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

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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-Gonzálvez 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
Dhonju H, Xiao W, Mills J, Sarhosis V. **Share Our Cultural Heritage (SOCH): Worldwide 3D Heritage Reconstruction and Visualization via Web and Mobile GIS.** ISPRS International Journal of Geo-Information 2018, 7(9), 360.
Share Our Cultural Heritage (Mobile App)
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 geo-crowdsourcing 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

A wonderful carving at Bhaktapur Durbar Square, Nepal

https://soch.ncl.ac.uk/Model/loadModel/204
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

Altman S, Xiao W, Grayson B. Evaluation of low-cost terrestrial photogrammetry for 3D reconstruction of complex buildings. In: ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences. 2017.
Next…
Contribution to SDGs

SDG 11.4: Protect and Safeguard
- 2D localisation
- 3D documentation
- 4D analysis
- Structural assessment
- Database management

Cultural Heritage
- Photogrammetry
- Laser scanning
- Remote sensing
- Web-mapping
- Spatial data science

Geoinformatics

SDG 8.9: Sustainable tourism
- Public participation
- Virtual tourism
- Physical reproduction
- Web visualisation
Thank you!