

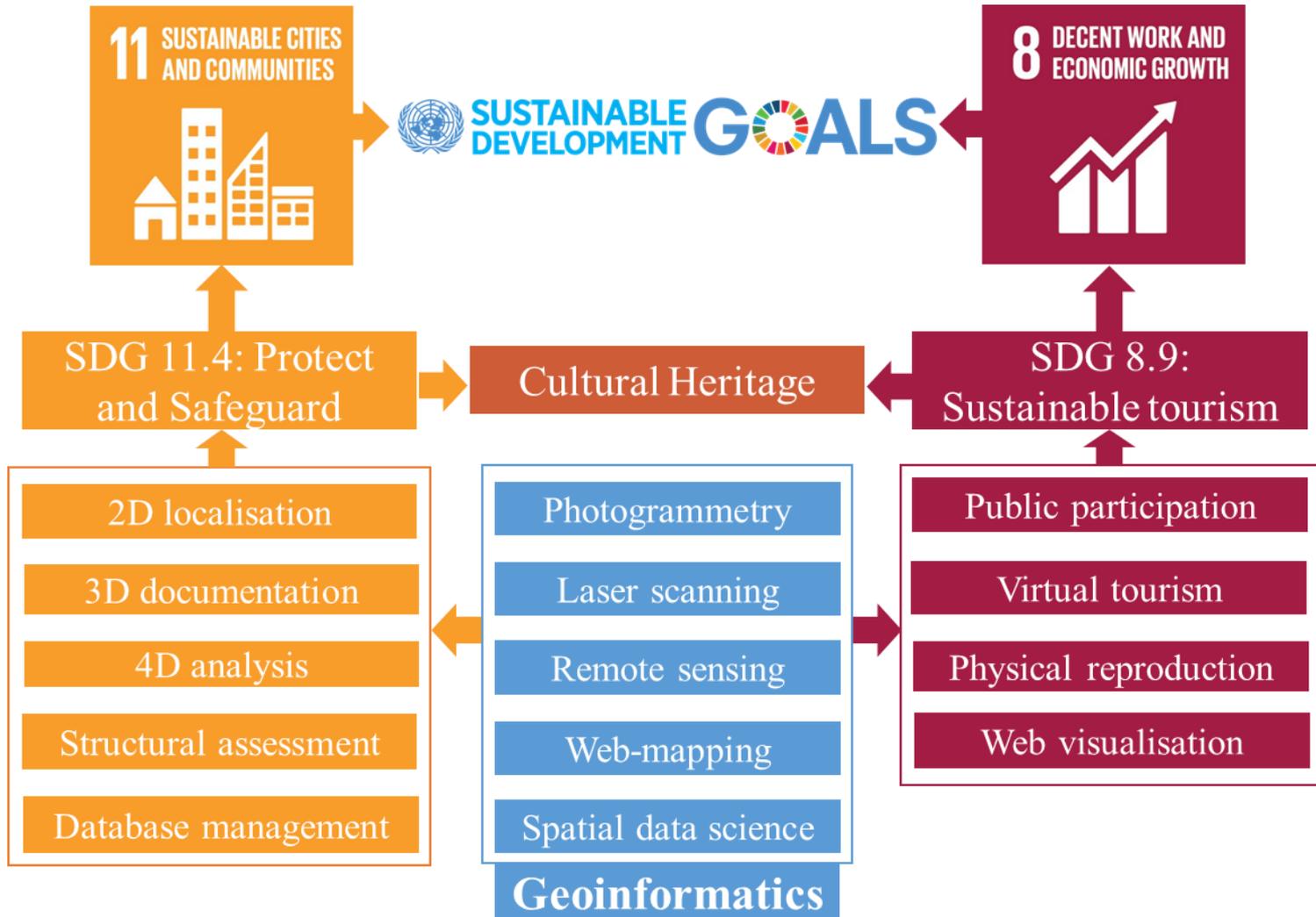
# **Geoinformatics for the Conservation and Promotion of Cultural Heritage in support of the UN Sustainable Development Goals**

Dr Wen Xiao  
University Research Fellow  
School of Engineering  
Newcastle University, UK

# UN Sustainable Development Goals

- 17 Goals, 169 targets to be achieved by all countries by 2030
- Address ALL aspects of sustainable development





Xiao W, Mills J, Guidi G, Rodríguez-González P, Gonizzi-Barsanti S, González-Aguilera D. **Geoinformatics for the conservation and promotion of cultural heritage in support of the UN Sustainable Development Goals.** *ISPRS Journal of Photogrammetry and Remote Sensing* 2018, 142, 389-406.

# Disaster Risk Reduction of Heritage Structures

- EPSRC: Disaster Risk Reduction of Heritage Structures in Nepal (<https://research.ncl.ac.uk/heritageconservation/>)
  - PI: Dr Wen Xiao; Co-Is: Prof Jon Mills, Dr Vasilis Sarhosis, Dr Sean Wilkinson (Civil Engineering)
  - Aligned with the UN SDGoals 11.4 and 8.9, and Nepal's national strategy for disaster risk management (2009)
  - To adopt state-of-the-art facilities and approaches for the development of a risk based analysis tool to support the decision making process on heritage protection and management to natural disasters
  - Contribute directly to the recovery of local people's livelihoods and the revitalization of economic development by indirectly supporting and promoting to tourism development
  - **3D Realistic Reconstruction, Digital Documentation and Structure Analysis/Inspection of heritage sites**

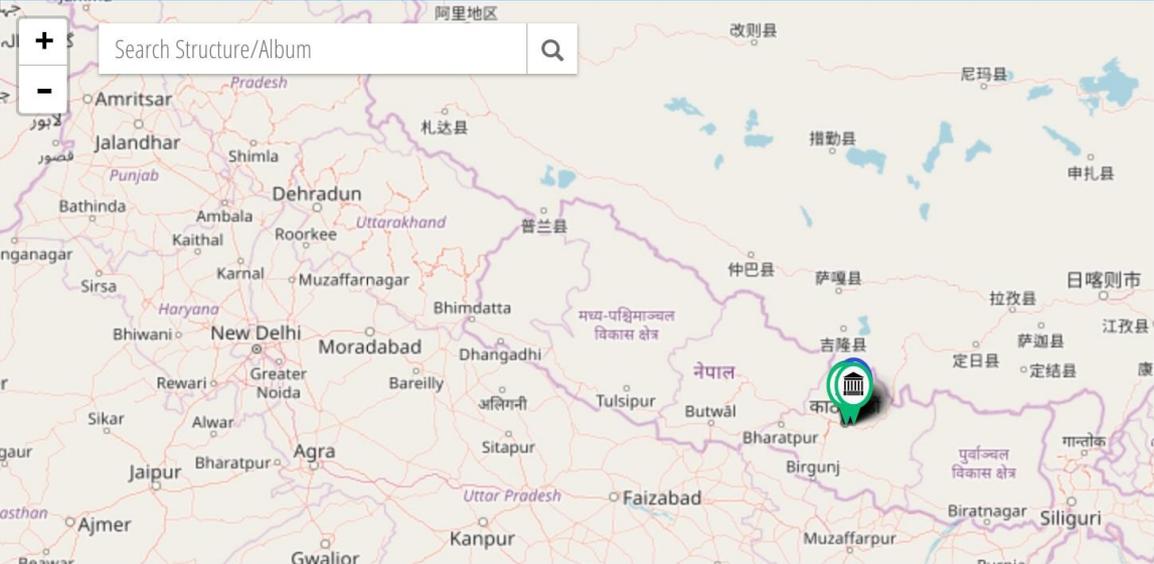
# Kathmandu, Nepal



# Share Our Cultural Heritage (<https://soch.ncl.ac.uk/>)

Share Our Cultural Heritage (SOCH)

[About](#) [Login](#) [Register](#) [Download](#) [Help](#)



### My Album List

SN	Structure	Action
1	Leaning tower	
2	Shiddhilaxmi	
3	Lion	
4	MiniTemple	
5	NamasteStatue1	
6	Mahadev Temple	

**Structure Status**

- No Damage
- Minor Crack
- Partial Damage
- Full Damage

**Current Album**

Album ID: 201

Structure: Lion

Album Name: Lion

Add Photos



SPAM Count: 0

IMG\_20160928\_170808



SPAM Count: 0

IMG\_20160928\_170819



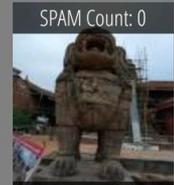
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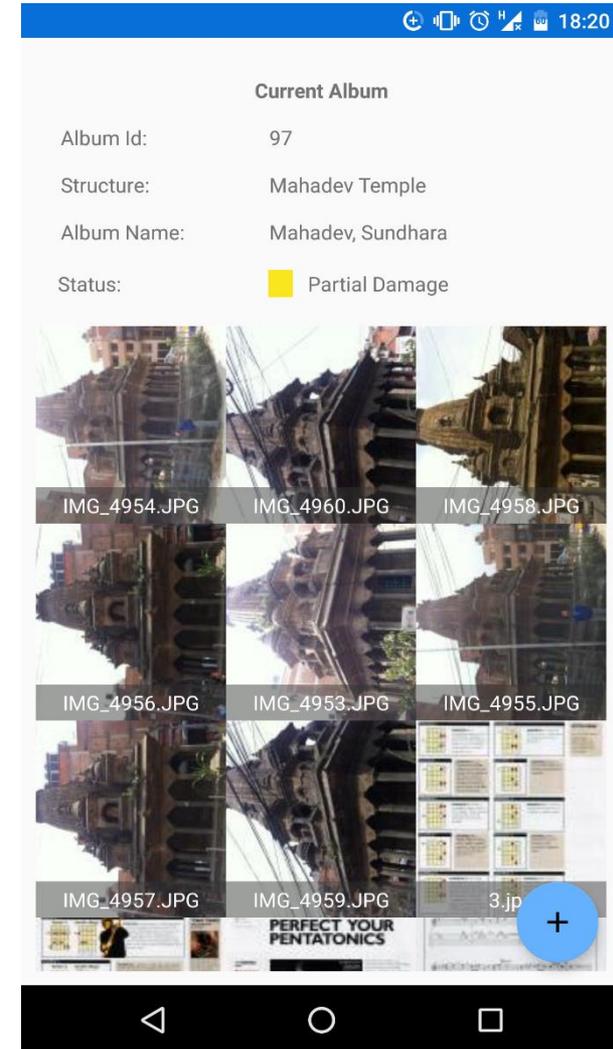
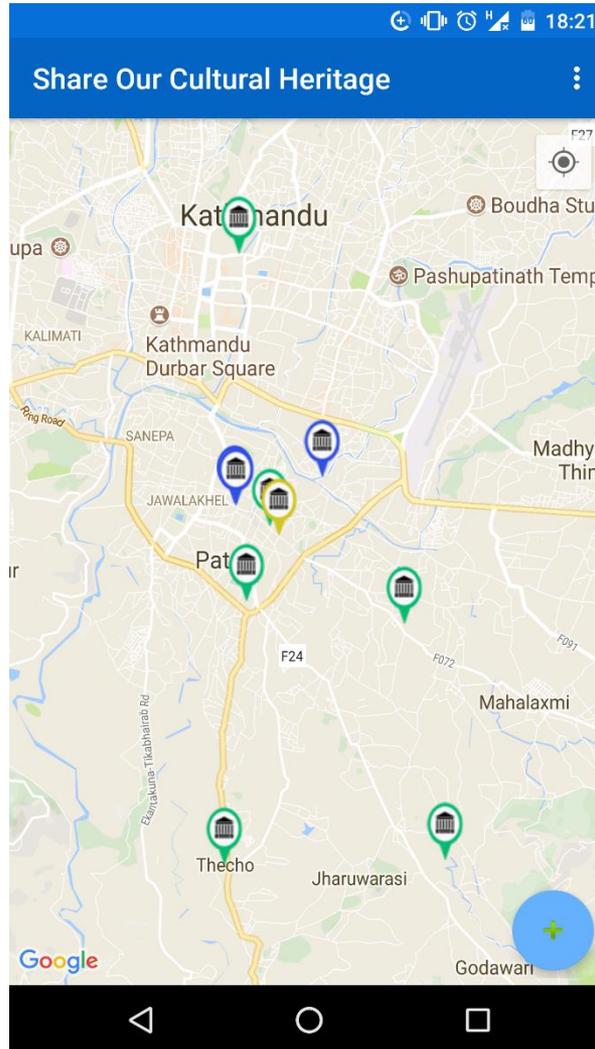
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# Share Our Cultural Heritage (Mobile App)



# SOCH App



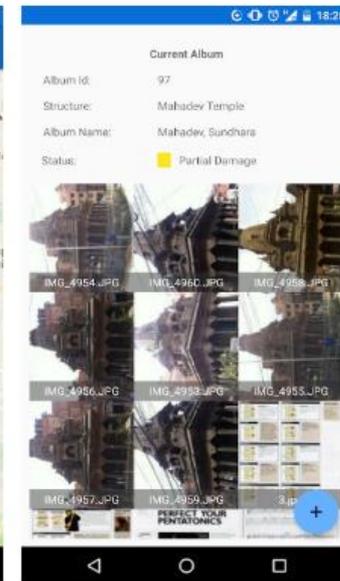
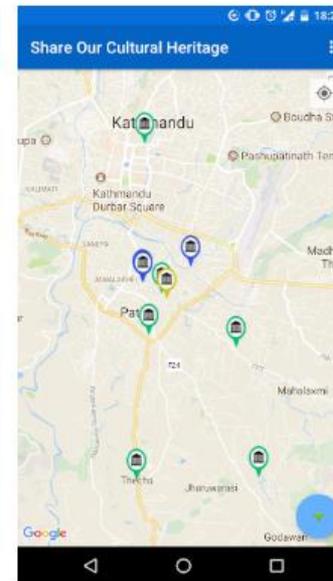
## SOCH

Hari Krishna Dhonju **Maps & Navigation**

**i** PEGI 3

**i** This app is compatible with all of your devices.

Installed



Online geo-crowdsourcing system, named Share Our Cultural Heritage (SOCH), which can be used for large-scale heritage documentation, visualisation and sharing via web and mobile GIS. Cultural heritage data, such as textual stories, locations and images collected via computers and portable devices, are geo-referenced and presented to the public by web-mapping. Using photogrammetric 3D

## Crowdsourcing for 3D documentation



Dhonju H, [Xiao W](#), Shakya B, Mills J, Sarhosis V. Documentation of heritage structures through geocrowdsourcing and web-mapping. In: ISPRS Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. 2017

# Online 3D Visualisation

## Share Our Cultural Heritage (SOCH) : 3D Viewer

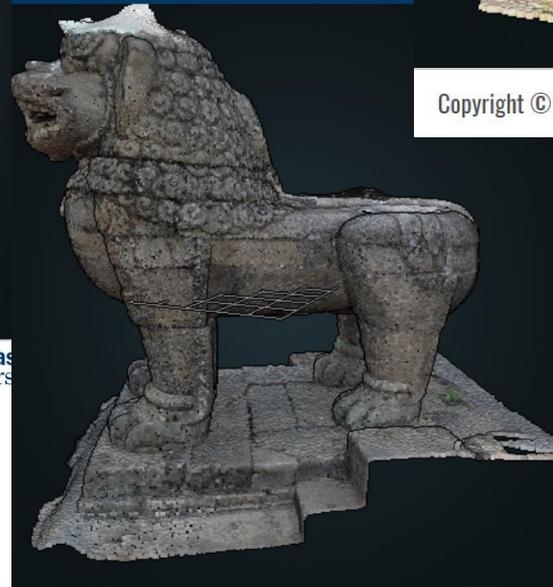


# Online 3D Visualisation

Share Our Cultural Heritage (SOCH) : 3D Viewer

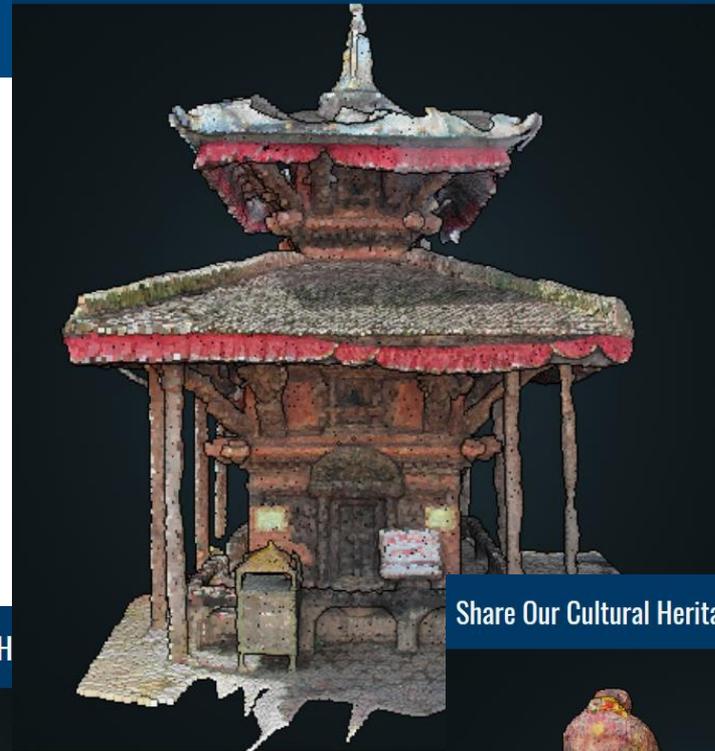


Share Our Cultural Heritage (SOCH)



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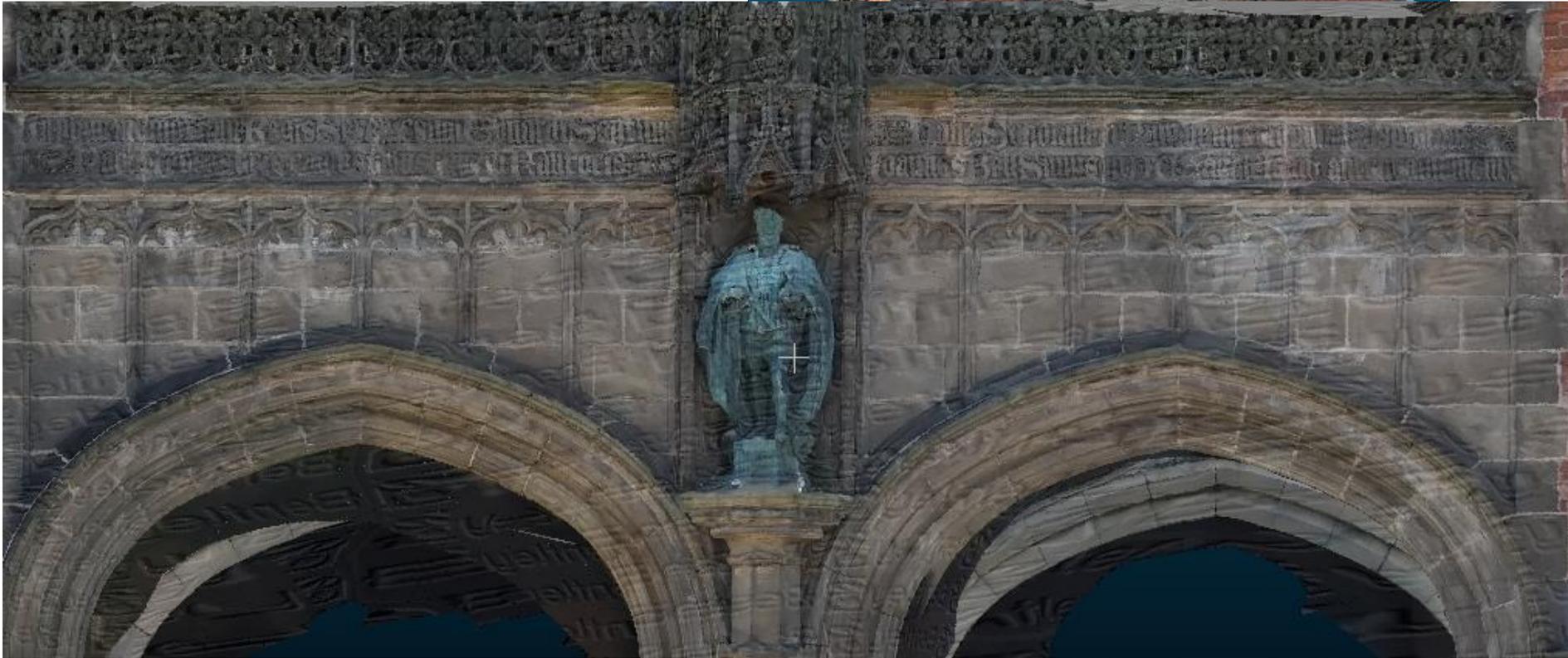


Share Our Cultural Heritage (SOCH) : 3D Viewer

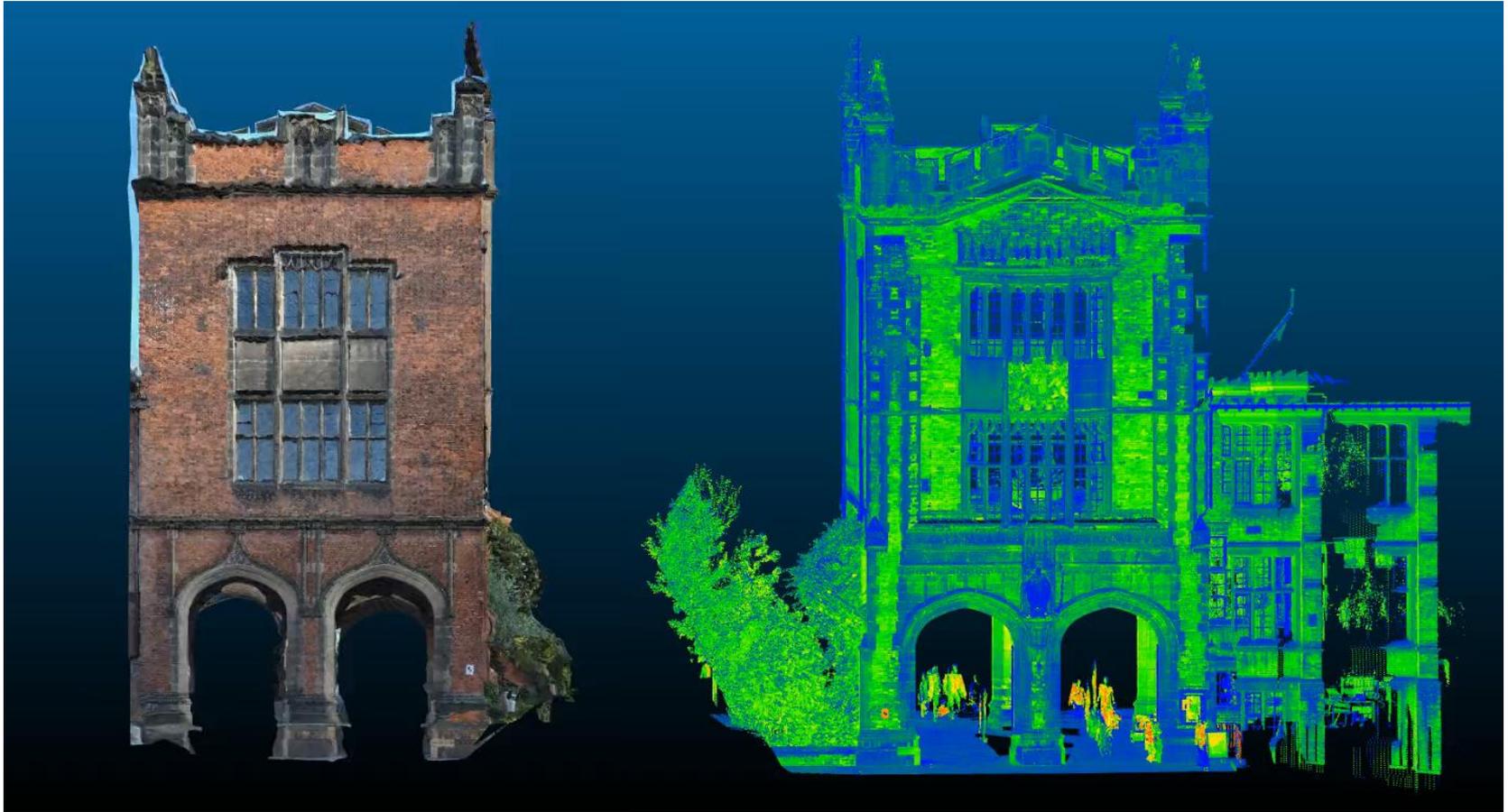


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# Accuracy assessment



# Low-cost photogrammetry vs. 3D laser scanning



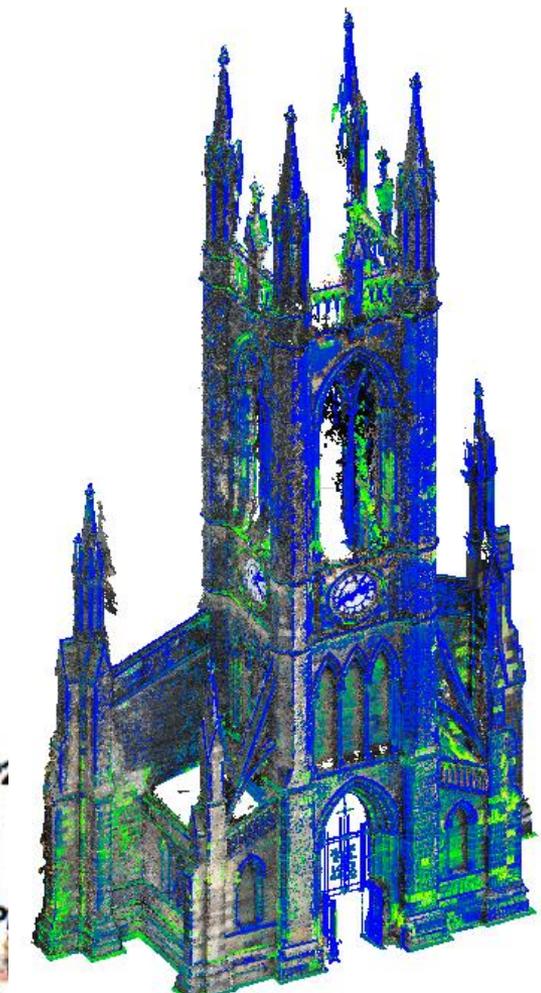
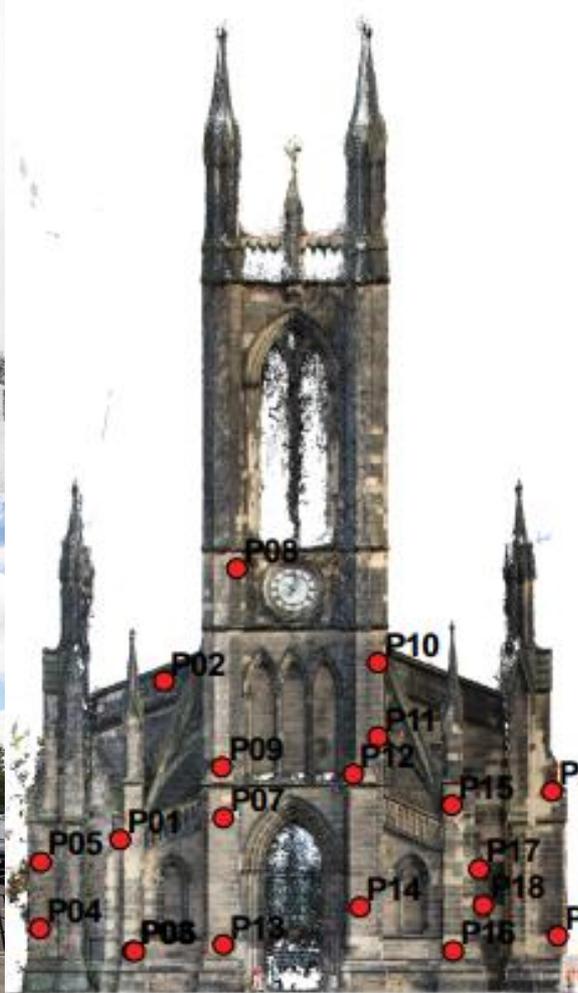
Dhonju H. K., Xiao W. et al., Feasibility study of low-cost image-based heritage documentation in Nepal. ISPRS Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. 2017.

# Church of St. Thomas the Martyr

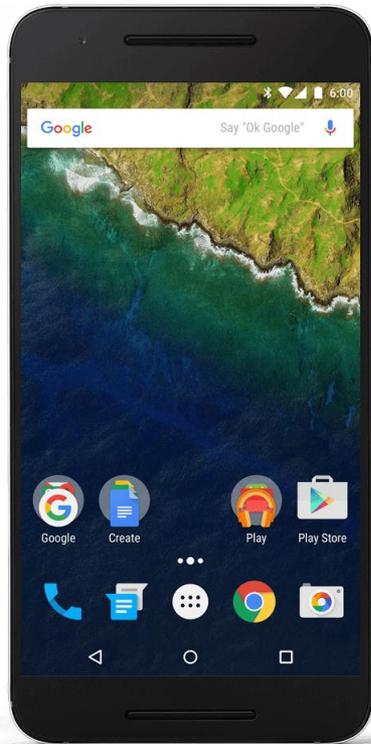
1890



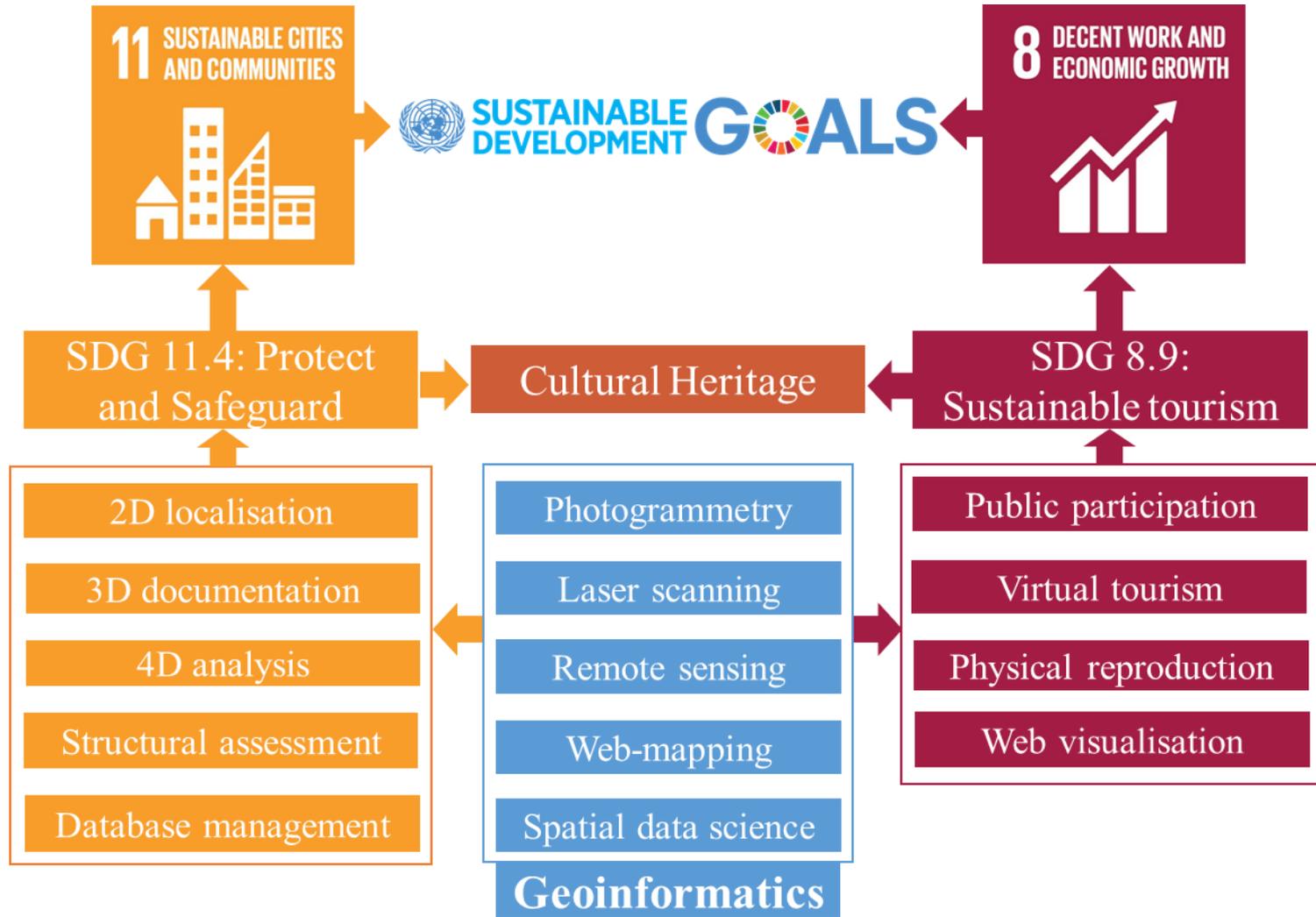
2017



Next...



# Contribution to SDGs



Thank you!

