The INDIGO graffiti project is funded by the Heritage Science Austria programme of the Austrian Academy of Sciences (ÖAW)
AGENDA
AGENDA
part 1 [13:30 – 14:30]
AGENDA

part 1 [13:30 – 14:30]

part 2 [14:45 – 16:30]
AGENDA

part 1 [13:30 – 14:30]

Geert / INDIGO—dissemination for general & scientific audiences 13:30
Benjamin / Introducing AUTOGRAF 13:45
Martin / RTK GNSS on top of the camera 13:55
Geert / COOLPI 14:05
Jona & Massimiliano / Discussing graffiti—Knowledge organization impossible? 14:10
Alex, Bernhard & Nina / New OpenAtlas features for INDIGO 14:20
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- Alex, Bernhard & Nina / New OpenAtlas features for INDIGO 14:20
Graffiti is unique, complex, short-lived, socially relevant cultural heritage.
the potential of graffiti to understand society is under-exploited
DISSEMINATION general audience
DISSEMINATION general audience

NEWSLETTER
NEWSLETTER

1

DISSEMINATION general audience

Website launch
Wednesday 13-10-2021
Unveiled on World's first version

Vocats meeting
Friday 15-10-2021
6:00 PM at Online Council
general introduction

1. TU server meeting
Tuesday 18-10-2021 / TU Wien-IOI
can provide 7 TB of server space
to the desktop hard drives of
Benjamin, Stefan and Geert

2. OpenAtlas meeting
Tuesday 25-10-2021 / introduction to
the world of OpenAtlas; discussion of
3D geometries, temporal resolutions,
image metadata and vocabularies

3. Total station survey
Friday 08-10-2021 / Juna and Benjamin
surveyed with total station 3D points
using real-time kinematic points on the test
site with 5 cm estimated point accuracy

This amazing densely packed office of the Augmented Reality
Nicola Stoev / Nicola All 4 INDIGO Street 644 442-256 240-256 260-260
DISSEMINATION general audience

NEWSLETTER

12
DISSEMINATION general audience

Gallery Wednesday

NEWSLETTER
24

INSTAGRAM
DISSEMINATION general audience

Gallery Wednesday

NEWSLETTER
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INSTAGRAM
DISSEMINATION general audience

Flashback Friday

2003

2022

NEWSLETTER

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INSTAGRAM
Flashback Friday

DISSEMINATION general audience

NEWSLETTER
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INSTAGRAM
DISSEMINATION general audience

SOLE KALLAR OSS KLOTTRARE
THEY CALL US VANDALS
SVENSK|SWEDISH GRAFFITI • MALCOLM JACOBSON

NEWSLETTER
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INSTAGRAM
DISSEMINATION general audience

TAKE OVER
VIENNA STREET ART NOW

NEWSLETTER
24

INSTAGRAM
DISSEMINATION general audience

TAKE OVER
VIENNA STREET ART NOW

NEWSLETTER
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INSTAGRAM
400+
Dissemination general audience

Newsletter 24

Press 1

Instagram 400+
DISSEMINATION general audience

NEWSLETTER
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PRESS
1

INSTAGRAM
400+

EVENTS
1

Lange Nacht Der Forschung 2022
DISSEMINATION general audience

NEWSLETTER 24
PRESS 1
INSTAGRAM 400+
EVENTS 1
DISSEMINATION general audience

European Researchers Night 2022

- NEWSLETTER: 24
- PRESS: 1
- INSTAGRAM: 400+
- EVENTS: 2
DISSEMINATION general audience

NEWSLETTER 24
PRESS 1
INSTAGRAM 400+
EVENTS 2+1

Boat tours Levin Statzer Foundation

Keep Smiling
Street Art vom Schiff aus

Die Ufer des Donaurands sind im Bezirk der Innere Stadt nahezu durchgängig mit Graffiti versehen. Sie bilden somit ein Museum der besonderen Art und die wahrscheinlich einzige Open-Air-Galerie Österreichs. Auf der Street Art River Cruise können interessierte jedes Sonntags die Kunstwerke bestaunen und Wissenswertes dazu erfahren.
DISSEMINATION general audience

PODCASTS 1
DISSEMINATION general audience

Artcade podcast S08 E01

May 9th, 2022

S08 E01: NDZW

NDZW is an illustrator and street artist from Poland. He is currently based in Vienna, Austria.

Check out his Instagram here.

and his website here.

Host: DeadBeat Hero

Visuals: Nino Werner

Podcasts 2
3D models to preserve a graffiti-scape in Vienna

Published by Benjamin Wild on July 5, 2022

Graffiti upset, please, provoke. However, they are also short-lived, and often exist only for several hours or days. If not documented, part of this unique cultural heritage will vanish forever. The INDIGO project tries to change this by building an online 3D platform to analyse and present graffiti scapes.
DISSEMINATION general audience

[Image: Visualisation of present-day Bassianae using an image fusion of the UAS imagery-based orthophoto with a particular relief rendering. PC: Geert Verhoeven]

Interview with Geert Verhoeven, CIPA Expert

CIPA Heritage Documentation Emerging Professionals
Published Oct 4, 2022

PODCASTS
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DISSEMINATION scientific audience
DISSEMINATION scientific audience
DISSEMINATION scientific audience

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February 23 – 25, 2023

SOFTWARE

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ARTICLES

3+1

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1
DISSEMINATION scientific audience

HARDWARE 1

SOFTWARE 2

ARTICLES 3+2

GoINDIGO 2022 proceedings [open-access]

Document | Archive | Disseminate graffiti-scapes
Proceedings of the GoINDIGO 2022 International Graffiti Symposium
Geert J. Verhoeven, Jana Schieper, Benjamin Witt, Stefan Wopins, Maastricht Conservatory (eds.)

Getting Listeners for Walls that Speak — Editorial Introduction
Geert J. Verhoeven, Maastricht Conservatory, Jana Schieper, Benjamin Witt, Stefan Wopins

PART I. REFLECTING
Graffiti Sonics Times: Archaeology, Artefacts and Archives
Jeroen Nijenhuis

Different Folks, Different Strokes: GoINDIGO 2022’s «Creators vs Academics» Discussion Round
Samantha Aaliv, Geert J. Verhoeven, Benjamin Witt, SERET, SNLF, Massimiliano Contoli, Martin De La Iglesia, Francisco Fernandez Merino, Ullano Roldan, Silvia Roca, Jana Schieper, Stefan Wopins

Imagine Being a Racist: GoINDIGO 2022’s Ethics & Legality in Graffiti (Research)
Discussion Round
Benjamin Witt, Geert J. Verhoeven, Norbert Pfefler, Enrico Bonato, DREADBEAT HEAD, FUNKY, JAHRE ONE, ARIANNE SKILL, Masimiliano Contoli, Chiara Ricci, Christo Raffu, Sven Nielsen, Ullano Rodolfo, MAR Schieper, Alexander Weisberger, Stefan Wopins

PART II. DOCUMENTING
Facing a Channel - How Project INDIGO Discovers and Records New Graffiti
Geert J. Verhoeven, Stefan Wopins, Jana Schieper, Martin Wieser, Benjamin Witt
Towards Colour-Accurate Documentation of Anonymous Expressions
Adolf Masadi-Takor, Geert J. Verhoeven

Urban Creativity Meets Engineering. Automated Graffiti Mapping along Vienna’s Donaukanal
Benjamin Witt, Geert J. Verhoeven, Stefan Wopins, Martin Wieser, Camilla Reisel, Johannes Ochlap Scheneman, Norbert Pfefler

Joseph Kyselka (1798-1851), the First TAGger and Local Patron of the Vienna Donaukanal Graffiti
Georgina Goffiner

Cataloguing Works of Art in Urban Spaces, of an Extremely Ephemeral, Performative Nature and/or using Organic Materials
Luisa Lagos Rodriguez, Carmen Maria Ruiz
DISSEMINATION scientific audience

PART I. REFLECTING
Graffiti Sonic Times: Archaeology, Artefacts and Archives
Alex Nève

*Different Folks, Different Strokes*: goINDIGO 2022’s «Creators vs Academics» Discussion Round
Simonetta Mener, Gert J. Verhoeven, Benjamin Wilz, Gayatri Chakravorty Spivak, Steven Harte, Masatoshi Komori, Martin De La Iglesia, Francisco Fernandez Merino, Ljiljana Radulović, Olko Rock, Jana Schiegel, Stefan Wogrin

*Imagine Being a Racist*: goINDIGO 2022’s «Ethics & Legality in Graffiti: Research»
Discussion Round
Benjamin Wilz, Gert J. Verhoeven, Norbert Pfefier, Erna Bonasia, DEADBEAT HEAD, FUNKY, HANR ONE, HALVaRT SKILL, Masatoshi Komori, Olko Rock, Christo Rambj, Sven Niemann, Ljiljana Radulović, Jana Schiegel, Alexander Wöhringer, Stefan Wogrin

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Joseph Kysliak (1798–1831), the First Tagger and Local Patron of the Wiener Donaukanal Graffiti
Gianvito Soffi
Cataloguing Works of Art in Urban Spaces, of an Extremely Ephemeral, Performative Nature and/or using Organic Materials
Luisa Luján Rodríguez, Carmen Moreno Ruiz
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Getting Listeners for Walls that Speak—Editorial Introduction
Oerri J. Verhoven, Joris Schepel, Benjamin Will, Steffen Wegner, Massimiliano Contoli (Eds.)

PART I. REFLECTING
Graffiti Sonia Times: Archaeology, Artefacts and Archives
Alex Neve

‘Different Folks, Different Stories’: goINDIGO 2022’s «Creators vs Academics» Discussion Round
Sonja Maria Kletsch, Oerri J. Verhoven, Benjamin Will, Stephan Pfeffer, Manuel Sarti, Sert, Simon, Massimiliano Contoli, Martin De La Iglesia, Francisco Fernandez Merino, Uljana Andrianova, Chikara Kato, Joris Schepel, Steffen Wegner

‘Imagine Being a Racist’: goINDIGO 2022’s « Ethics & Legality in Graffiti [Research] »
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PART II. DOCUMENTING
Facing a Chanel-Deau—How Project INDIGO Discovers and Records New Graffiti
Oerri J. Verhoven, Steffen Wegner, Joris Schepel, Martin Werner, Benjamin Will

Towards Colour-Accurate Documentation of Anonymously Expressions
Adetola Musa-Tayo, Oerri J. Verhoven

Urban Creativity Meets Engineering: Automated Graffiti Mapping Along Vienna’s Donaukanal
Benjamin Will, Oerri J. Verhoven, Steffen Wegner, Martin Werner, Camillo Rest, Johannes Ostapke-Schreinemachers, Stephan Pfeffer

Joseph Kyselka (1796-1831), the First Tagger and Local Patron of the Wiener Donaukanal Graffiti
Gudrun Gatterer

Cataloguing Works of Art in Urban Spaces, of an Extremely Ephemeral, Performative Nature and/or Using Organic Materials
Izaskua Lazapu Rodriguez, Carmen Merca Ruiz
DISSEMINATION scientific audience

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Proceedings of the goINDIGO 2022 International Graffiti Symposium

Gerrit J. Vethoven, Jana Schlieper, Benjamin Witt, Steffen Wegryn, Massimiliano Contori (Eds.)

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Graffiti Sonia Times: Archaeology, Artefacts and Archives

Alex Heye

‘Different Folks, Different Strokes’: goINDIGO 2022’s «Creators vs Academics» Discussion Round

Dominik Alten, Gerrit J. Vethoven, Benjamin Witt, SAGERONE, MANUEL, SARKI, SERT, SNIF, Massimiliano Contori, Marta De La Iglesia, Francisco Fernandez Marinas, Luis A. Rodalvaj, Okoro Rock, Jana Schlieper, Steffen Wegryn

‘Imagine Being a Racist’—goINDIGO 2022’s «Ethics & Legality in Graffiti (Research)» Discussion Round

Benjamin Witt, Gerrit J. Vethoven, Norbert Pfeiffer, Enrico Bonasia, DEADBEAT HEAT, FUNKY, HANK ONE, MAURO SKRIL, Massimiliano Contori, Okoro Rock, Christof Ranzko, Sven Niemann, Luis A. Rodalvaj, AMO Schlieper, Alexander Woschtag, Steffen Wegryn

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Facing a Challenge—How Project INDIGO Discovers and Records New Graffiti

Gerrit J. Vethoven, Steffen Wegryn, Jana Schlieper, Martin Wiener, Benjamin Witt

Towards Colour-Accurate Documentation of Anonymous Expressions

Adelheid Masoli-Teke, Gerrit J. Vethoven

Urban Creativity Meets Engineering: Automated Graffiti Mapping along Vienna’s Donaukanal

Benjamin Witt, Gerrit J. Vethoven, Steffen Wegryn, Martin Wiener, Camillo Reis, Johannes Ortink-Schremmer, Norbert Pfeiffer

Joseph Kyselka (1796-1831), the First Tagger and Local Patron of the Wiener Donaukanal Graffiti

Gerdne Sofriner

Cataloguing Works of Art in Urban Spaces, of an Extremely Ephemeral, Performative Nature and/or using Organic Materials

Lisardo Lajara Rodrigo, Emma Merit Ruiz
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Gernot Kellner, Gert J. Verhoeven, Benjamin Welt, SHERON, MAMES, SERT, SNFE, Massimiliano Conti,
Marta De La Iglesia, Francisco Fernandez Merino, Ljiljana Kadijevic, Olmo Rico, Jana Schlepke, Stefan Wogrin

‘Imagine Being a Racist’ gotINDIGO 2022’s «Ethics & Legality in Graffiti» (Research) Discussion Round
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MARBLE SKILL, Massimiliano Conti, Olmo Rico, Christo Kaidz, Sven Niemann, Ljiljana Kadijevic, JAKO
Schlepke, Alexander Warshauer, Stefan Wogrin

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Facing a Channel: How Project: goINDIGO Discovers and Records New Graffiti
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Towards Colour-Accurate Documentation of Anonymous Expressions
Adetokunbo Taiwo, Uwe Leichner

Urban Creativity Meets Engineering: Automated Graffiti Mapping along Vienna’s Donaukanal
Benjamin Welt, Gert J. Verhoeven, Stefan Wogrin, Martin Wieser, Camilo Reis, Johannes Oehl-Liebert,
Nadine Pflicht

Joseph Kyselka (1796-1831), the First Tagger and Local Patron of the Wiener Donaukanal Graffiti
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Luisa Casaño Rodriguez, Carmen Mena Ruiz
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Martin de la Selle

Tools to Document and Disseminate the Conservation of Urban Art: the Experience of the CAFhus Project
Oleksii Kostiuk, Pietro Covery, Ariane Scorzella, Sagita Mitjaev Sureau, Tari Tobais, Minjoo Barrass, Dominike Spierenburg

Making a Mark—Towards a Graffiti Thesaurus
Joris Soehnke, Marcus Reindl Corri, Stefan Wagner, Anne-M. Groß, Deert Verheesen

One Ontology to Rule Them All—CITOC CRM in the Humanities and Its Use in OpenAtlas
Irene Richards, Stefan Fischer, Alexander Wissinger

INGRID—Archiving Graffiti in Germany
Sven Naemann

Spraycity—at—Graffiti Archive and Online Map
Stefan Wagner

PART IV. DISSEMINATION
Conservation of Graffiti: Ethics and Practices
Koichi Aoi Garcia

Street-Art Communication of Street Art Works through Augmented Reality
Flavia Cozzoni, Elena Quaglio, Alessandro Menchini, Michele Russo

Art in the Streets, in the Virtual Worlds: A Case Study of the First Graffiti and Street Art VR Exhibition in Serbia
Ujjesa Rasileva

Graffiti & Bananas: Street Art in Luc
Elvado Kriekemmer

TAKEOVER—Street Art & Skateboarding: Turning the Museum into an Urban Playground
Christine Käßler

AUTHOR BIOGRAPHIES

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3+7

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DISSEMINATION scientific audience

3D-ARCH 2022
9th International Workshop 3D-ARCH
3D Virtual Reconstruction and Visualization of Complex Architectures

BEST PAPER AWARD

awarded to


For the paper titled
PROJECT INDIGO – DOCUMENT, DISSEMINATE & ANALYSE A GRAFFITI-SCAPE

Luigi Fregonese Francesco Fassi Fabio Remondino

SOFTWARE
2

ARTICLES
3+7

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DISSEMINATION scientific audience

TALKS

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DISSEMINATION scientific audience

TALKS 11
DISSEMINATION scientific audience

11 TALKS

1 POSTERS
DISSEMINATION scientific audience

How project INDIGO automatically turns graffiti photos into orthophotomaps

1 - Why orthophotomaps?

Conventional photographs suffer from various drawbacks:

- Limited observation surface
- Difficult to compare
- Difficult to post-process

Orthophotomaps have the distortions removed, making them:

- Maps of graffiti

2 - How to make them?

Four types of data are required:

- Orthophotomaps from drone photos
- Digital orthophotomaps
- A set of locations
- A digital model of the site

3 - INDIGO’s AUTOGRAF tool

AUTOGRAF was tested on a test site of 230 images corresponding to 1000 graffiti on the sidewalk.

- 100% of the tested graffiti were successfully orthophotographed
- AUTOGRAF worked well to remove even graffiti photos set

4 - The 100-graffiti test

The average orthophotomap test size is below

TALKS

11

POSTERS

2
DISSEMINATION scientific audience

Architecture Image Studies - Narrative Architecture

Much of the work published here was initially exhibited in a series of exhibitions, most recently as part of the Shanghai Urban Space Art Season 2019 in the exhibition ‘Sensory’. Through the production of these drawings and texts, the contributors seek to align themselves with a tradition of visionary narratives and use the multiple platforms of dissemination to communicate those ideas to a wider set of audiences beyond architectural academia.

AUTHORS

NC Chair, Hyun Jun Park

Check here the contents
Request here the printed copy

Street Art Decade Urban Forms Gallery 2009-2019

The book has been created for admirers of urban art interested in learning about and experiencing olympian. It contains photos and standardized descriptions of all external works compiled by the Urban Forms Foundation in the years 2009-2019 mainly in Lodz (Poland).

AUTHORS

TALKS 11

SYMPOSIUM 1

POSTERS 2

EDITED VOLUME (1)
INDIGO website

https://projectindigo.eu

software

The INDIGO team created COOLPI and AUTOGRAF, two software packages that are free to downloaded from the INDIGO's GitHub account.

- COOLPI (Colur Operations Library for Processing images) is an open-source Python toolbox including procedures for the colour correction of RAW photos. The code comes with an extensive manual.
- AUTOGRAF (Automated Orthorectification of GRAFSHI photos) is an open-source Python-based plugin added to automatically orthorectify (graffiti) photos. Its source code can be found here.

hardware

The INDIGO team has developed a device to record the camera’s exact 3D position and angular movement, allowing for the precise collection of graffiti images. The device code is available here.
ZENODO community

project INDIGO

Recent uploads

- Acquiring centimetre-accurate camera coordinates in project INDIGO
- How project INDIGO automatically turns graffiti photos into orthophotos
- AUTOGRAF (Automated Orthorectification of GRAFFiti photos)
- COOLPI - Colour Operations Library for Processing Images

https://zenodo.org/communities/projectindigo
RESEARCHGATE project page

INDIGO - INventory and Disseminate Graffiti along the dOnaukanal

Geert J.J. Verhoeven, Jona Schiegel, Norbert Pfeifer - Show all 7 collaborators

Goal: This academic graffiti project aims to build the basis to systematically document, monitor, disseminate, and analyse circa 13 km of uninterrupted graffiti along Vienna’s Danube Canal in the next decade

https://projectindigo.eu
https://rastudio.org/communities/projectindigo

Date: 1 September 2021 - 31 August 2023

Research referenced in this project

AUTOGRAF—AUTomated Orthorectification of GRAFFITI Photos

Article  Full-text available - Oct 2022 - Heritage
Benjamin Wild, Geert J.J. Verhoeven, Martin Wieser, Norbert Pfeifer

Acquiring centimetre-accurate camera coordinates in project INDIGO

Poster  Full-text available - Sep 2022
Martin Wieser, Geert J.J. Verhoeven, Benjamin Wild
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AUTomated Orthorectification of GRAFfiti Photos

Benjamin Wild, Norbert Pfeifer, Geert Verhoeven, Martin Wieser, Camillo Ressl, Johannes Otepka-Schremmer, Stefan Wogrin

The INDIGO graffiti project is funded by the Heritage Science Austria programme of the Austrian Academy of Sciences (ÖAW)
What does this number represent?

26779
## # of Photos taken by INDIGO

<table>
<thead>
<tr>
<th>Month</th>
<th>Photos</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1620</td>
</tr>
<tr>
<td>February</td>
<td>2957</td>
</tr>
<tr>
<td>March</td>
<td>2552</td>
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<tr>
<td>April</td>
<td>4093</td>
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<tr>
<td>May</td>
<td>6315</td>
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<tr>
<td>June</td>
<td>2954</td>
</tr>
<tr>
<td>July</td>
<td>6288</td>
</tr>
</tbody>
</table>

**Total:** 26779

What does this number represent?
No matter what we do with the photos, it must be automated and fast...

AUTomated Orthorectification of GRAFFiti Photos
Why Orthophotos?
Why Orthophotos?

- Distortions
  - Perspective
Why Orthophotos?

- Distortions
  - Perspective
  - Topography
  - Lens distortions
Why Orthophotos?

- Distortions
  - Perspective
  - Topography
  - Lens distortions

- Georeferenced
  - Locate it in space
  - Measure proportions
  - Stitch photos together
Why Orthophotos?

• Distortions
  – Perspective
  – Topography
  – Lens distortions

• Georeferenced
  – Locate it in space
  – Measure proportions
  – Stitch photos together
Orthophoto recipe

Camera orientation
Orthophoto recipe

Camera orientation + 3D model
Orthophoto recipe

Camera orientation + 3D model + Projection plane
Orthophoto recipe

Camera orientation + 3D model + Projection plane
Orthophoto
Perimeter: 36.82 m
Area: 51.2 m²

Orthophoto
Ca. 10 images of a new graffito (different viewing directions/tilts/positions)

Orthophoto
Initial checks

Ca. 10 images of a new graffito (different viewing directions/tilts/positions)

Orthophoto

Camera Orientations

Incremental SfM

Orthophoto
Initial checks

Ca. 10 images of a new graffiti (different viewing directions/tilts/positions)
Initial checks

Ca. 10 images of a new graffito (different viewing directions/tilts/positions)
Initial checks

Ca. 10 images of a new graffito (different viewing directions/tilts/positions)

OK?

Yes

Camera Orientations

Incremental SfM
Incremental SfM
3D Model
Projection plane
One click = Hundreds of Orthophotos
• Processing times:
  - ca. 1800 photos (ca. 220 graffiti) per day
AUTOGRAF—AUTomated Orthorectification of GRAFfiti Photos

By Benjamin Wilt 1, 2, 3, Geert J. Verhoeven 2, Martin Wieser 2, Camillo Ressi 1, Jona Schlegel 2, Stefan Wogrin 1, Johannes Otepka-Schrömer 1, and Norbert Pfeifer 4

1 Department of Geodesy and Geoinformation, TU Wien, 1040 Vienna, Austria
2 Ludwig Boltzmann Gesellschaft—LBI ArchPho, 1190 Vienna, Austria
3 Independent Researcher, Vienna, Austria
4 SprayCity, Austria; Vienna, Austria

* Author to whom correspondence should be addressed.

Academic Editors: Francesco Fassi, Fabio Remondino and Luigi Fregonese
Heritage 2022, 5(4), 2987-3009; https://doi.org/10.3390/heritage5040155 (registering DOI)
Received: 12 September 2022 / Revised: 29 September 2022 / Accepted: 30 September 2022 /
Published: 6 October 2022

(This article belongs to the Special Issue 3D Virtual Reconstruction and Visualization of Complex Architectures)
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COOLPI

colour-accurate pixels
COOLPI

colour-accurate pixels
3 CIE

The Commission Internacional de l'Eclairage (CIE) establishes standards of response functions, models and procedures of specification relevant to photometry, colorimetry, colour rendering, visual performance and visual assessment of light and lighting (CIE, Division 1: Vision and Colour).

The COOLPI package follows in a rigorous manner the recommendations published by the CIE concerning the standard colorimetric observers, illuminants, the computation of tristimulus values, the colour space conversions formulae and colour difference equations among other colorimetric practices (CIE, 2010).

The CIE objects implemented into the COOLPI package are based on the abstract class CIE, and can include other abstract classes according to their requirements. The CIE main classes are: Observer, SCComponents, CMF, CIEB, and RGSCMF.

Figure 2: UML diagram for the CIE classes

For further explanation of some of the calculations applied, we highly recommend users to consult the standards published by the CIE, particularly the Technical Report CIE 015.2018, Colorimetry, 4th Edition (CIE, 2018). This publication provides the recommendations of the CIE concerning colorimetry, particularly the use of the standard colorimetric observers and standard illuminants, colour spaces, colour difference metrics and other colorimetric practices and formulae.

Practical use of CIE classes

Users are encouraged to previously take a look at the Jupyter Notebook:
<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:30</td>
<td>Geert</td>
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<td>COOLPI</td>
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<tr>
<td>14:20</td>
<td>Alex, Bernhard &amp; Nina</td>
<td>New OpenAtlas features for INDIGO</td>
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Discussing graffiti – knowledge organisation impossible?

Jona Schlegel
Massimiliano Carloni

STATUS-QUO GATHERING

LOOKING BACK | AHEAD

14 October 2022 Vienna, Austria

The INDIGO graffiti project is funded by the Heritage Science Austria programme of the Austrian Academy of Sciences (ÖAW)
A triple concept

- **graffiti as activity**: "the creation of a mark"
- **graffiti as objects/graftito as object**: "the mark resulted from graffiti as activity"
- **graffiti as style**: "the mark looking like graffiti writing"
Graffiti as activity
"the creation of a mark"

By human (+tool)
Done on purpose
Is a visual intervention
Real world
On all public, communal, and private surfaces
Involves the appropriation of a surface
Done with different techniques – additive or reductive
Graffiti as objects

"the mark resulted from graffiti as activity"

- Anthropogenic
- Has a purpose
- Visual intervention
- Situated in the real world
- On or through any possible surface (except a private surface only accessible by the mark-maker)
- Appropriated surface
- In different styles with various techniques
Mark-making
(Non-) practical reasons

Graffiti as style

"the mark looking like graffiti writing"
Objects Facet

.... Visual and Verbal Communication (hierarchy name) (G)
......... Information Forms (hierarchy name) (G)
............ information forms (objects) (G)
................. document genres (G)
................. <documents by form> (G)
................. inscriptions (G)
..................... graffiti (casual notations) (G)
The Getty AAT
Outlook

- **SKOS** (Simple Knowledge Organization System)
  - Hierarchical + associative
  - Preferred/alternative labels

- **Publication on Vocabs**
  - Based on Skosmos
  - Easy navigation
  - Accessibility and reusability
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<th>Topic</th>
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Status quo -
OpenAtlas features for INDIGO
OpenAtlas - https://openatlas.eu

- Open source, browser based database software
  - available on GitHub: https://github.com/craws/OpenAtlas
- Initiated about 10 years ago by Stefan Eichert
- Now mainly developed at the ACDH-CH
- Used to acquire, edit and manage research data
- CIDOC CRM as model
OpenAtlas and INDIGO

- INDIGO’s research focuses on the present time
- Different workflow: e.g. media is stored in ARCHE (https://www.oeaw.ac.at/acdh/tools/arche)
- Providing metadata for various applications through the API
- Each project adds features to OpenAtlas
OpenAtlas Features for INDIGO

- **Implemented**
  - Record production of artefacts, e.g. graffiti (#1500)
  - Improved time tracking with hours, minutes and seconds (#1574)
  - Improved database model to store 3D geometries (#1631)

- **In Progress**
  - Importing INDIGO vocabulary from Vocabs (#1663)
  - Display 3D geometries (#1573)
  - Connecting to ARCHE to get image files (#1575)
  - More detailed structure, e.g. track individual components of graffiti (#1587, #1647)
  - Relative chronological and spatial relation between graffiti (#1648)
AGENDA

part 1 [13:30 – 14:30]

part 2 [14:45 – 16:30]
INDIGO approach

**INventory and Disseminate**

**WHAT**

digitally preserve and analyse

**WHY**

**WHERE**

**WHO**

- INdigo
- Indigografitti and nomaukanal
INDIGO approach
STRUCTURE 5 pillars

A. ACQUISITION
- 3D surfaces
- photographs + GNSS/IMU
- auxiliary (spectra, metadata, video)

B. PROCESSING
- colour correction
- orthorectification & texturing
- segmentation & annotation
- change detection

C. MANAGEMENT
- adding metadata
- thesaurus
- spatial database(s)
- data archiving

D. DISSEMINATION
- online platform
- social media & QR codes
- symposium 1
- articles & presentations

E. ANALYSIS
- symposium 2
- thesaurus
## STRUCTURE 5 pillars

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<thead>
<tr>
<th>A. ACQUISITION</th>
<th>B. PROCESSING</th>
<th>C. MANAGEMENT</th>
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<th>E. ANALYSIS</th>
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**A. ACQUISITION**  
3D surfaces  
photographs + GNSS/IMU auxiliaries  
(spectra, metadata, video)

**B. PROCESSING**  
colour correction  
orthorectification & texturing  
segmentation & annotation  
change detection

**C. MANAGEMENT**  
adding metadata  
thesaurus  
spatial database(s)  
data archiving

**D. DISSEMINATION**  
online platform  
social media & QR codes  
symposium 1

**E. ANALYSIS**  
symposium 2  
theses

A. ACQUISITION: 3D surfaces, photographs + GNSS/IMU auxiliaries (spectra, metadata, video)

B. PROCESSING: colour correction, orthorectification & texturing, segmentation & annotation, change detection

C. MANAGEMENT: adding metadata, thesaurus, spatial database(s), data archiving

D. DISSEMINATION: online platform, social media & QR codes, symposium 1

E. ANALYSIS: symposium 2, thesaurus
STRUCTURE 5 pillars

A. ACQUISITION
3D surfaces
photographs + GNSS/IMU
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(spectra, metadata, video)

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articles & presentations

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E. ANALYSIS
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## Structure 19 Work Packages

### A. Acquisition
- 3D Surfaces Photographs + GNSS/IMU
- Auxiliary (Spectra, Metadata, Video)

### B. Processing
- Colour Correction
- Orthorectification & Texturing
- Segmentation & Annotation
- Change Detection

### C. Management
- Thesaurus
- Spatial Database(s)
- Data Archiving

### D. Dissemination
- Online Platform
- Social Media & QR Codes
- Symposium 2
- Symposium 1

### E. Analysis
- Thesaurus

### Work Packages Timeline

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### Work Packages

- **WP 1** - Management
- **WP 2** - Awareness
- **WP 3** - H&S
- **WP 4** - Legislation
- **WP 5** - Photography
- **WP 6** - GNSS/IMU
- **WP 7** - 3D Geometric backbone
- **WP 8** - Colourimetry
- **WP 9** - Orthorectification and Texturing
- **WP 10** - Segmentation and annotation
- **WP 11** - Change detection
- **WP 12** - Image processing
- **WP 13** - Thesaurus
- **WP 14** - Spatial database
- **WP 15** - Data Ingestion
- **WP 16** - Online Platform
- **WP 17** - Symposium 1
- **WP 18** - Symposium 2
- **WP 19** - Fundraising
STRUCTURE 7 “institutes”
STRUCTURE 7 “institutes”

Nina Richards
STRUCTURE 6 “institutes”

Nina Richards
STRUCTURE 5.5 “institutes”

Nina Richards
STRUCTURE 6 “institutes”
HOW 19 work packages

A. ACQUISITION
3D surfaces photographs + GNSS/IMU auxiliary (spectra, metadata, video)

B. PROCESSING
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C. MANAGEMENT
- adding metadata
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- spatial database(s)
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D. DISSEMINATION
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- articles & presentations

E. ANALYSIS
- symposium 2
- thesaurus

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WORK PACKAGES

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Year 2
- WP 1 - Management
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thesaurus
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data archiving

D. DISSEMINATION
online platform
social media & QR codes
symposium

E. ANALYSIS
thesaurus
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**Phase 2 - Research and Development**

- WP 1: Project management
- WP 2: Awareness
- WP 3: Data ingestion
- WP 4: Online platform
- WP 5: Image processing
- WP 6: GNSS/IMU
- WP 7: 3D geometric backbone
- WP 8: Colourimetry
- WP 9: Segmentation and annotation
- WP 10: Change detection
- WP 11: Image processing
- WP 12: Thesaurus
- WP 13: Spatial database

**Phase 3 - Implementation**

- WP 14: Spatial database
- WP 15: Image processing
- WP 16: Online platform
- WP 17: Symposium 2
- WP 18: Fundraising
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**PHASE 0 - PROJECT MANAGEMENT**

**PHASE 1 - RESEARCH AND DEVELOPMENT**

**PHASE 2 - OUTREACH**
WP 1 - Project management
WP 2 - Awareness

**PHASE 3 - IMPLEMENTATION**
WP 6 - GNSS/IMU
WP 7 - 3D geometric backbone
WP 8 - Colourimetry
WP 9 - Photography
WP 10 - Segmentation and annotation
WP 11 - Change detection
WP 12 - Image processing
WP 13 - Thesaurus
WP 14 - Spatial database
WP 15 - Data ingestion
WP 16 - Online platform
WP 18 - Symposium 2
WP 19 - Fundraising

**WORK PACKAGES**

**Pillar A**

**Pillar B**

**Pillar C**

**Pillar D**

**Pillar E**

**All pillars**

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**PHASE 2 - RESEARCH AND DEVELOPMENT**

**PHASE 4 - OUTREACH**

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WP 2 - Awareness
WP 5 - Photography
WP 6 - GNSS/MU device & manual
WP 7 - 3D geometric backbone
WP 8 - Colourimetry
WP 9 - Segmentation and annotation
WP 10 - Change detection
WP 11 - Image processing
WP 12 - Data ingestion
WP 13 - Thesaurus
WP 14 - Spatial database
WP 15 - Online platform
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### PHASE 0 - PROJECT MANAGEMENT

**WP 1 - Project management**

**WP 2 - Awareness**

### PHASE 1 - RESEARCH AND DEVELOPMENT

#### PHASE 2

**WP 6 - GNSS/MU**

**WP 7 - 3D geometric backbone**

**WP 8 - Colourmetry**

**WP 9 - 3D feature identification**

**WP 10 - Segmentation and annotation**

**WP 11 - Change detection**

**WP 12 - Image processing**

**WP 13 - Thesaurus**

**WP 14 - Spatial database**

**WP 15 - Data ingestion**

**WP 16 - Online platform**

**WP 18 - Symposium 2**

### PHASE 3 - IMPLEMENTATION

**WP 4 - Outreach**

**WP 19 - Fundraising**
HOW inventory + disseminate pipeline

1. Laser-scanned
2. Photographed & described
3. Processed data
4. Put in database
5. Put online
6. Directly include in ARCHE
7. Provide permalinks
8. Download data via permalinks
9. Include in ARCHE at end
HOW external alliances

1. Laser-scanned
2. Add metadata
3. Process data
4. Put in database
5. Put online
6. Directly include in ARCHE
7. Provide permalinks
8. Download data via permalinks
9. Include in ARCHE at end

- 3D geometry
- 2D Imagery
- Auxiliary stuff: spectra, notes

Raw data + metadata

- 3D geometry
- 2D Imagery
- Auxiliary stuff: spectra, notes

Online interactive platform | app
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The INDIGO graffiti project is funded by the Heritage Science Austria programme of the Austrian Academy of Sciences (ÖAW)