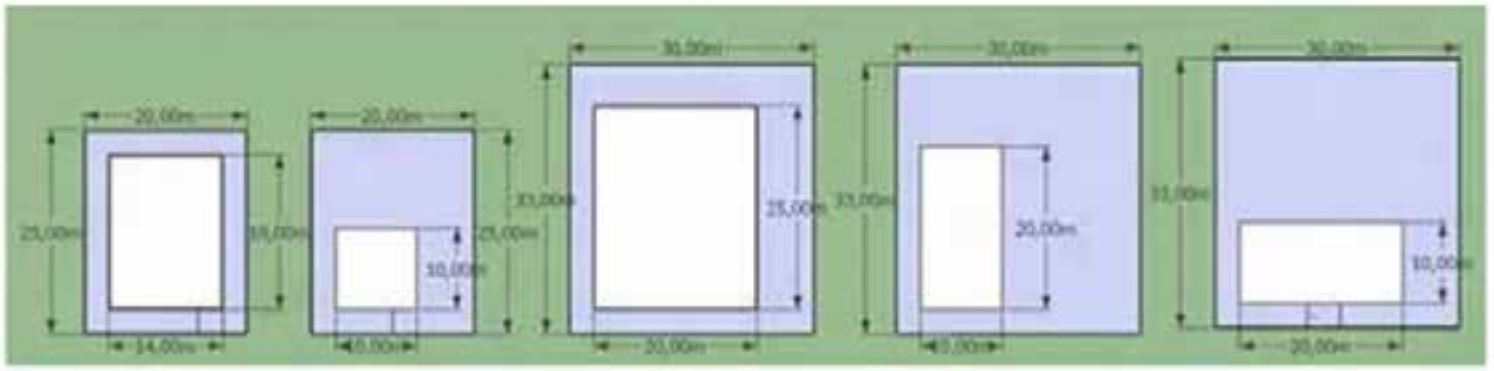
Parametric Modeling of Territorial Occupation: New Paradigms in the Spatial Representation Using Cityengine

Sheyla Santana and Ana Clara Mourão Moura

Department of Urban Planning, Architecture School, Federal University of Minas Gerais, Belo Horizonte, Brazil

- In Brazil we have some urban parameters set by the Master Plan to regulate territory occupation, for example, setbacks, coefficient of utilization, occupancy rate.

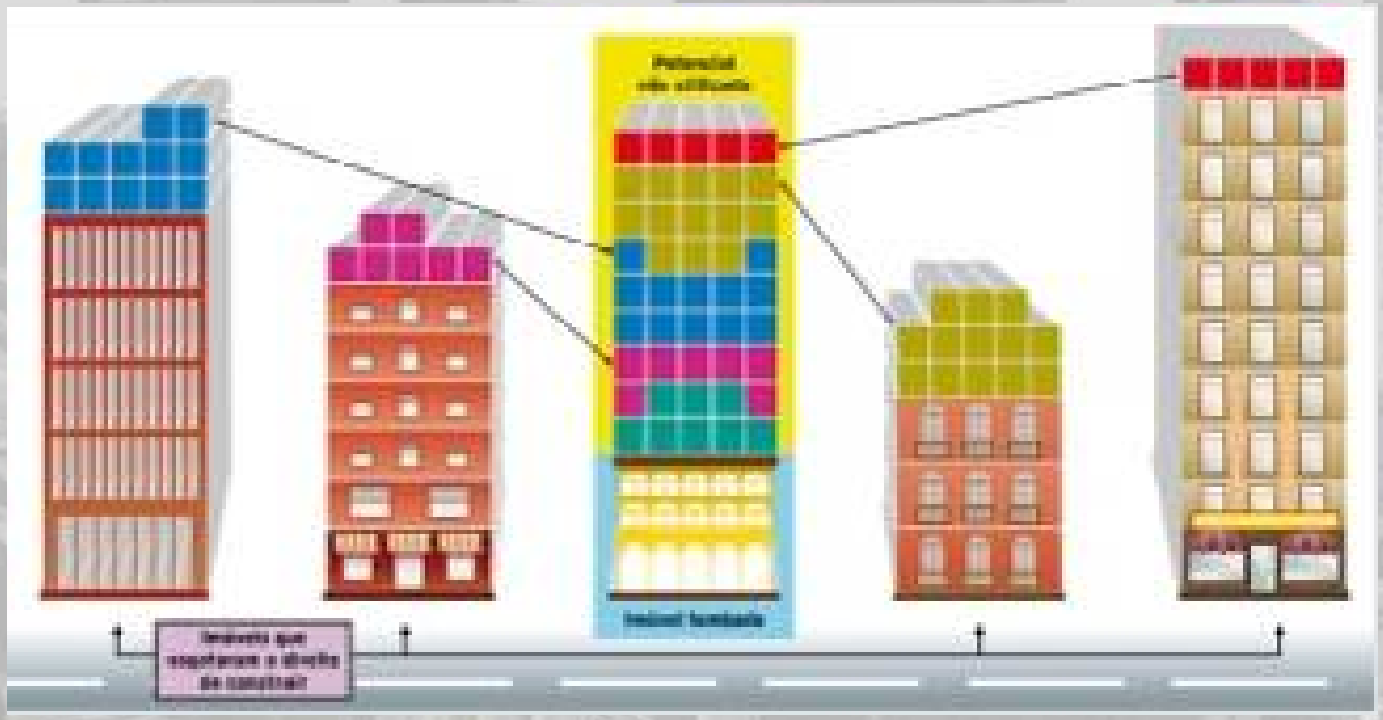


	CA	TO	TP	ALT MÁX EDIF	AFASTAMENTOS (m)			LOTE MÍN.
		(%)	(%)	(m)	FRONTAL	LATERAL	FUNDOS	(m²)
ZAR	0,3	20	70	20	5	3	10	-
ZEDI	0,2	10	80	15	10	10	10	5000
ZHU	0,4	30	70	10	5	3	5	500

- Zyngier (2012)

Methodology

- Create a simulation of how the city would be if all the lots built the maximum allowed by law.
- Simulate the real urban landscape that is already built
- Make studies of urban carry capacity to show where we can no longer build new volumes unless other types of investment are done.



http://www.tribunademinas.com.br/cultura/protec-o-em-potencial-1.478850/comments-7.511277

Goal

- Help in a definition of probable areas to urban densification and the receipt of coefficients, which are the result of operations on urban supplements regulations existing in the country.
- Provide a tool for urban planning so that managers have a feedback of impacts to be generated by regulations that are willing to approve.
- The visualization of the landscape before it is built allows them to assess whether it is what they really want for the city landscape and use.

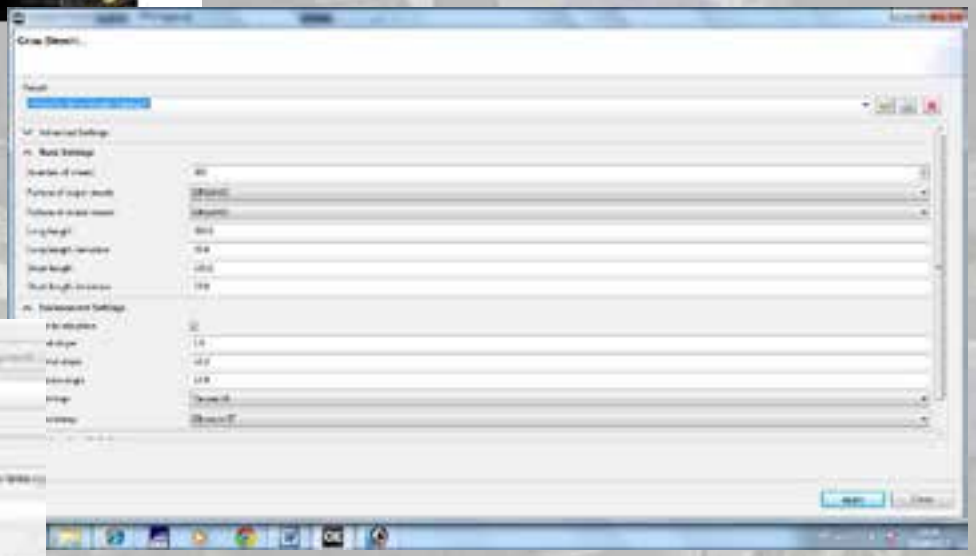
- Moura (2012):

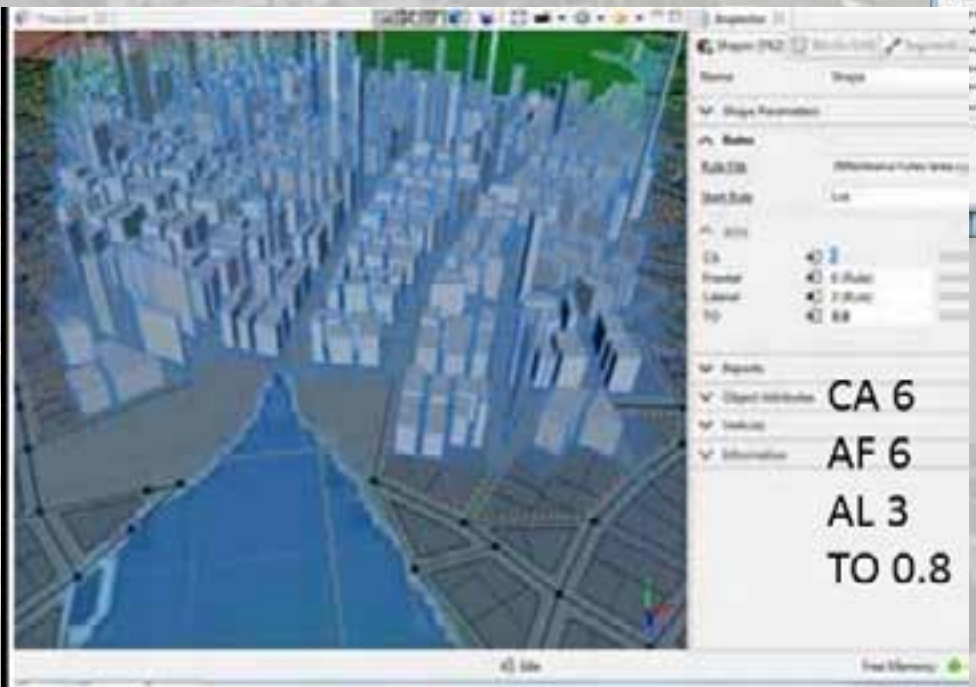
- “Parametric Modeling of Territorial Occupation”.

- Thus, the first step was to find a system that would allow the simulation and make changes driven manager.

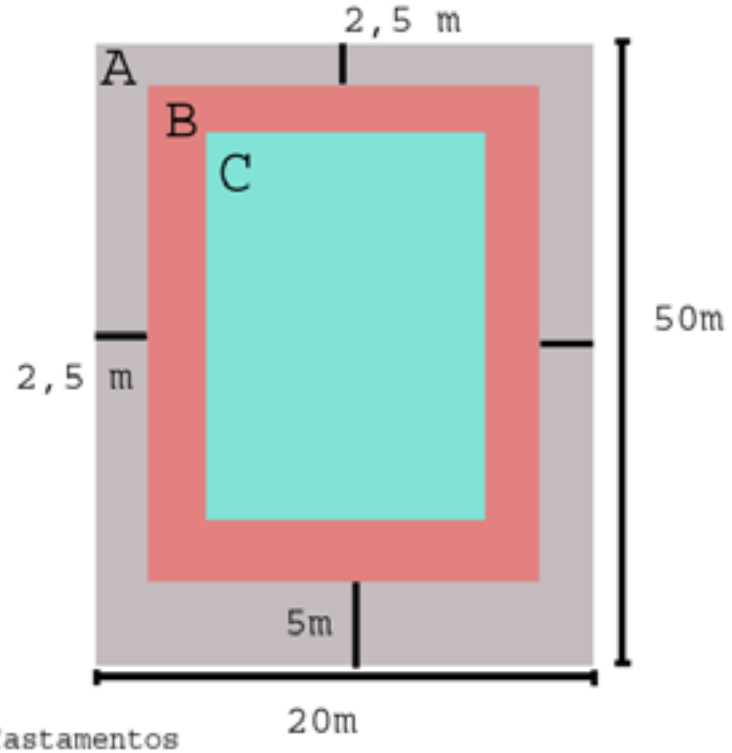
  - CityENGINE

The CityEngine comes with inspiring examples that demonstrate different use cases. Included are ancient, contemporary and future cities at different levels of detail.

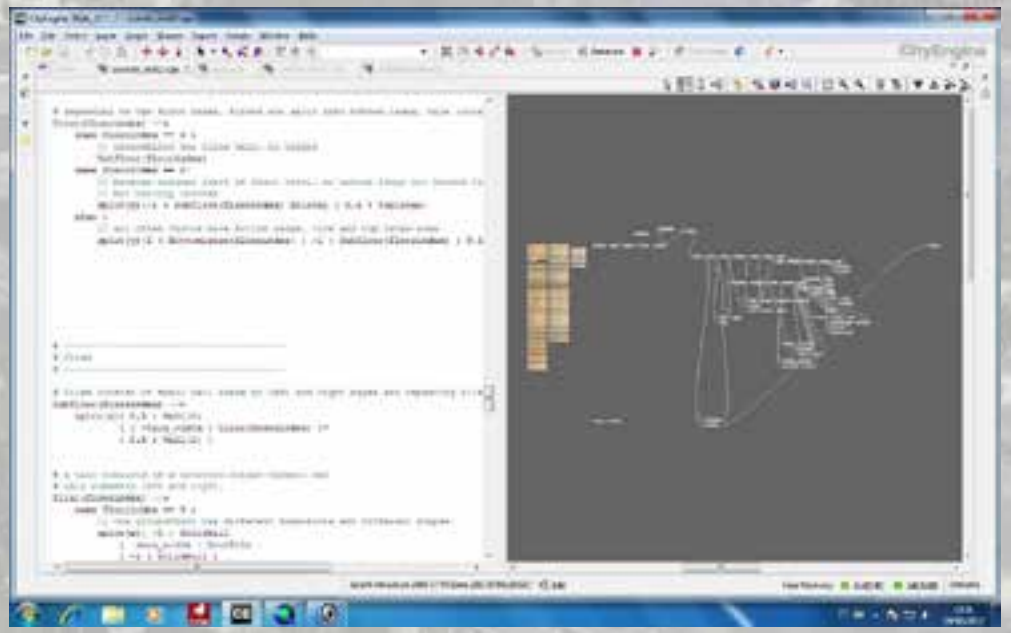




- Create rules and algorithms that build cities according to the regulations for each urban zoning.



1-Afastamentos
2-Calcular a área em B
3-Se
    B > (Taxa de Ocupação)* Área de A
    faça:
    De um fator de escala onde:
Escala: Area de A * Taxa de Ocupação/Area B
Logo: B * Escala = C
4-Área A * Coeficiente de Aproveitamento)/C =
   Altura



- Simulate the urban landscape for a small area to see if the rules were correct, if the software could process the data and create the desired scenario.

- With the modeling of the real city (reproduction of existing occupation) and the city according to the urban parameters (volume indicated as maximum constructive in the Master Plan), it was possible to make a comparison of where there's constructive stocks, ie, sites that were not used maximums allowed constructive by law or even places susceptible of urban growth.

WebScene

CityEngine
Belo Horizonte Citycngine Model - Comparação
Layers
Real City
Legal City
esri

Next steps

- Improve the urban rules in CityEngine,
- Create a random city according to the zones,
- Make the comparison of the parametric proposed city according the Master Plan and the real city resulted in the landscape, in order to identify areas with building stocks and possibilities of landscape renovation. This can help on the definitions of probable areas to urban densification and the receipt of coefficients, which are the result of operations on urban supplements regulations existing in the country.

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Thanks

- Sheyla Santana
  - shesantana@hotmail.com

    +55 31 83081659

- Ana Clara Mourão Moura
  - anaclara@ufmg.br