

An interactive and Web-based simulator of drug markets

Assoc Prof Pascal Perez

Director

HEMA Consulting Pty Ltd

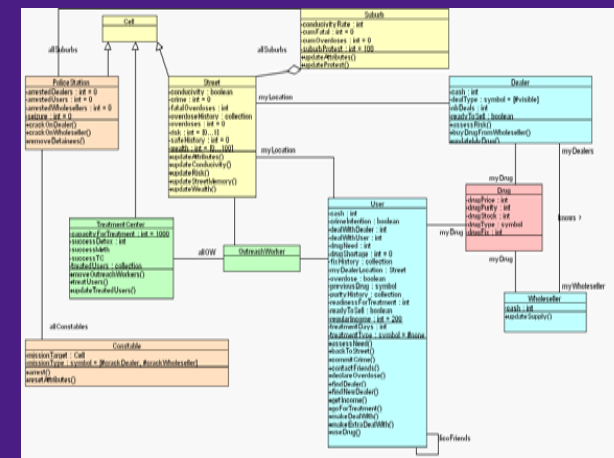
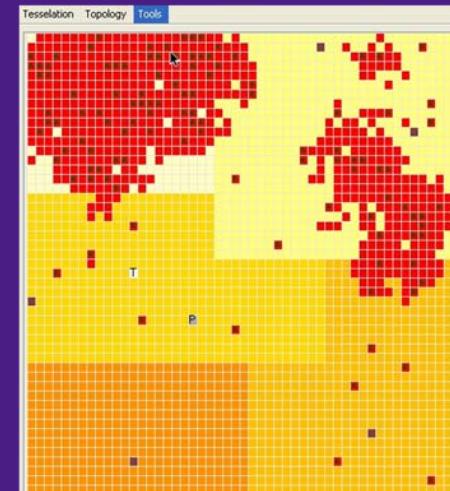
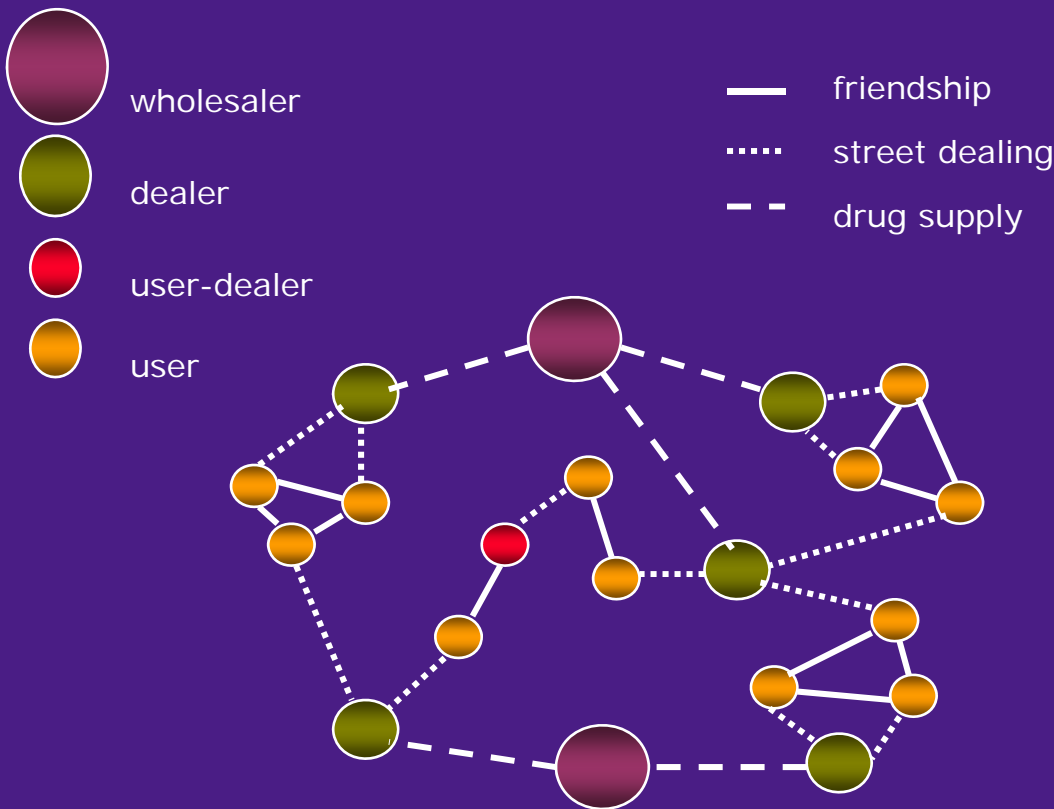
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Models to translate evidence



- Often, **AOD** issues are described as complex and adaptive systems (CAS).
- **Models** are useful to explore behavior and properties of CAS.
- Models not only need to describe but also to **explain** social patterns.
- **Generative social science** (Epstein, 2006) states that: "*you can't explain it if you can't grow it*"
- **Computer simulation**, using agent-based technology, allows to grow social systems *in silico*.

SimDrug: drug market in silico



Perez P. & Dray A. (2005). DPMP monograph 11.
 Dray A. et al. (2008). Jour. Exp. Criminology.

Exploring behavioral patterns

INPUT PARAMETERS

POPULATION OF AGENTS

System: Open Closed

Number of Users: 1000

Number of Constables: 10

Number of Outreach Workers: 10

Number of Dealers (non-ISO): 100

Number of Wholesalers: 10

STREETBLOCKS

Wealth range per suburb (A\$K):

Suburb 1: Suburb 2: Suburb 3: Suburb 4: Suburb 5

Min: 50 100 200 100 250

Max: 150 200 500 200 500

Streetblock becomes conducive to drug dealing if:

Risk > 20 OR: Nr of consecutive calls around > 3

Risk = 10 + nr of crimes + 10 + nr of CO + nr of users

Wealth decreased by: 5 % in case of crime

Wealth updated after: 10 days without crime

Wealth re-increased by: 3 %

DRUG MARKET

Mark-up for drug prices:

wholesaler to dealer: 2.00

dealer to user-dealer: 1.50

dealer and user-dealer to user: 1.00

Drug data:

real (1999-2001)

fixed

HEROIN: 150 125

OTHER: 30 30

Price (\$K): 150 125

Purity (%): 30 30

Rate heroin/other: 50 50

DEALERS

Initial cash between: 5000 and 10000 A\$K

Prob. to freeze dealing activity: 20 %

WHOLESALEERS

Initial cash between: 50 and 100 A\$K

USERS

Maximum number of Herbs: 3

Centenikid dose (mg/kg): 300 A\$K

% of users with:

- Light addiction: 30 %
- Moderate addiction: 54 %
- Severe addiction: 14 %

Prob. to declare an overdose: 0.50

Prob. to be rescued: 50 %

Readiness to treatment, initial count down values between: 10 and 50

Drug shortage reduces readiness countdown by: 1 after 3 days

POLICE

Prob. for a constable to arrest a dealer: 10 %

Prob. for a constable to arrest a user-dealer: 40 %

Prob. for police to tip-off a wholesaler: 0.00 %

POLICING SCENARIO

Random Patrol

Hotspot

Nr of consecutive patrols to a given hotspot: 3

Problem Oriented Policing

Nr of consecutive patrols to a given hotspot: 1

Influence of Outreach workers on user's readiness to treatment: 1

TREATMENT

Capacity of treatment centre: 1000

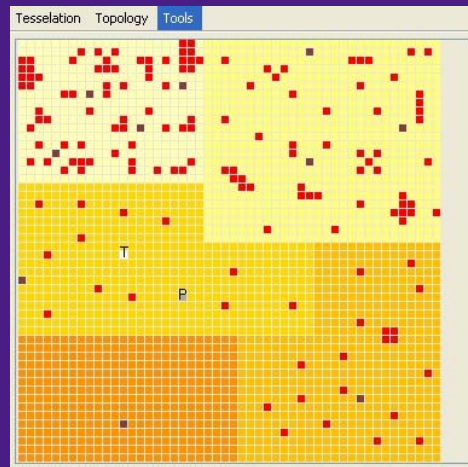
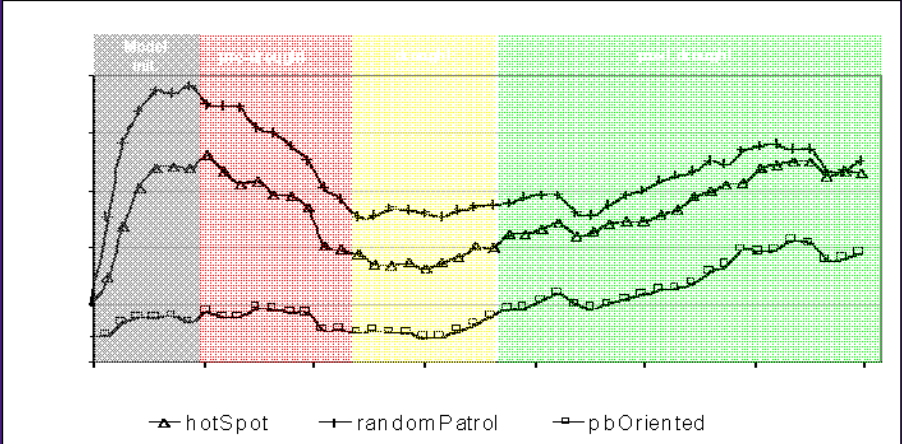
Prob. to enter: 100 days Prob. of success:

Details:

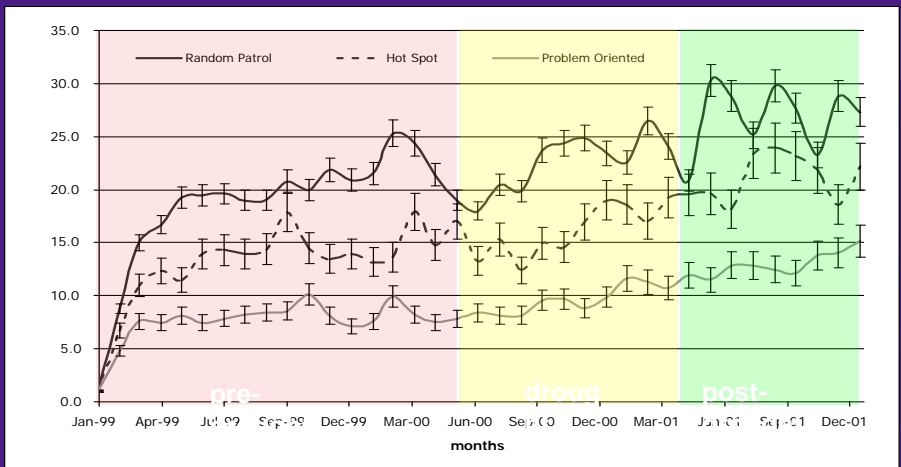
Heroin	30 %	0 %	0 %
Therapeutic Com.	10 %	70 %	50 %
Methadone	70 %	20 %	25 %

Prob. to use heroin under methadone program: 7 %

Parameters interface



Visual interface



Lost in translation...

- Translating for whom?
 - Policy-makers and intervention agencies
- Complicated models often inappropriate
- Local installation often problematic
- Updating spatially distributed data seldom trivial
- Spatial visualization comes at a cost (GIS)

- Not to mention Science-Policy gap on risk and uncertainty (Smithson M. & Bammer G., 2008)

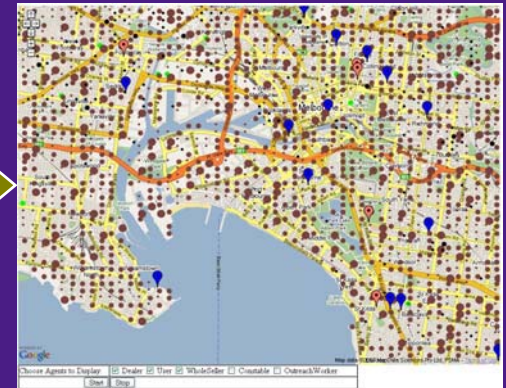
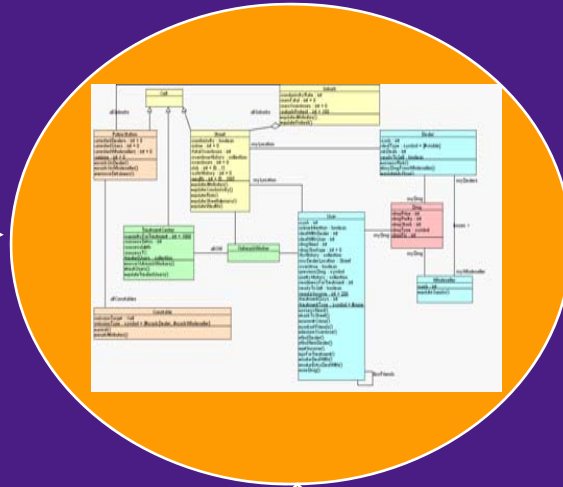
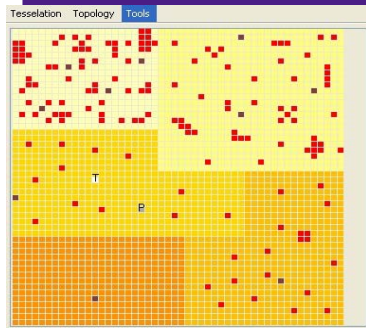
DeciUrban[©] workflow



Scientific model
(Cormas[©])

Web-based simulator
(Repast-J[©])

Web-based interface
(GoogleMap[©])



Other Applications:

- Database manager (MySQL[©])
- Scenario manager (Pentaho[©])



Joining together for a healthier world



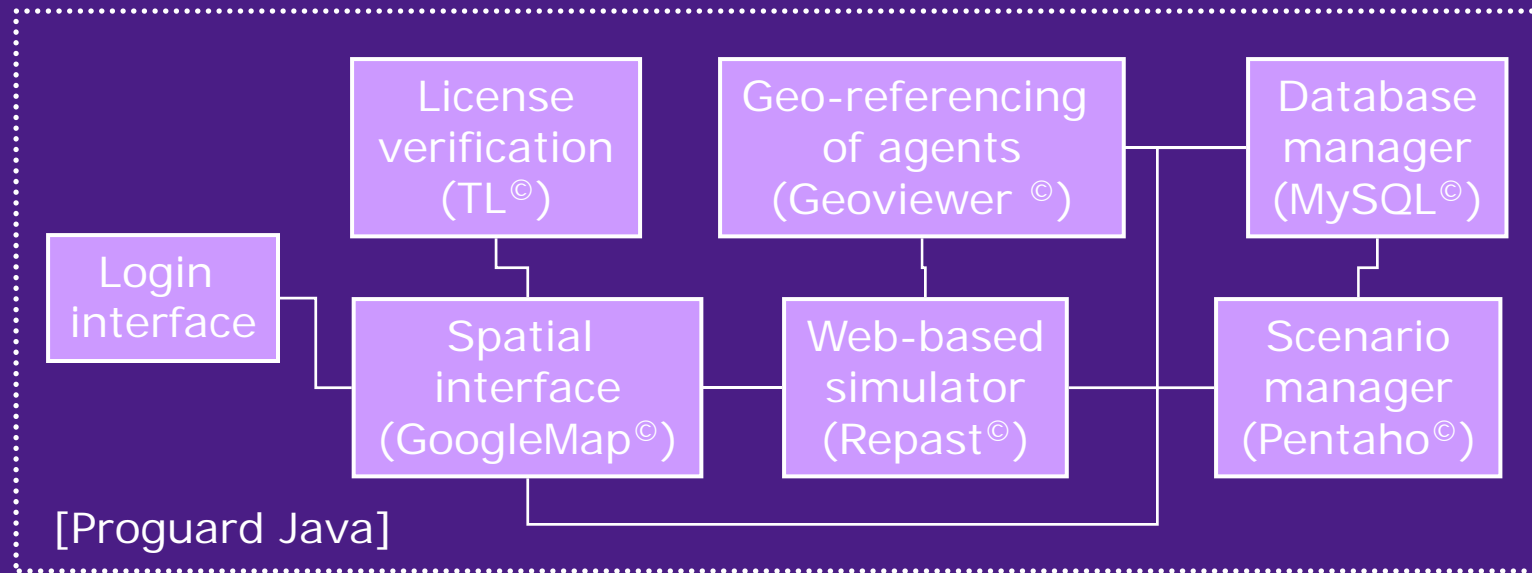
DeciUrban[©] in action



QuickTime™ and a
TechSmith EnSharpen decompressor
are needed to see this picture.



Work in progress



- DeciUrban© to be licensed in 2010 (Australia and China)
- In principle, possibility to 'click on' different types of simulators
- For example, application to alcohol-related problems in Perth (collaboration with WA Police, WA Health and WA DRGL)

More information...



Pascal Perez

HEMA Consulting Pty Ltd

www.hemaconsulting.com.au

hemaconsulting@mac.com

Mobile: 0432 435 192

Thank You!

