UrbanCo2Fab: Comprehension Of Concurrent Viewpoints Of Urban Fabric Based On GIT
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Urban Evolution

- Studied by urban planners, historians, archaeologists
- Slow or fast evolution of cities
- Lessons from past failures and successes for sustainable urban planning
- Need for representation and management of urban changes
Objectives

- Manage City Life cycle
- A generic approach
- Reduce learning curve and development time
Urban Evolution: Related Works

- 4D visualization (e.g., Bastian Fort, digital reconstruction of Pompeii)
- Relief maps
- Venice Time machine project
- GeoGig (but focus on user changes)
Our solution

- Not a one-time solution
- Proposition based on Chaturvedi et al. 2017

Version

Diagram showing the timeline of building phases and changes from V1 to V5:
- V1 (1950-1957)
- V2 (1957-1958)
- V3 (1958-1961)
- V4 (1961-1965)
- V5 (1965-1970)

Key events:
- Building constructed (V1)
- New floor added (V2)
- Change in function (V3)
- New roof added (V4)
- Building destroyed (V5)

Changes over time:
- VT1 (V1-V2)
- VT2 (V2-V3)
- VT3 (V3-V4)
- VT4 (V4-V5)

Properties over time:
- Roof type
- Number of storeys
- Texture
- Function
Version Transition

Diagram showing the transition of building versions from V1 to V5 over time, with phases such as construction, new floor added, change in function, new roof added, and building destroyed. The diagram includes timelines for different versions and factors such as roof type, number of storeys, texture, and function.
Versionable Features


V1  V2  V3  V4  V5

VT1  VT2  VT3  VT4
V1-V2  V2-V3  V3-V4  V4-V5

Building constructed  New floor added  Change in function  New roof added  Building destroyed

Construction Phase  Building abandoned

V1  V2  V3  V4  V5

VF1,1  VF2,1  VF3,1, VF4,2  VF4,4

F1  F2  F3
VF1,5  VF1,3  VF3,2  VF3,4

t1  t2  t3  t4  t5  t6  t7  t8  t9  t10
Workspace
UrbanCo2Fab: Architecture

GIT-like urbano2fab commands

1. Urbano2Fab
2. pygit2
3. GIT

- urbano2fab metadata
- git metadata

get/write/update
get/write
UrbanCo2Fab: GIT commit

- Building constructed
- New floor added
- Change in function
- New roof added
- Building destroyed

commit time:
- Jan '18
- Feb '18
- May '18
- Nov '17
- Dec '17
- Jan '18
- Fev '18
- May '18
- Nov '17
- Dec '17

real-world existence time:
- 1950
- 1957
- 1958
- 1960
- 1961
- 1962
- 1965
- 1967
- 1970
- 1972

VT1: V1-V2
VT2: V2-V3
VT3: V3-V4
VT4: V4-V5
Conclusion and Future Works

- Growing need for a solution to represent urban evolution
- UrbanCo2Fab demonstrates a generic approach with reduced development
- Scalability and Performance of UrbanCo2Fab
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