature's location=none
 THEN : Nature's location' \leftarrow Region01
 ELSE : Nature's location' \leftarrow Nature's location
 = active: IF Nature's location
 OTHERWISE : Nature's location' \leftarrow Nature's location
 = Region01: Nature's location' \leftarrow none
 = none: Nature's location' \leftarrow none

4.1.4 Effect on Nature's phase of Nature evolve

IF Nature's phase
 = none: IF Nature's days>1
 THEN :
 80%: Nature's phase' \leftarrow approaching
 19%: Nature's phase' \leftarrow none
 ELSE : Nature's phase' \leftarrow none
 = approaching: IF Nature's days>1
 THEN :

4.2.1 Applicability of Actor decreaseRisk Region01

```

IF Actor's location=Region01
  THEN : IF Actor's alive
    THEN : true
    ELSE : false
  ELSE : false

```

4.2.2 Effect on Actor's risk of Actor decreaseRisk Region01

Actor's risk' $\leftarrow 80\% \cdot \text{Actor's risk} + 0.20$

4.2.3 Effect on Region01's risk of Actor decreaseRisk Region01

Region01's risk' $\leftarrow 80\% \cdot \text{Region01's risk}$

4.3 Actor evacuate

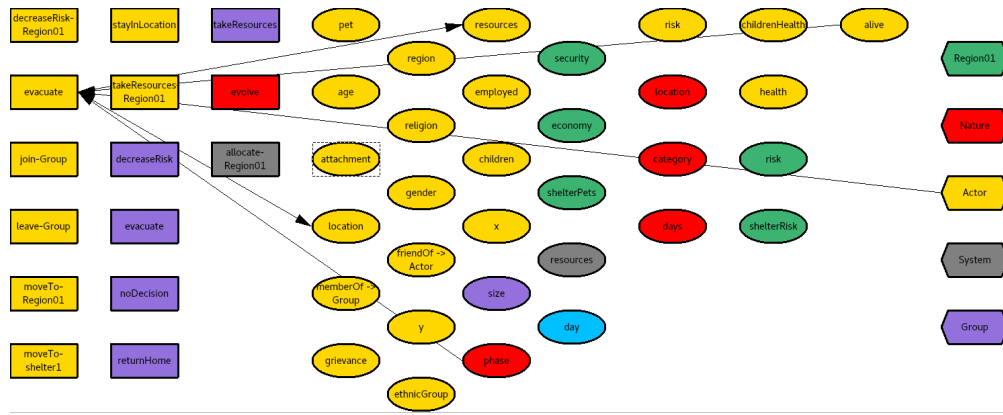


Figure 25: Ground Truth subgraph for Actor-evacuate

4.3.1 Applicability of Actor evacuate

```

IF Nature's phase=none
  THEN : false
  ELSE : IF Actor's location=evacuated
    THEN : false
    ELSE : IF Actor's alive
      THEN : true
      ELSE : false

```

4.3.2 Effect on Actor's location of Actor evacuate

Actor's location' \leftarrow evacuated

4.3.3 Effect on Actor's resources of Actor evacuate

```

IF Actor's resources>0.20
  THEN : Actor's resources'  $\leftarrow$  Actor's resources - 0.20
  ELSE : Actor's resources'  $\leftarrow$  0.00

```

4.4 Actor join Group

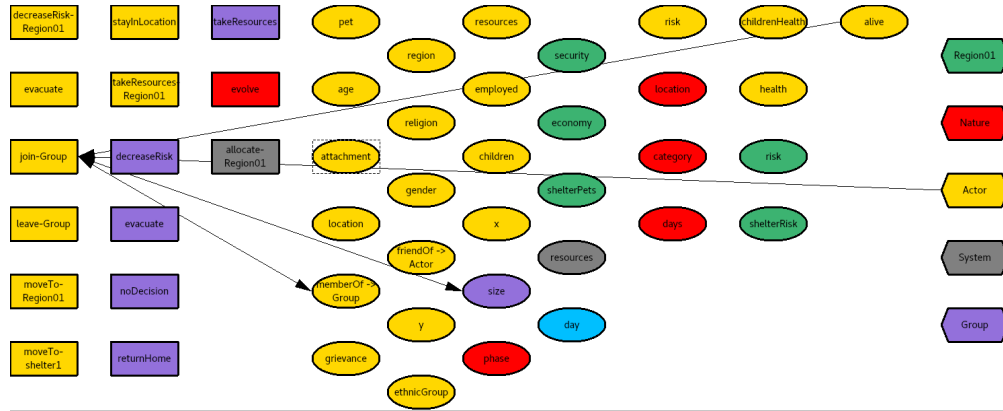


Figure 26: Ground Truth subgraph for Actor-join-Group

4.4.1 Applicability of Actor join Group

IF Actor's alive

THEN : IF Actor memberOf Group

THEN : false

ELSE : true

ELSE : false

4.4.2 Effect on Actor memberOf Group of Actor join Group

Actor memberOf Group' \leftarrow true

4.4.3 Effect on Group's size of Actor join Group

Group's size' \leftarrow Group's size+1

4.5 Actor leave Group

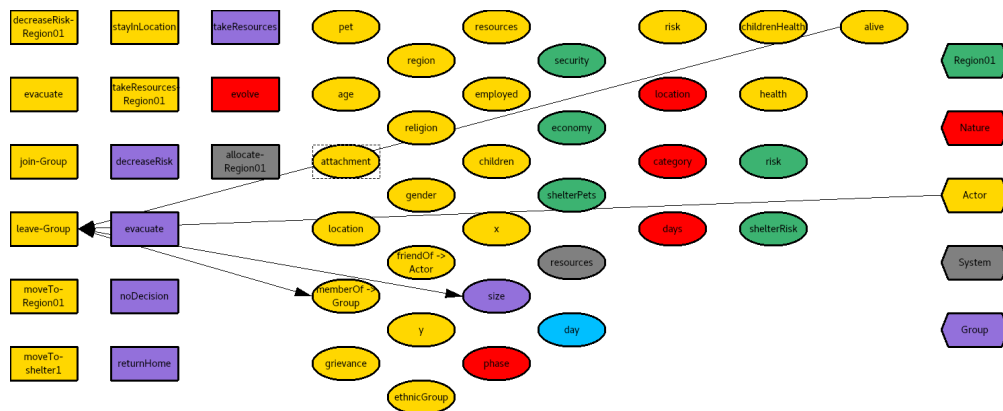


Figure 27: Ground Truth subgraph for Actor-leave-Group

4.5.1 Applicability of Actor leave Group

IF Actor's alive

THEN : IF Actor memberOf Group

THEN : true

ELSE : false

ELSE : false

4.5.2 Effect on Actor memberOf Group of Actor leave Group

Actor memberOf Group' \leftarrow false

4.5.3 Effect on Group's size of Actor leave Group

Group's size' \leftarrow Group's size - 1

4.6 Actor moveTo Region01

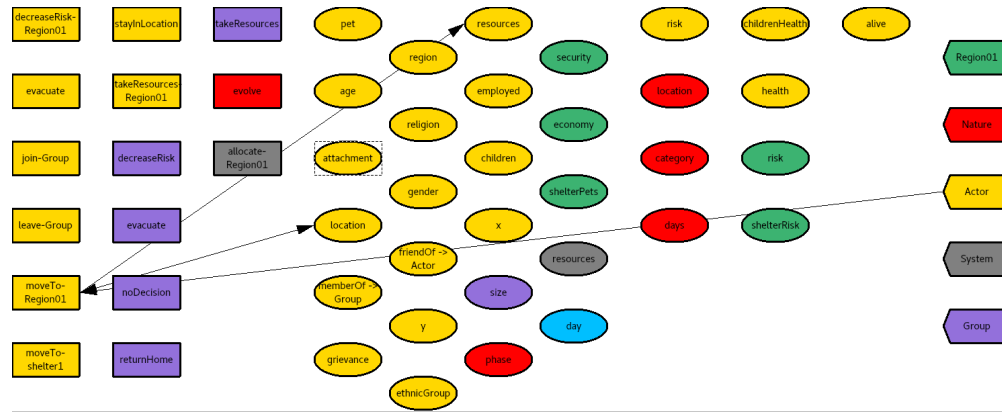


Figure 28: Ground Truth subgraph for Actor-moveTo-Region01

4.6.1 Applicability of Actor moveTo Region01

IF Actor's location={ 'shelter1', 'evacuated' }

THEN : true

ELSE : false

4.6.2 Effect on Actor's location of Actor moveTo Region01

Actor's location' \leftarrow Region01

4.6.3 Effect on Actor's resources of Actor moveTo Region01

IF Actor's alive

THEN : IF Actor's employed

THEN : Actor's resources' \leftarrow 80%·Actor's resources+0.20

ELSE : Actor's resources' \leftarrow Actor's resources

ELSE : Actor's resources' \leftarrow Actor's resources

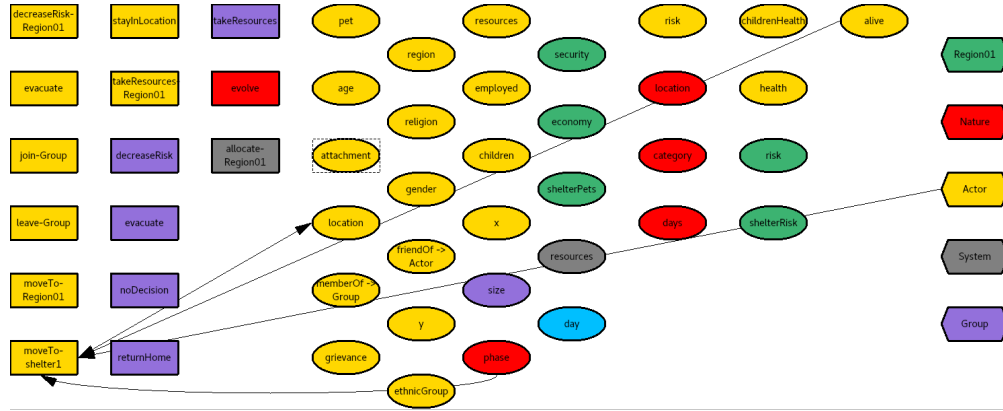


Figure 29: Ground Truth subgraph for Actor-moveTo-shelter1

4.7 Actor moveTo shelter1

4.7.1 Applicability of Actor moveTo shelter1

IF Nature's phase=none
 THEN : false
 ELSE : IF Actor's alive
 THEN : IF Actor's location=shelter1
 THEN : false
 ELSE : true
 ELSE : false

4.7.2 Effect on Actor's location of Actor moveTo shelter1

Actor's location' ← shelter1

4.8 Actor stayInLocation

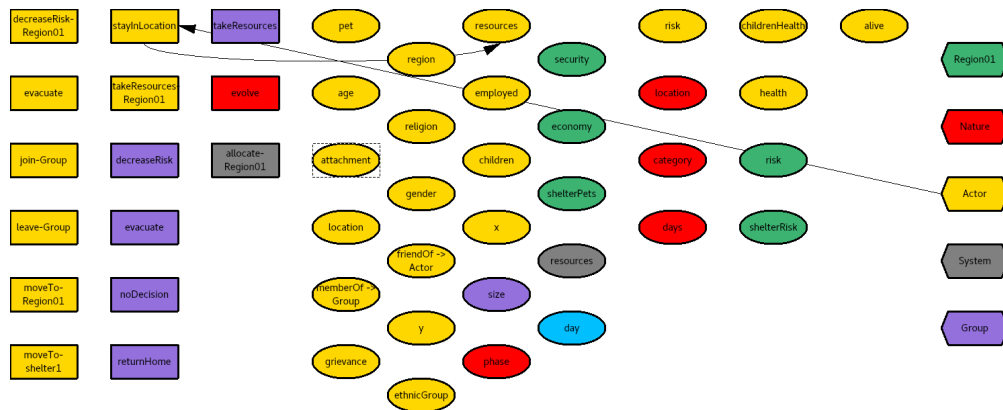


Figure 30: Ground Truth subgraph for Actor-stayInLocation

4.8.1 Effect on Actor's resources of Actor stayInLocation

IF Actor's alive
 THEN : IF Actor's employed

THEN : IF Actor's location={ 'Region01', 'evacuated' }
 THEN : Actor's resources' $\leftarrow 80\% \cdot \text{Actor's resources} + 0.20$
 ELSE : Actor's resources' $\leftarrow \text{Actor's resources}$
 ELSE : Actor's resources' $\leftarrow \text{Actor's resources}$
 ELSE : Actor's resources' $\leftarrow \text{Actor's resources}$

4.9 Actor takeResources Region01

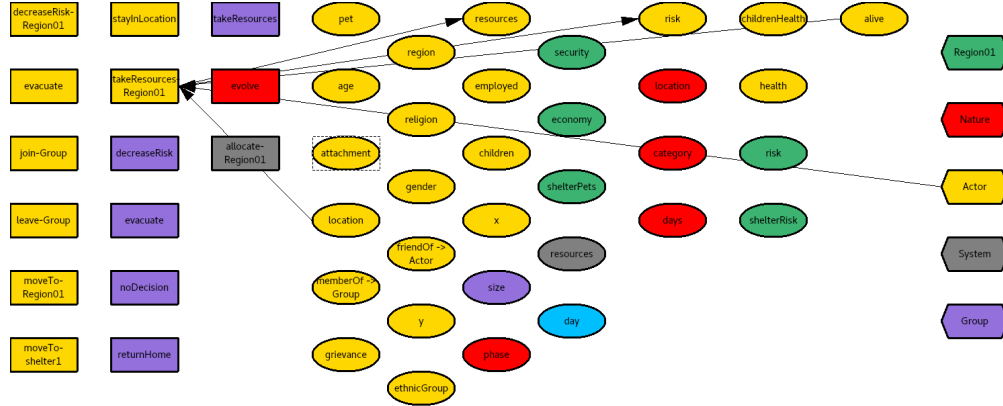


Figure 31: Ground Truth subgraph for Actor-takeResources-Region01

4.9.1 Applicability of Actor takeResources Region01

IF Actor's location=Region01
 THEN : IF Actor's alive
 THEN : true
 ELSE : false
 ELSE : false

4.9.2 Effect on Actor's resources of Actor takeResources Region01

Actor's resources' $\leftarrow 80\% \cdot \text{Actor's resources} + 0.20$

4.9.3 Effect on Actor's risk of Actor takeResources Region01

IF Nature's phase=none
 THEN : Actor's risk' $\leftarrow 19\% \cdot \text{Actor's risk} + 0.80$
 ELSE : Actor's risk' $\leftarrow 40\% \cdot \text{Actor's risk} + 0.60$

4.10 System allocate Region01

4.10.1 Effect on Region01's risk of System allocate Region01

Region01's risk' $\leftarrow 80\% \cdot \text{Region01's risk}$

4.11 Group decreaseRisk

4.11.1 Applicability of Group decreaseRisk

IF Group's size > 0
 THEN : true
 ELSE : false

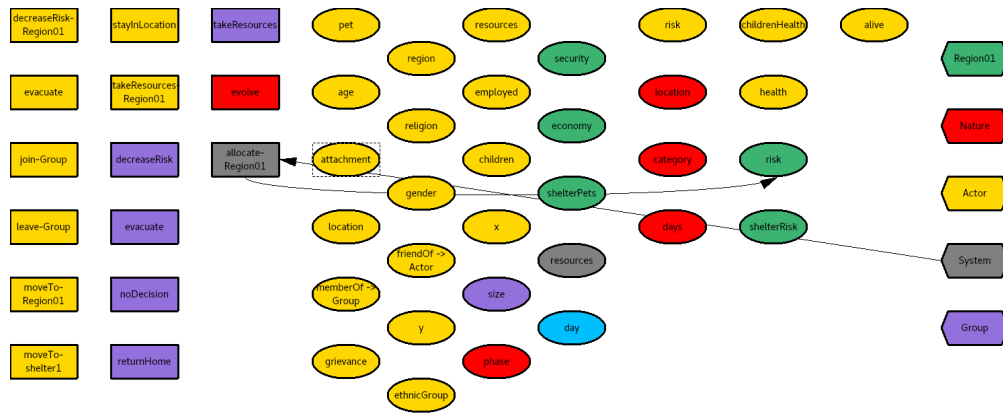


Figure 32: Ground Truth subgraph for System-allocate-Region01

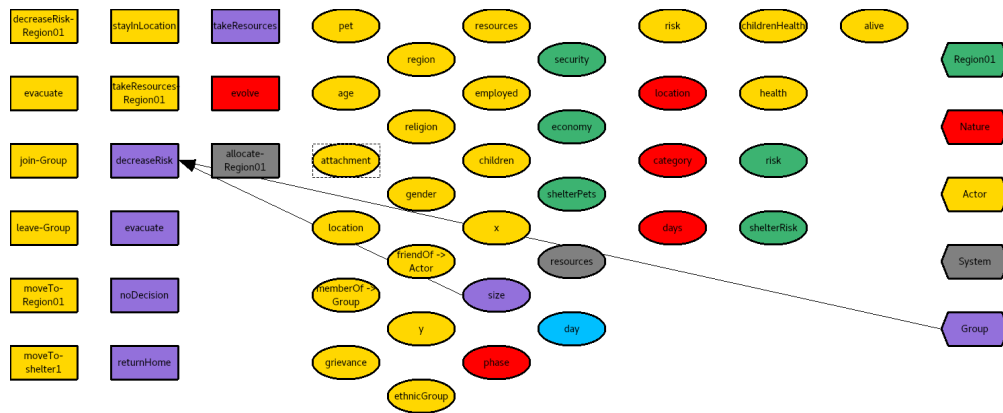


Figure 33: Ground Truth subgraph for Group-decreaseRisk

4.12 Group evacuate

4.12.1 Applicability of Group evacuate

IF Nature's phase=none
 THEN : false
 ELSE : true

4.13 Group noDecision

4.14 Group returnHome

4.15 Group takeResources

4.15.1 Applicability of Group takeResources

IF Group's size>0
 THEN : true
 ELSE : false

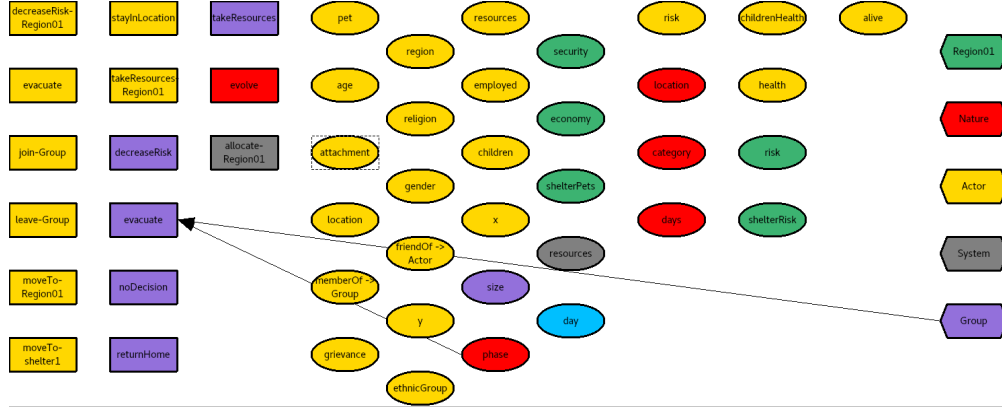


Figure 34: Ground Truth subgraph for Group-evacuate

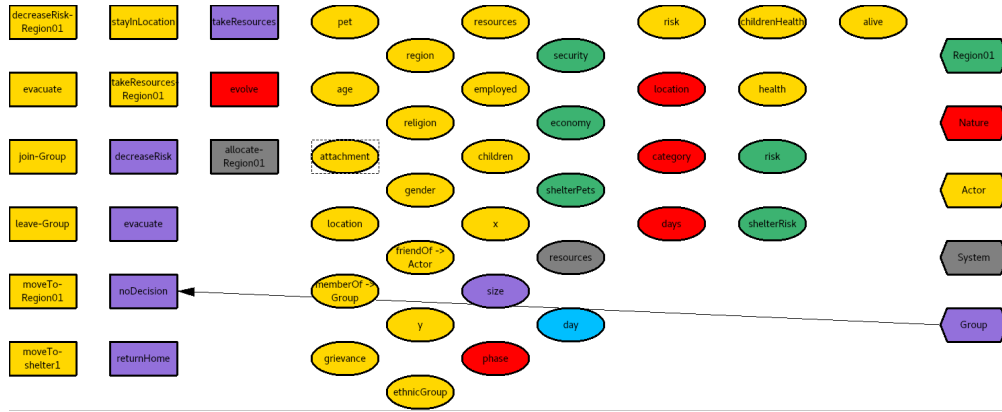


Figure 35: Ground Truth subgraph for Group-noDecision

5 Expected Reward

5.1 Actor's Reward

IF Actor's risk > 0.60

THEN : IF Actor's attachment = anxious

THEN : $R \leftarrow 20\% \cdot \text{Actor memberOf Group} + 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + 60\% \cdot \text{Region01's risk}$

ELSE : IF Actor's attachment = avoidant

THEN : $R \leftarrow -20\% \cdot \text{Actor memberOf Group} + 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + 60\% \cdot \text{Region01's risk}$

ELSE : $R \leftarrow 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + 60\% \cdot \text{Region01's risk}$

ELSE : $R \leftarrow 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + 60\% \cdot \text{Region01's risk}$

5.2 Group's Reward

IF Actor's risk > 0.60

THEN : IF Actor's attachment = anxious

THEN : $R \leftarrow 20\% \cdot \text{Actor memberOf Group} + 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + 60\% \cdot \text{Region01's risk}$

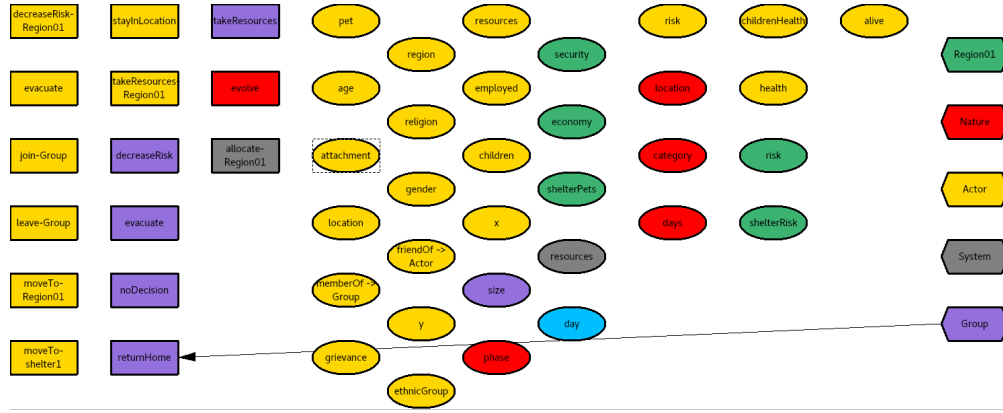


Figure 36: Ground Truth subgraph for Group-returnHome

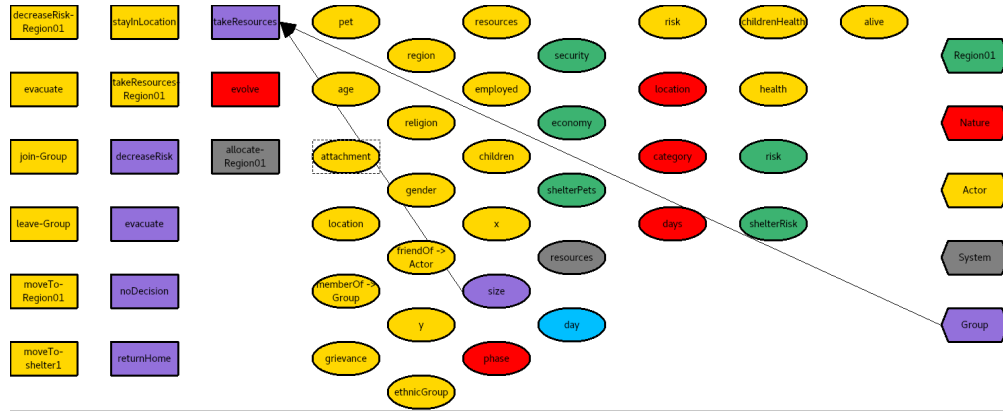


Figure 37: Ground Truth subgraph for Group-takeResources

ELSE : IF Actor's attachment=avoidant
 THEN : $R \leftarrow -20\% \cdot \text{Actor memberOf Group} + 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + -60\% \cdot \text{Region01's risk}$
 ELSE : $R \leftarrow 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + -60\% \cdot \text{Region01's risk}$
 ELSE : $R \leftarrow 40\% \cdot \text{Actor's childrenHealth} + 60\% \cdot \text{Actor's health} + 20\% \cdot \text{Actor's resources} + -60\% \cdot \text{Region01's risk}$

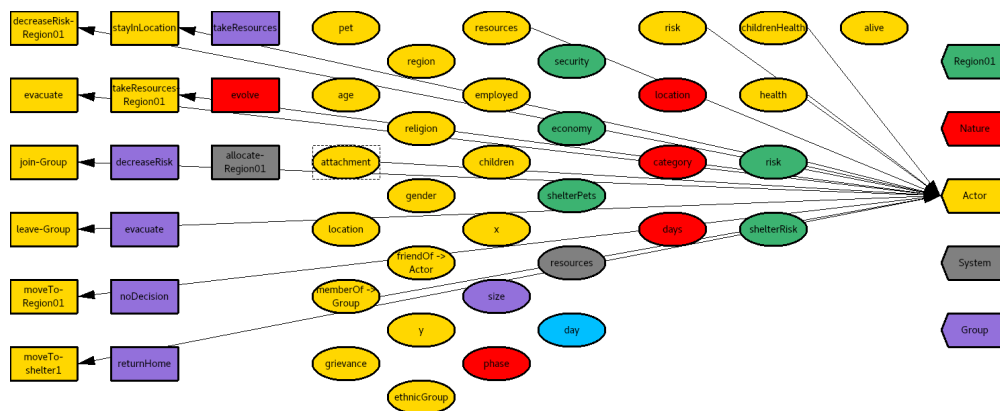


Figure 38: Ground Truth subgraph for Actor

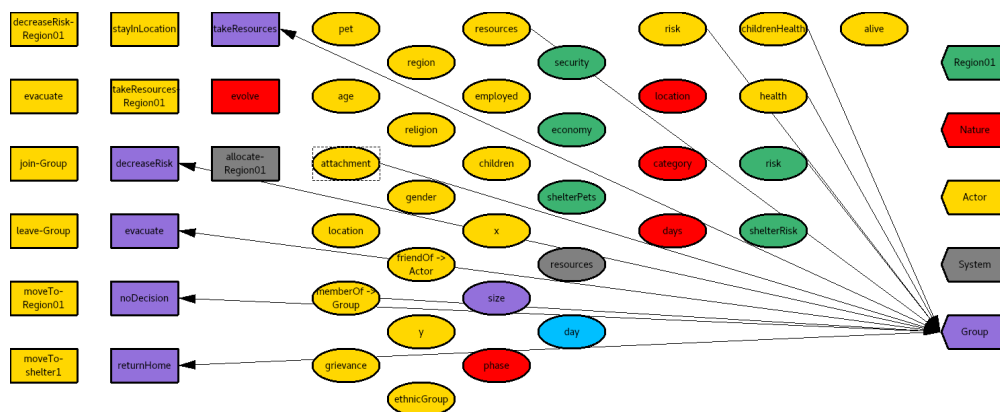


Figure 39: Ground Truth subgraph for Group