



Integrating multimedia documents in 3D city models for a better understanding of territories

GAUTIER Corentin

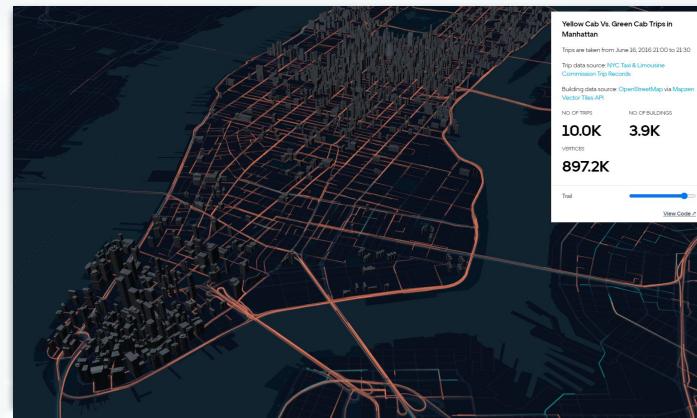
corentin.gautier@universite-lyon.fr

LIRIS - UMR 5205 - Université de Lyon

Digital 3D representations of urban areas

How to understand a territory with urban data ?

Goal : Describe a territory to a better comprehension



[Google map - Lyon]



[Cesium - La Part-Dieu district Lyon]

Multimedias

Other way to describe an urban territory

Multimedia :

- Videos
- Pictures
- Web pages
- Audio

[Archive picture "cours Lafayette" 1856]



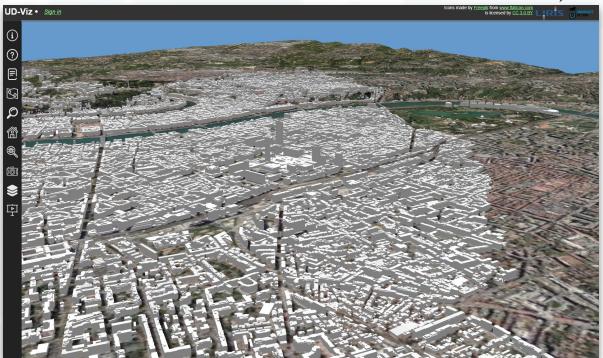
[Interview video of a stakeholders of a territory]

Our approach

Integrate

Mixed 2D representation in a
3D georeferenced
environment

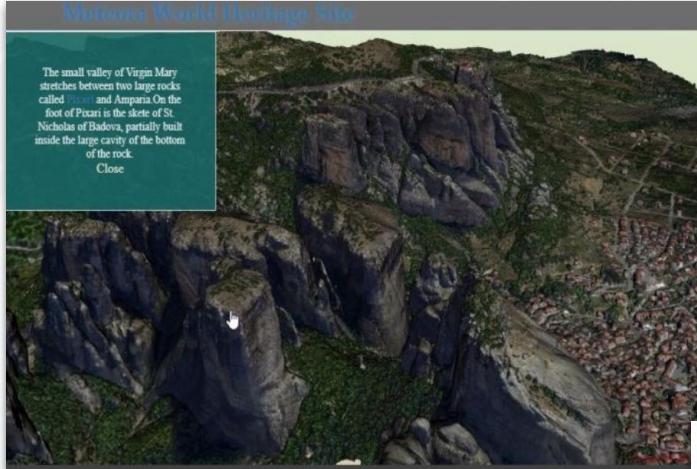
Navigate



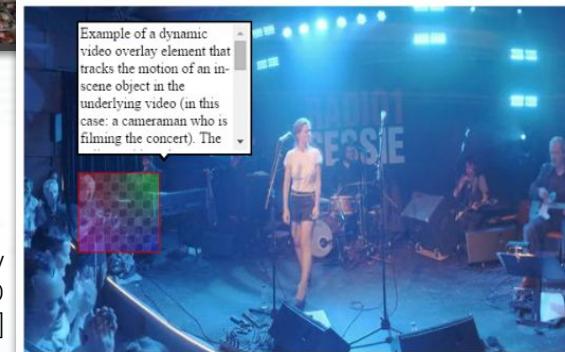
**court théorique, que
l'on peut mettre en
pratique en
entreprise.**

Luca Bombace – Alternant INTERFORA IFAPM
Apprenti chez Sandof Pasteur

User interface integration



Interactive online visualization of complex 3D geometries [Boutsi et al., 2019]

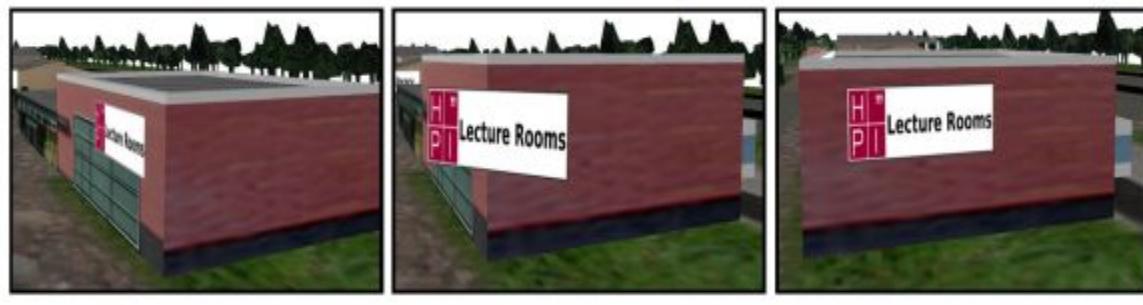


Web-mediated Augmentation and Interactivity
Enhancement of Omni-directional Video in Both 2D and 3D
[Wijnants et al. 2015]

3D representation

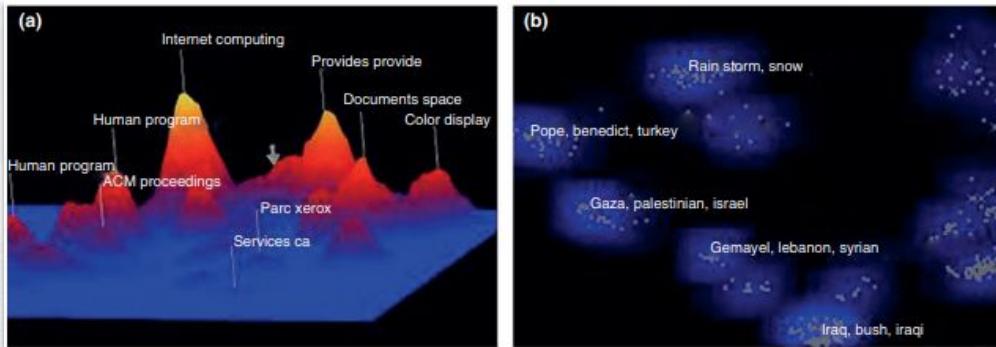
Linking position in a 3D scene and a picture/documents

Visualisation of Documented 3D Cities [Chagnaud et al., 2016]

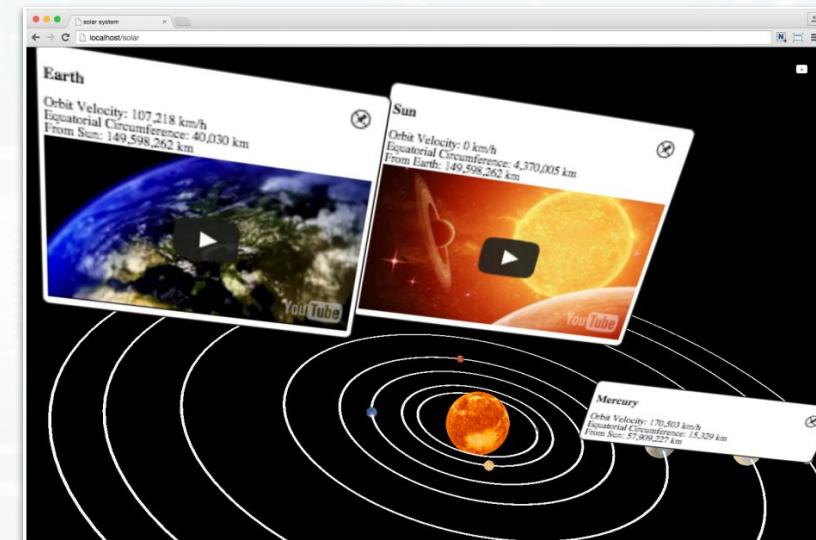


Dynamic Annotation of Interactive Environments using Object-Integrated Billboards [Maas and Döllner, 2006]

Multimedia

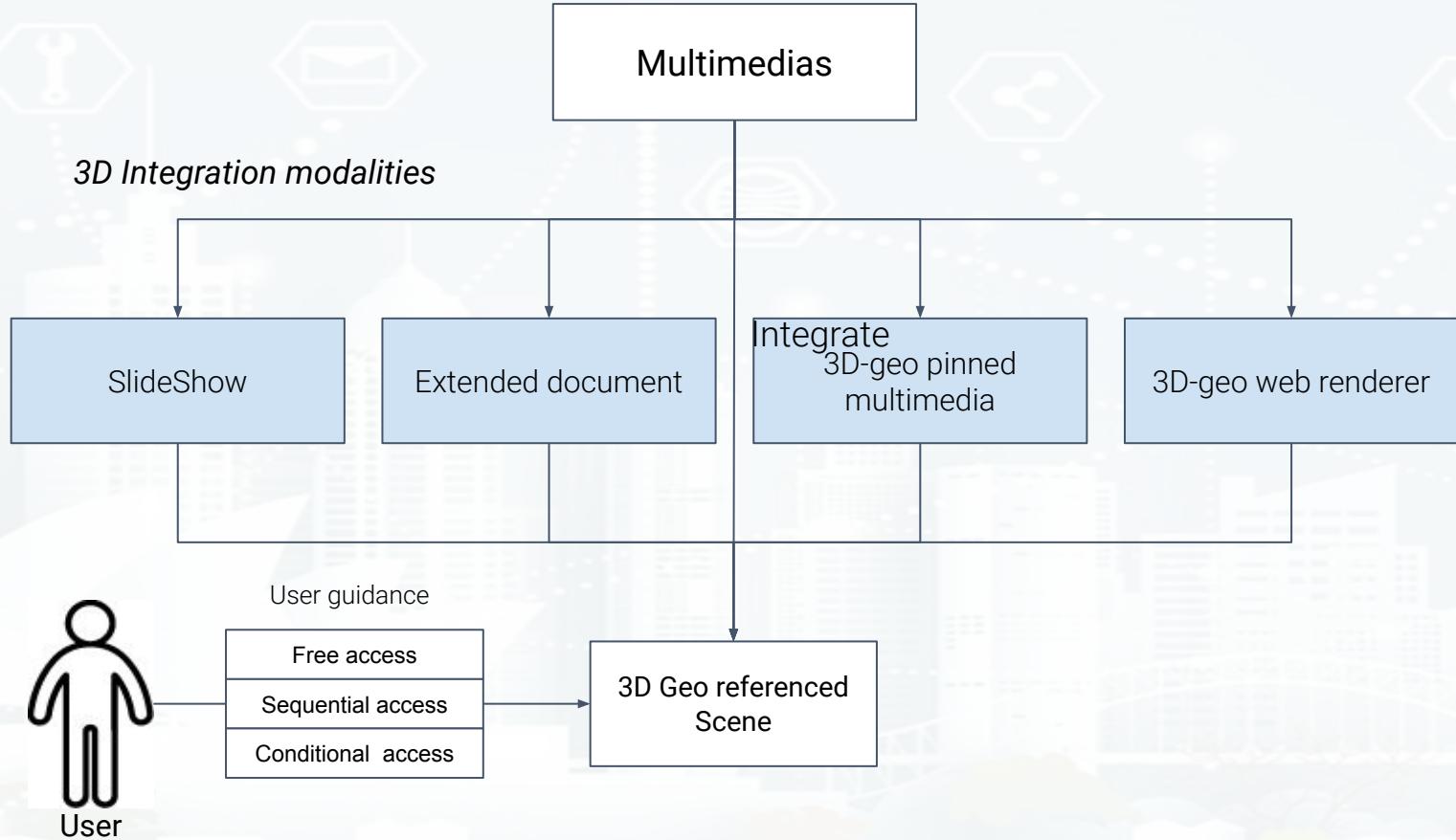


Document visualization: An overview of current research [Gan et al. 2014]

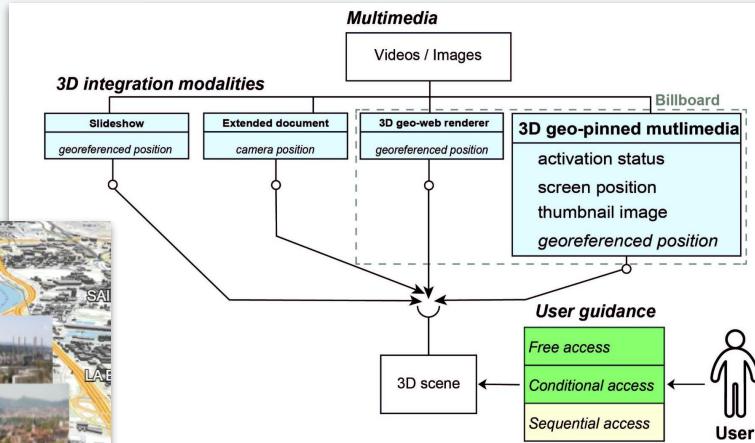


Webized 3D Experience by HTML5 Annotation in 3D Web [Seo et al., 2015]

Features Articles	Multimedia				3D scene	Geo referenced
	Videos	Pictures	Documents	Web pages		
[Maas and Döllner, 2006]		✓			✓	
[Seo et al., 2015]		✓		✓	✓	
[Gan et al. 2014]		✓	✓			
[Wijnants et al. 2015]	✓	✓	✓	✓		
[Samuel et al., 2016]		✓			✓	✓
[Boutsi et al., 2019]		✓		✓	✓	✓
Our approach	✓	✓	✓	✓	✓	✓



3D-geo pinned multimedia



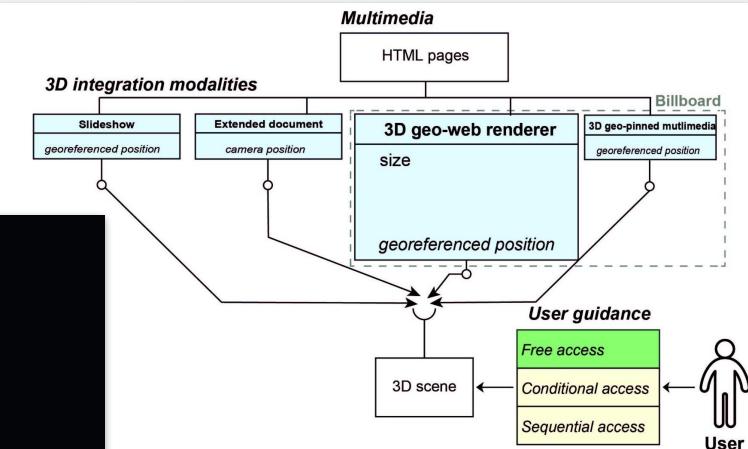
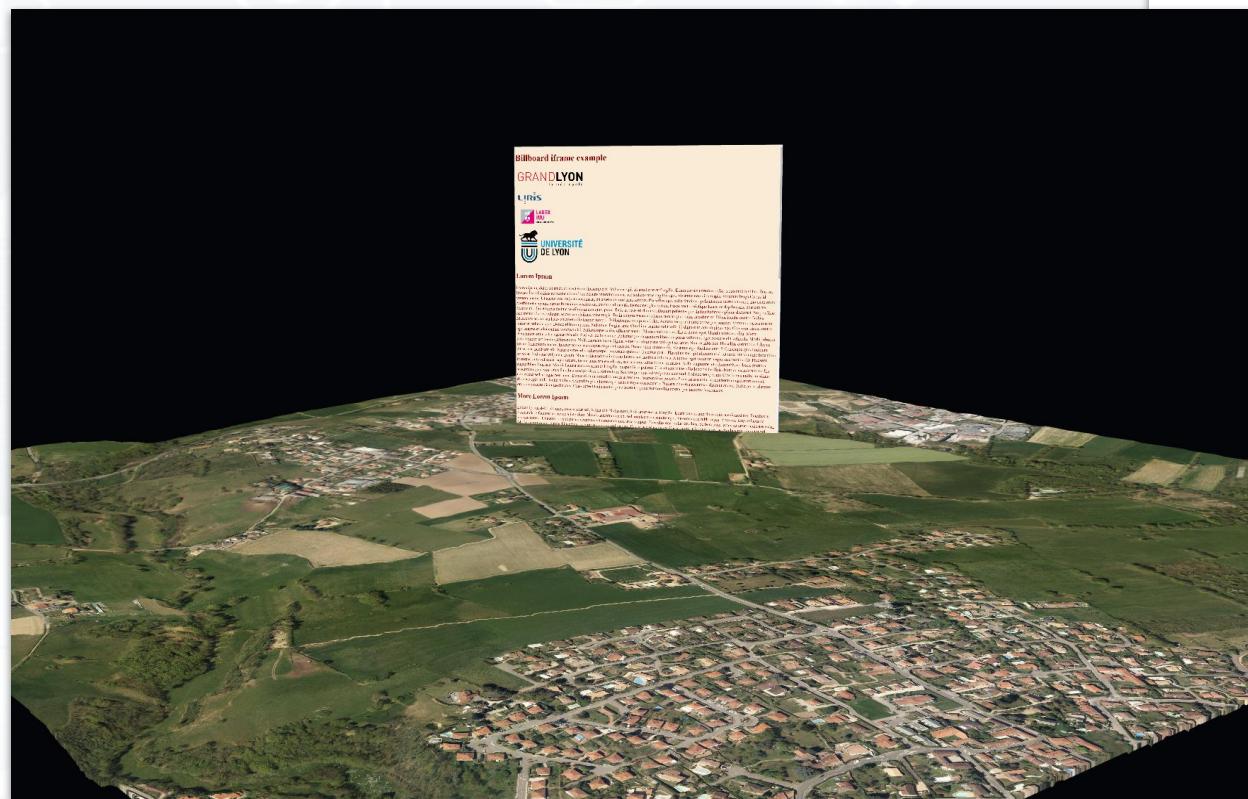
Multimedias: Videos / 360 Videos / Pictures

The thumbnail gives information about the **subject** of the multimedia integrate

The multimedia content is shown after the user interacts with the thumbnail

A "Lock" parameter to control the user consumption

3D-geo web renderer

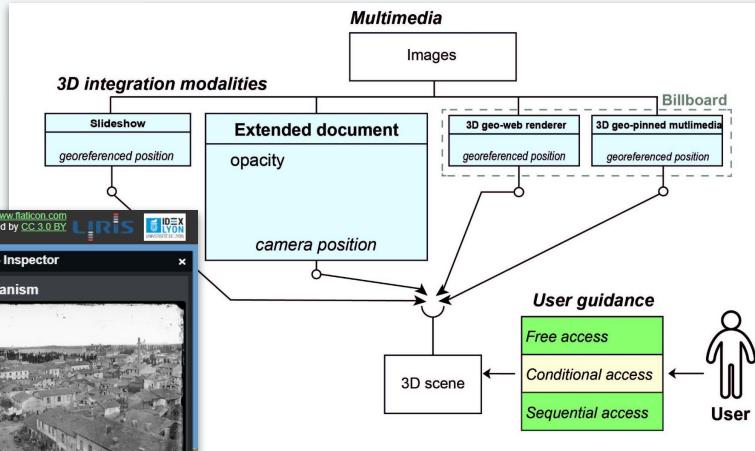


Multimedias: Dynamic web pages
(*Html*)

The multimedia content is directly integrated in the 3D scene

This allows the user to keep the focus on the urban representation

Extended document

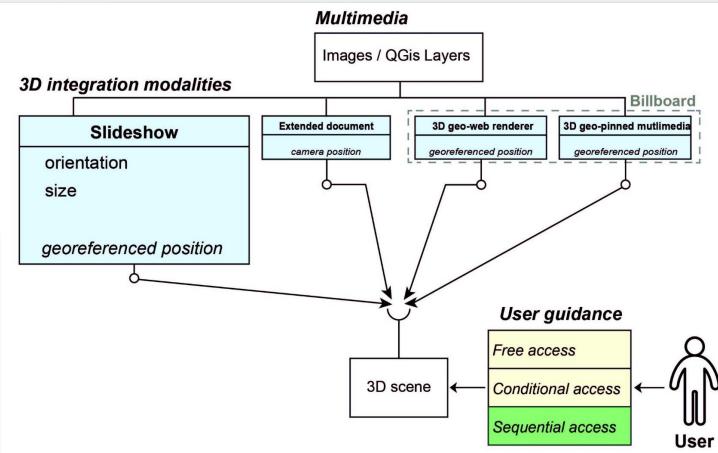


Multimedias: Pictures

This makes it possible to **compare** the **geometry** of the buildings with the current state and the archive images

Enhancing by a **guided tour** that gives a logical flow of documents

SlideShow



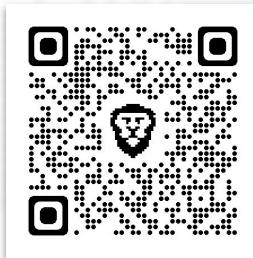
Multimedias: Pictures

Qgis layers (2D carto) can be integrate in the SlideShow

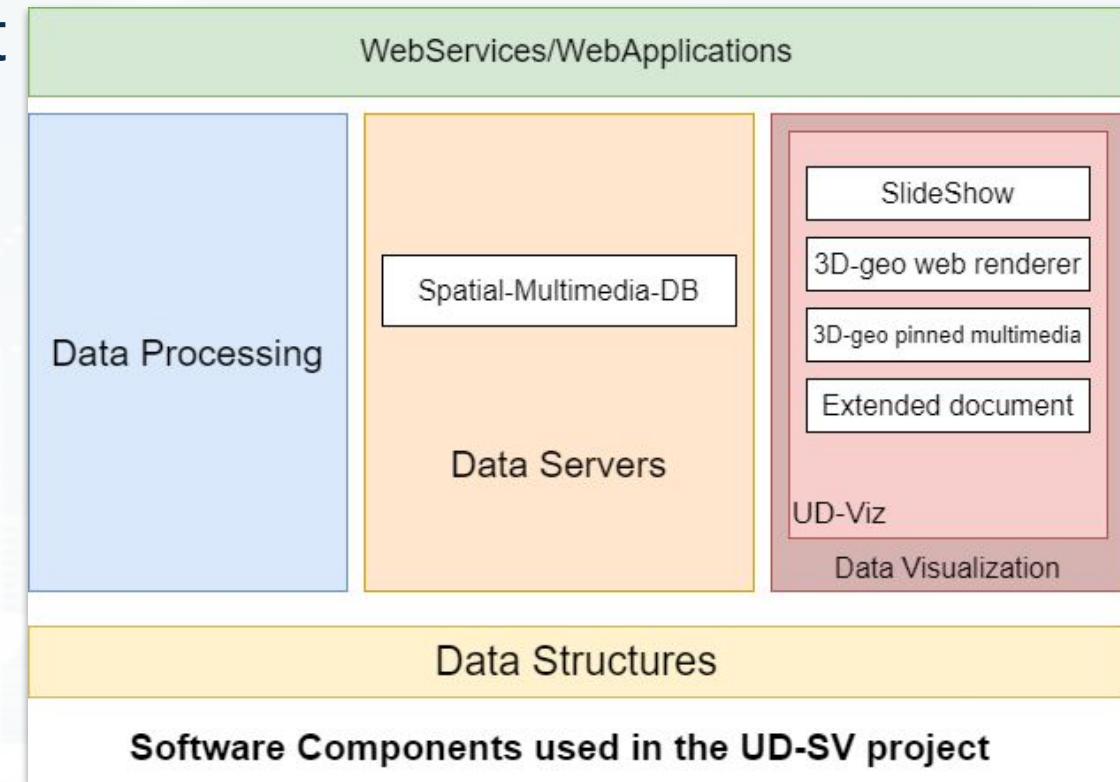
Use-case: Environment



Developed in UD-Viz

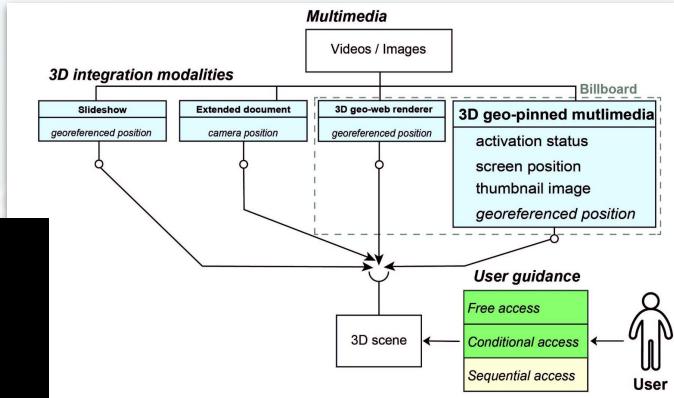


<https://github.com/VCityTeam/UD-SV>



Urban Data Services and Visualization environment [Vcity 2022]

Use-case: Chemistry Valley (1/2)

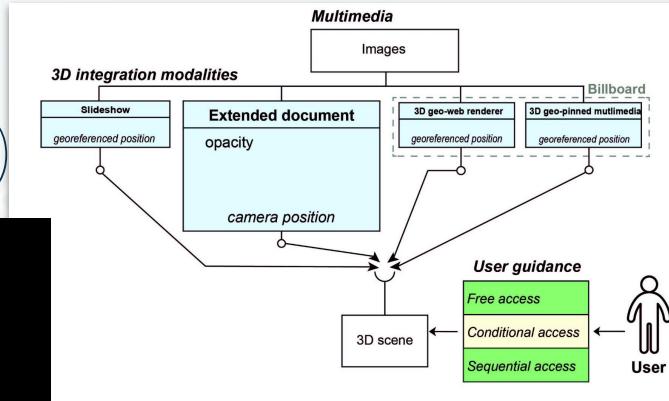


Change citizens visions of
the Chemistry Valley through
a **web documentary**

Territory: Chemistry Valley (Lyon)

Data: 3D urban model (*CityGML*)
/ Stakeholders interviews /
Citizen interviews

Use-case: Historical guided tour (2/2)



Contextualise 3D
urban data with
archives documents

Territory: Lyon metropolis

Data: 3D urban model
(CityGML) / Districts
pictures of Lyon in the
19th century

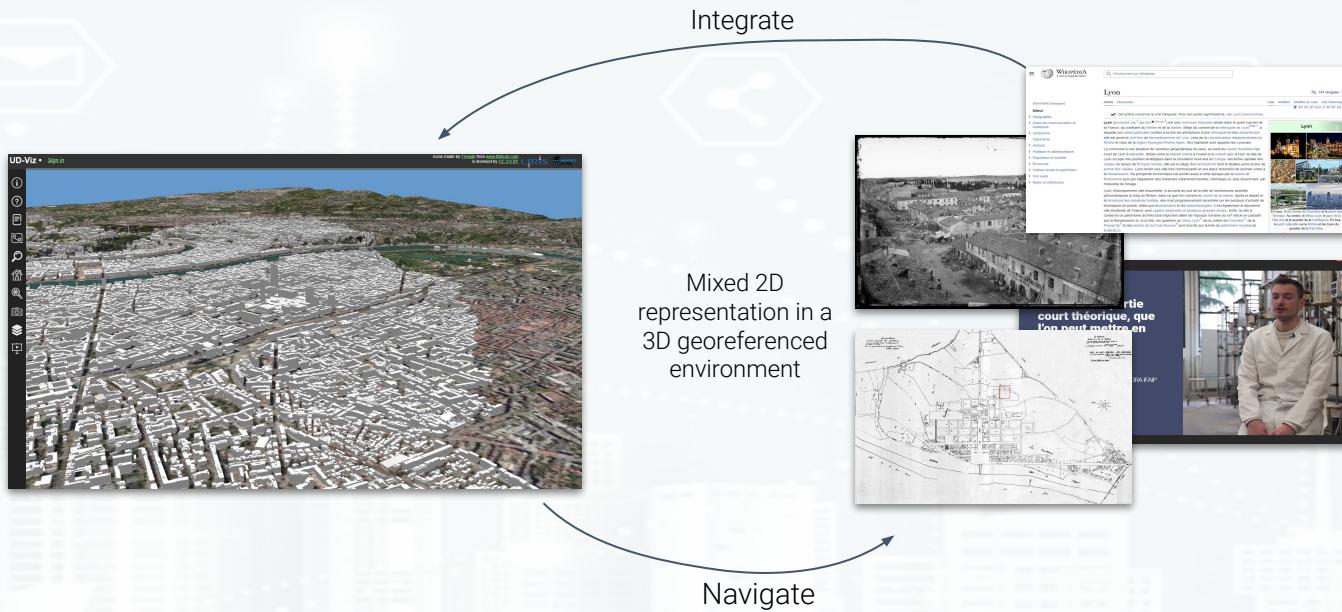
Conclusion

Better understanding of the territory.

New way to **navigate** through browser and find **documents**.

Future works :

- Filtering when you have a lot of multimedia in the scene
- Enhancing 3D evolutive representation thanks to multimedia

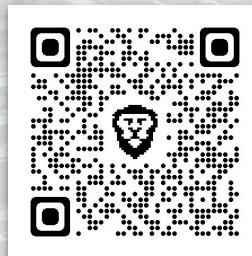




Thank you for your attention

All this projects/modules are available on Github and reproducible here :

UD-SV: <https://github.com/VCityTeam/UD-SV/>



Ex - Anthropocene week

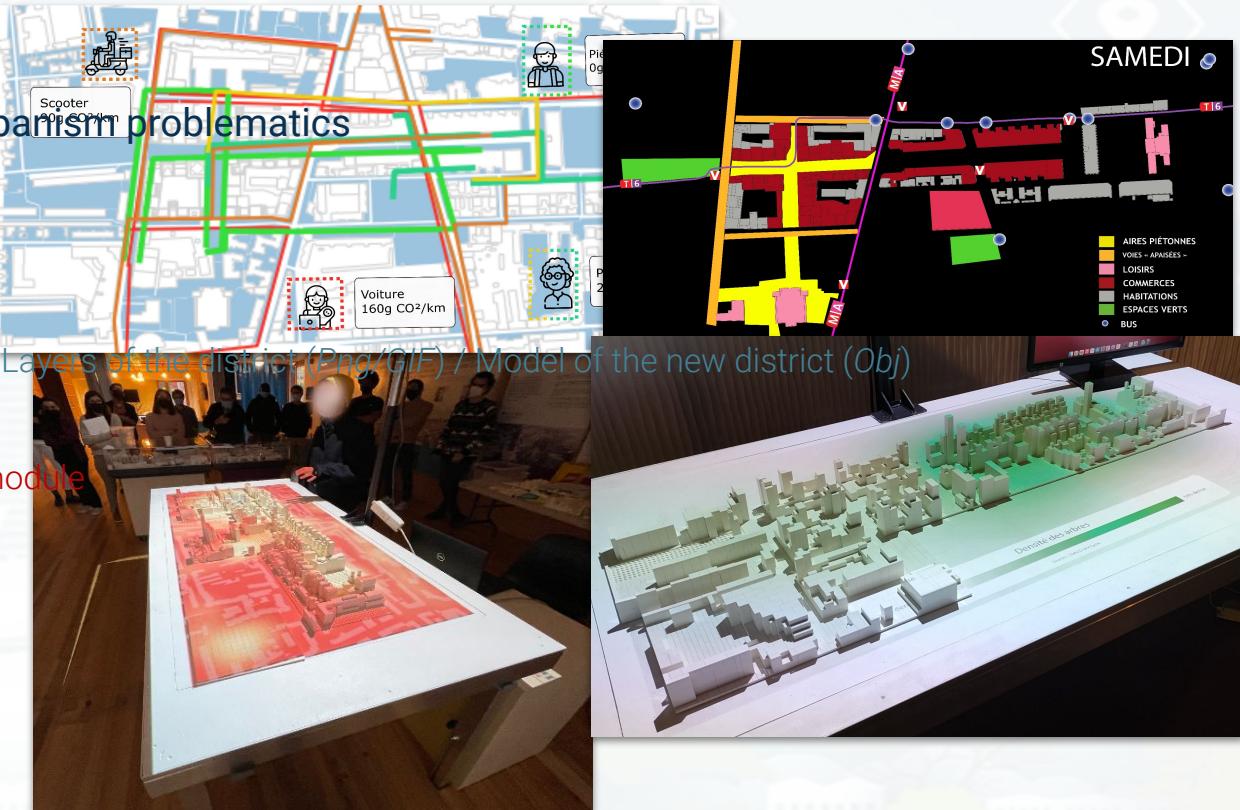
Mediation tools to explain urbanism problematics

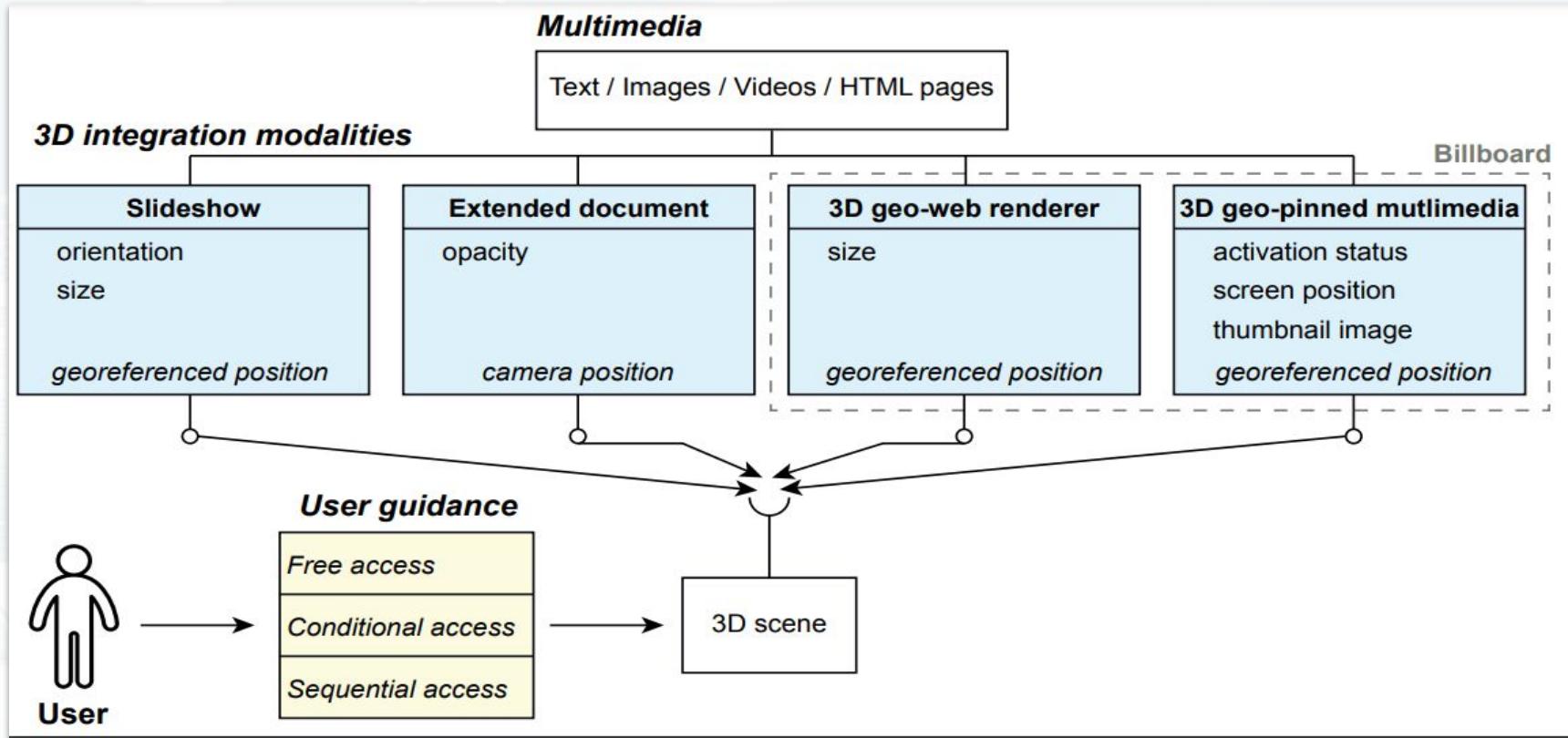
Territory: Gratte-ciel district - Lyon

Data: 3D urban model (CityGML) / Layers of the district (Png/GIF) / Model of the new district (Obj)

Integration modality: SlideShow module

User guidance: sequential access





User Guidance

Sequential access (specific order of consumption of multimedia)

Conditional access (can access like a graph of document)

Free access (no constraint)

Control how the user access to the documents and not be lost in a large workflow of documents/multimedia

Why : not lose the user in the visualizer