

Model for HIV/AIDS Impact in Ga-Selala

The model is developed in Java and uses the Repast 3.1 Simulation toolkit. Figure 1 shows the UML diagram for the classes implemented in the model and those inherited from the Repast libraries.

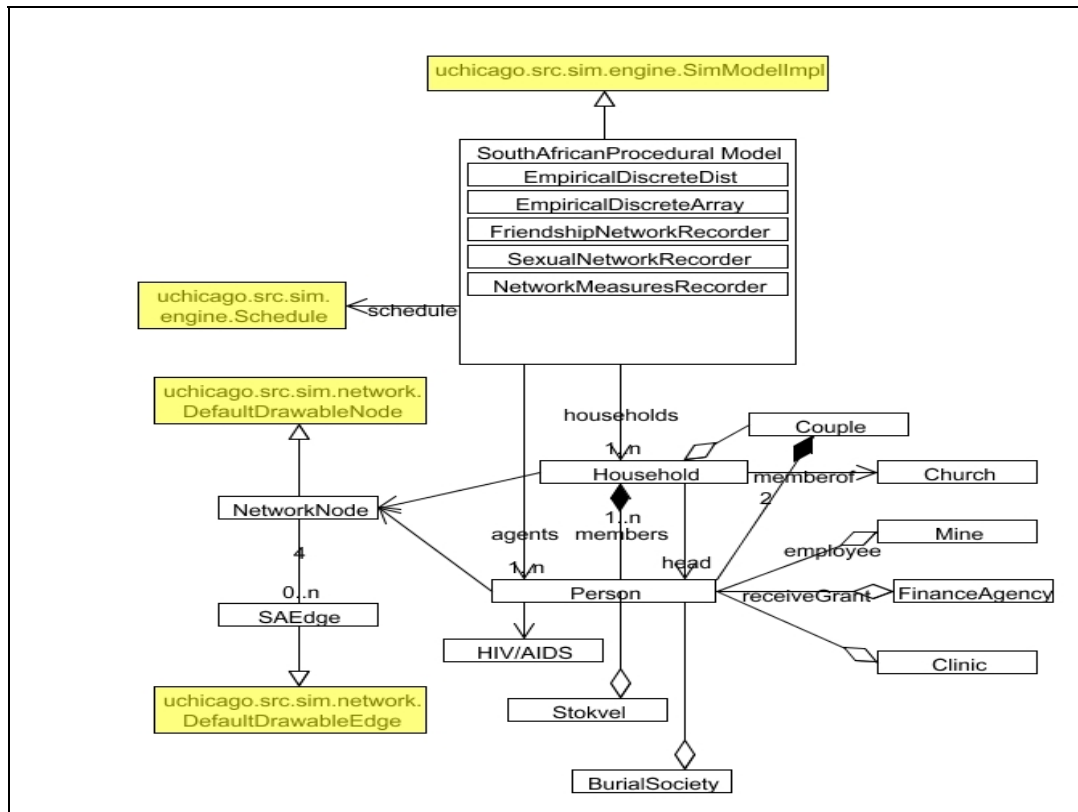


Figure 1: UML diagram showing the class relations and hierarchy in the model

User Guide¹

Model Parameters

The procedural model has quite a few parameters. The following table shows the model's parameters and their default values.

<i>Parameter</i>	<i>Default value</i>	<i>Description</i>
birthrate	23	Birth rate per 1000 person per year
churchParticipation Rate	0.8	Proportion of households being member of a church
clusterProportion	7	Number of moieties
healthExpenditure	true	flag to turn health expenditure on (true) or off (false)
HIV	True	Flag to turn the HIV incidence on (true) or off (false)
infantMortalityRate	52	Infant mortality rate per 1000 person per year
initialFuneralClubs	11	Number of initial funeral clubs

¹ Following Ruth Meyer's introduction to the declarative model

lobola	10000	Maximum amount for lobola in Rand
maximumMoneyToFeed	165	Maximum money required to feed an adult male
meanLifeExpectancy	63	Mean life expectancy for a new born without HIV/AIDS
minimumMoneyToFeed	120	Minimum money required to feed an adult male
networkRecordInterval	10	Interval at which the generated networks are recorded.
numDenominations	4	Number of church denomination
numHouseholds	24	Number of households
numVillages	1	Number of villages
probabilityForMarriage	0.20	Chance for a couple to marry with lobola
seed	11999957972501	Seed for the random number generators
showGUI	false	Flag to turn the GUI on (true) or off (false)
showOutput	true	Flag to turn the output to console on (true) or off (false)
skilledCapacity	100	Skilled capacity for mine
stdDevLifeExpectancy	11	StdDev life expectancy for a new born without HIV/AIDS
unSkilledCapacity	450	Unskilled workers capacity for mine
womenMaximumSexAge	45	Maximum age for sexually active female
womenMinimumSexAge	13	Minimum age for sexually active female

Running the model from the Repast

Since the model is using Repast for its simulation infrastructure, simulation runs can be started from the Repast GUI. Invoking the main() method of the model class (display.Model) will bring up the Repast GUI (see screenshot). You can set parameters and start, pause or stop simulation runs from there.

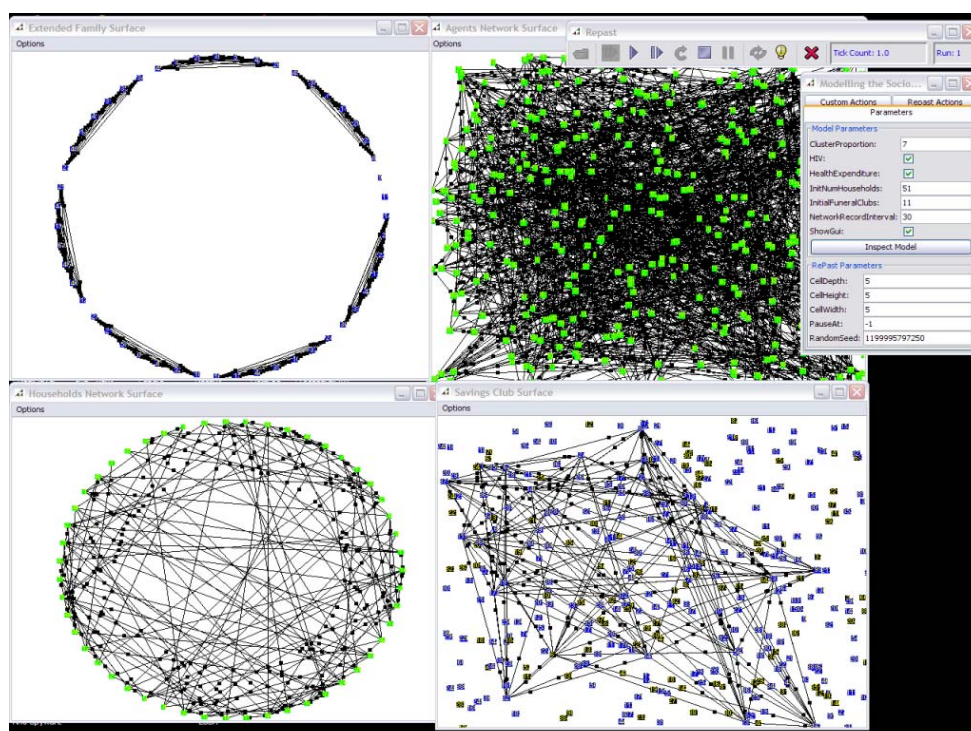


Figure 2: Screenshot of the model with the GUI

Running the model from console as a batch run

To save on time and memory it is possible to run the model from console. This is a so-called batch run in Repast terminology and is started by invoking the Repast class SimInit with the model class as parameter:

```
java uchicago.src.sim.engine.SimInit -b display.Model
```

Make sure the classpath is set correctly. The model needs the following libraries:

- flanagan.jar
- repast.jar
- colt.jar

Model Output

The model produces output on several levels:

- *GUI*: friendship network and stokvel network (updated dynamically), extended family network, social links of the households in the village
- *Files*: complete model output. For each model run a folder is created in the specified output
 - At every interval: networkRecordInterval, the sexual network, friendship network and households social links are output in pajek format².
 - Time series data for labour activity, demographics, HIV/AIDS incidence and prevalence are output at every time step.

² adapted from Friedrich Krebs implementation.