

Digital Documentation of Built Heritage - Batch 1

Nagarkhana, Bhuj Darbargadh, Kutch

2nd - 6th January 2023



This booklet was prepared by Drashti Nakrani and Mrudula Mane for CHC - CRDF.

Cover Image Credits : View generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF

About the program

Center for Heritage Conservation (CHC) and CEPT Professional Programs (CPP) conducted a five-day certificate program on Digital Documentation of Built Heritage. It was conducted at CEPT Conservation Site School at Pragmahal, Darbargadh, Bhuj in Kutch, Gujarat, from 2nd to 6th January. The certificate program focused on developing the skills of the participants in digital documentation of historic buildings and structures through hands-on engagement. Participants across India from different built environment professions attended the workshop. The program covered three techniques: GIS Mapping, Photogrammetry, and 3D LiDAR Scanning. On the first day, the participants were introduced to the application of GIS in Heritage Documentation with an expert lecture by Shaily Gandhi (Ph.D.). Over the next two days, a workshop on architectural photography and photogrammetry by Maniyarasan Rajendran was conducted followed by post-processing and generating orthoimages and 3D models. During the last two days, a workshop by Mrudula Mane and Zeus Pithawalla introduced participants to understanding 3D laser scanning as a technique for documentation which also included an onsite demonstration of the data collection using the scanner followed by the demonstration of post-processing and registration in FARO Scene of the data collected. The workshop ended with participants exploring exporting and visualization of the 3D data. Onsite support for the workshop came from Pragmahal, MMKB Trust, Darbargadh, Bhuj. The tutors were supported by Jayashree Bardhan (Program Lead, Continuous Professional Development, CHC - CRDF), Drashti Nakrani (Workshop Assistant, CHC - CRDF), and Shriraj Gohil (Conservation Site School Incharge, Nagarkhana).

Program Faculty



Mrudula Mane

Conservation Architect,
Digital Documentation
Expert for Built Heritage,
CHC - CRDF, Ahmedabad



Dr. Shaily Gandhi

Geoinformatics, GIS, Data Science Expert
Deputy Center Head, CAG, CRDF
and Program Chair, Geomatics, CEPT
University, Ahmedabad



Maniyarasan R

Architectural Photographer
and Photogrammetry Expert
Associate Professor, CARE
School of Architecture,
Tiruchirappalli



Zeus Pithawalla

Conservation Architect
Research associate,
CHC - CRDF,
Ahmedabad

About Nagarkhana - Workshop Location

Nagarkhana Naka, the majestic entrance of the fort of Bhuj, stands as an epitome of architectural grandeur. This significant structure holds immense ceremonial and religious importance, solidifying its position as a cornerstone of the architectural landscape of Bhuj. Drawing inspiration from trade, symbolism, politics, and geography, the gate's design seamlessly weaves together these diverse influences. The resplendent Nagarkhana Naka used to stand as a towering edifice, comprising two magnificent stories. The masonry work, skillfully executed using vibrant light yellowish sandstones, emanates an aura of grandeur, while the structural members, meticulously crafted from red sandstones, enhance the fortitude of the structure. The floor slabs, adorned with elongated stone slates known as chippars, serve as a sturdy foundation, with each meticulously laid upon a bed of lime mortar. The façade and the regal chatris adorning the pinnacle bear intricate carvings, expertly chiseled into soft sandstones. In earlier times, a coat of lime plaster, enveloping the entire façade, bestowed a pristine monochrome white hue, further adding to its majestic allure. Nagarkhana Naka is owned, operated, and managed by Pragmahal Trust under the patronage of late H.H. Maharaosaheb Pragmulji III of Kutch and H.H. MaharaniSaheb Pritideviji of Kutch. Also known as Toraniya Naka and Halvad Naka it serves as the principal gateway to the palace and grand court of Kutch. Unfortunately, it suffered significant damage during the earthquake of 2001. The managing Trust was keen to restore the structure to its original form which led to it being offered as a site for research and education.

Nagarkhana was adopted as a CEPT Conservation Site School by CHC in August 2022. To know more about the initiative visit: www.ceptconservationsiteschool.com



Image Credits: S. Gohil

Participants:

1. Abhi Dev A.G
Architect; Kerala
2. Amit Chatterjee
Assistant Professor, VSSUT; Odisha
3. Amritha R
Architect; Kerala
4. Bhavya Singh
Student of Bachelors in Architecture; Bangalore
5. Bindu Chandana
Assistant Professor, JNAFAU; Odisha
6. Gayathri S S
Architect; Kerala
7. Krutika Shailesh Gaikwad
Architect; Mumbai
8. Madhushree Bose
Conservation Architect; Mumbai
9. Mandar Bam
Filmmaker/writer; Vadodara
10. Nachiket Kishore Gujar
Architect, Pune
11. Prajakta Pramod Ghorpade
Student of Bachelors in Architecture; Mumbai
12. Raj Ganeshbhai Sompura
Architect; Ahmedabad
13. Raksha Nagendra Gummaraju
Architect; Mumbai
14. Shrushtee Basavaraj Khanderao
Architect; Bangalore
15. Sthitapragna Krishnamurthy
Architect; Bangalore
16. Swapnali Shivaji Ladpatil
Conservation Architect; Pune
17. Uma Maheshwari
Student of Bachelors in Architecture; Chennai
18. Vatsal Chheda
Student of Bachelors in Interior Design; Mumbai



Workshop participants and CHC - CRDF team with the members of the Pragmahal Darbargadh Bhuj Trust

GIS (Geographic Information System)

Program Faculty: Dr. Shaily Gandhi

Geoinformatics, GIS, Data Science Expert
Deputy Center Head, CAG, CRDF and Program Chair, Geomatics,
CEPT University
Email id: shaily.gandhi@cept.ac.in

GIS (Geographic Information System) workshop involved an introduction to mapping techniques and hands-on mapping of Pragmahal and its environs.





Image Credits: P. Ghorpade, S. Ladpatil, R. Gummaraju

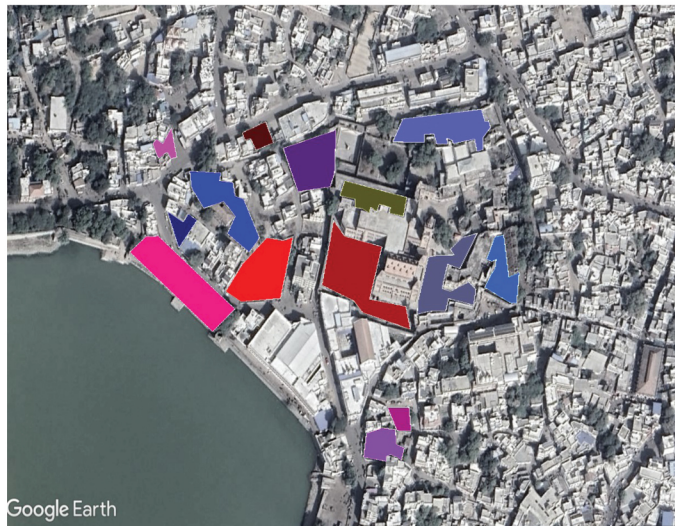


Image Credits: A. Dev, V. Chheda, K. Gaikwad

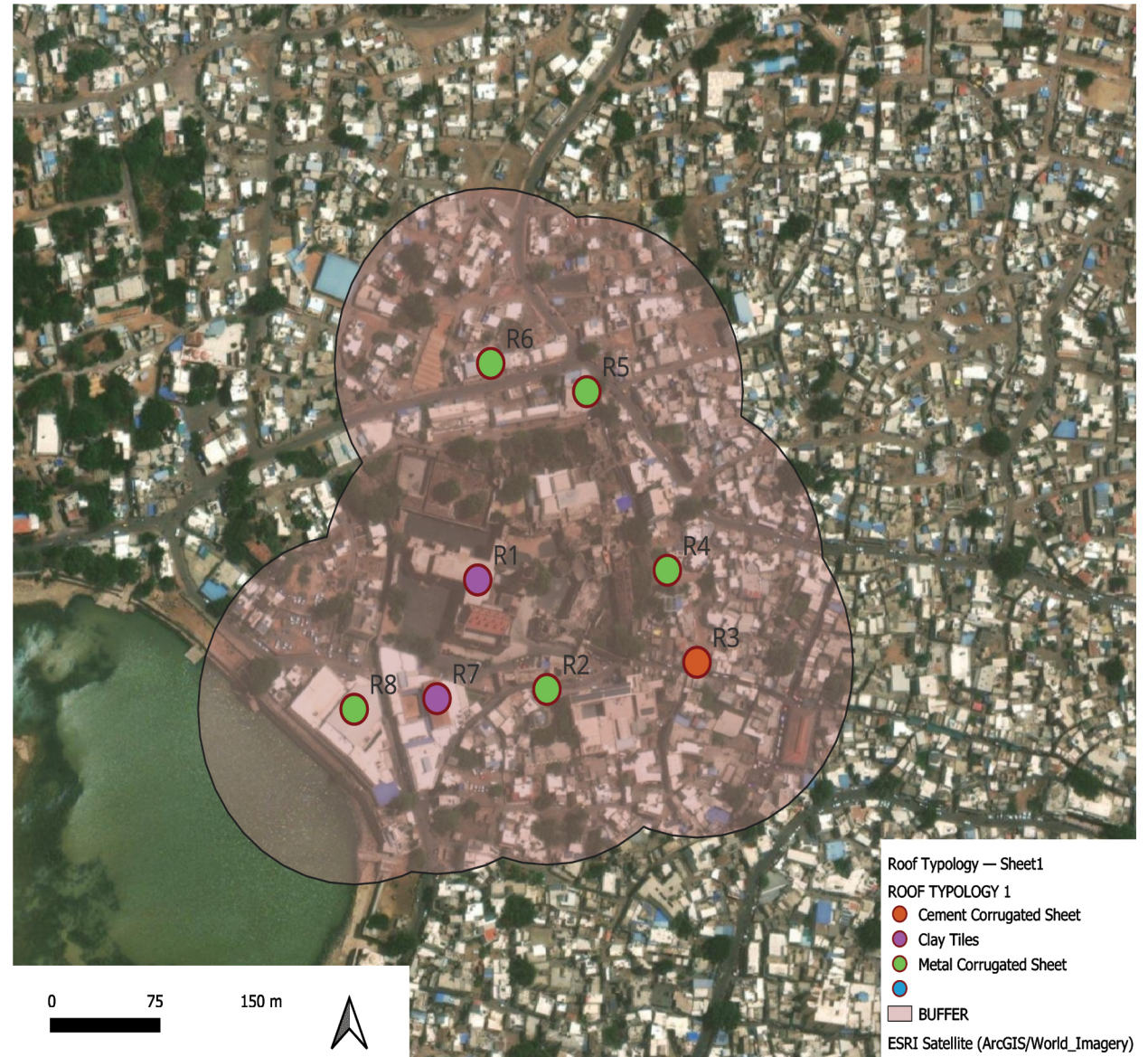


Image Credits: A. Chatterjee, M. Bam, R. Sompura

Architectural Photography

Program Faculty: Maniyarasan R.

Architectural Photographer and Photogrammetry Expert Associate
Professor, CARE School of Architecture, Tiruchirappalli
Email id: maniyarasan@gmail.com

The Architectural Photography workshop involved understanding the selection of appropriate cameras, lenses, and settings, light conditions as per the site situations, and capturing information in different formats as per the output requirements alongwith its onsite application.





Image Credits: Amritha R.



Image Credits: B. Chandana



Image Credits: M. Bose



Image Credits: P. Ghorpade

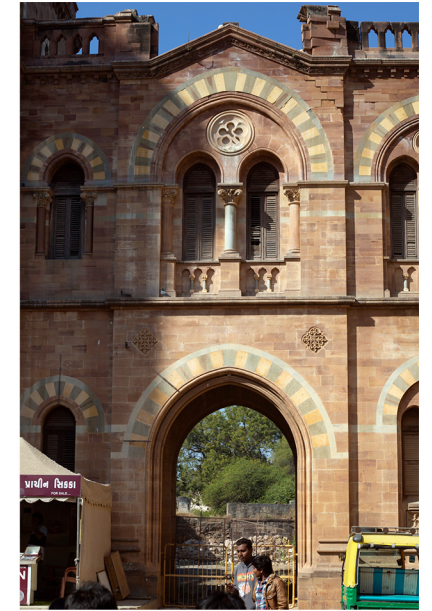


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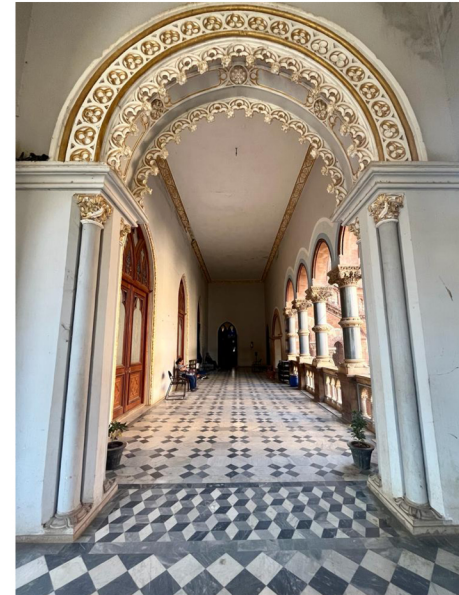


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Image Credits: S. Krishnamurthy



Image Credits: Amritha R.



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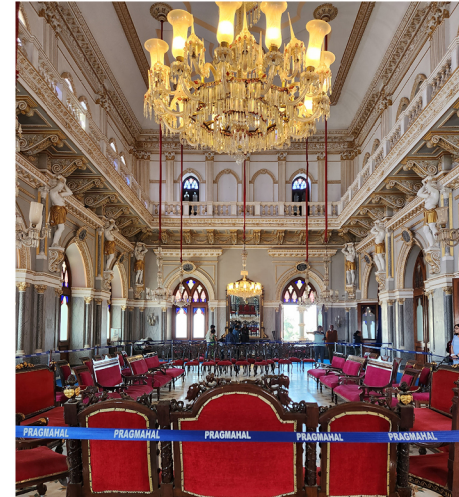


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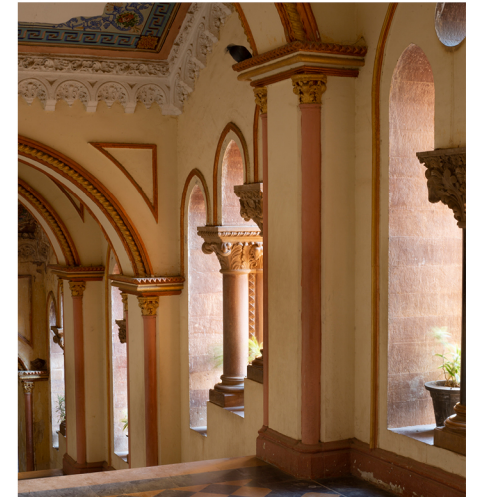


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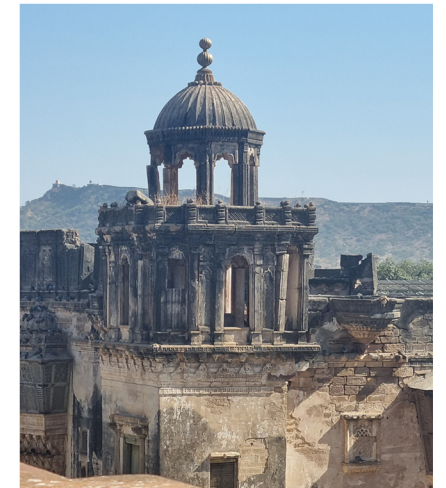


Image Credits: Amritha R



Image Credits: Amritha R



Image Credits: R Sompura

Architectural Photogrammetry

Program Faculty: Maniyarasan R.

Architectural Photographer and Photogrammetry Expert Associate
Professor, CARE School of Architecture, Tiruchirappalli
Email id: maniyarasan@gmail.com

The Architectural Photogrammetry workshop involved capturing photographs at Nagarkhana and its environs and post-processing of the captured data in the prescribed software for generating the photogrammetric output.

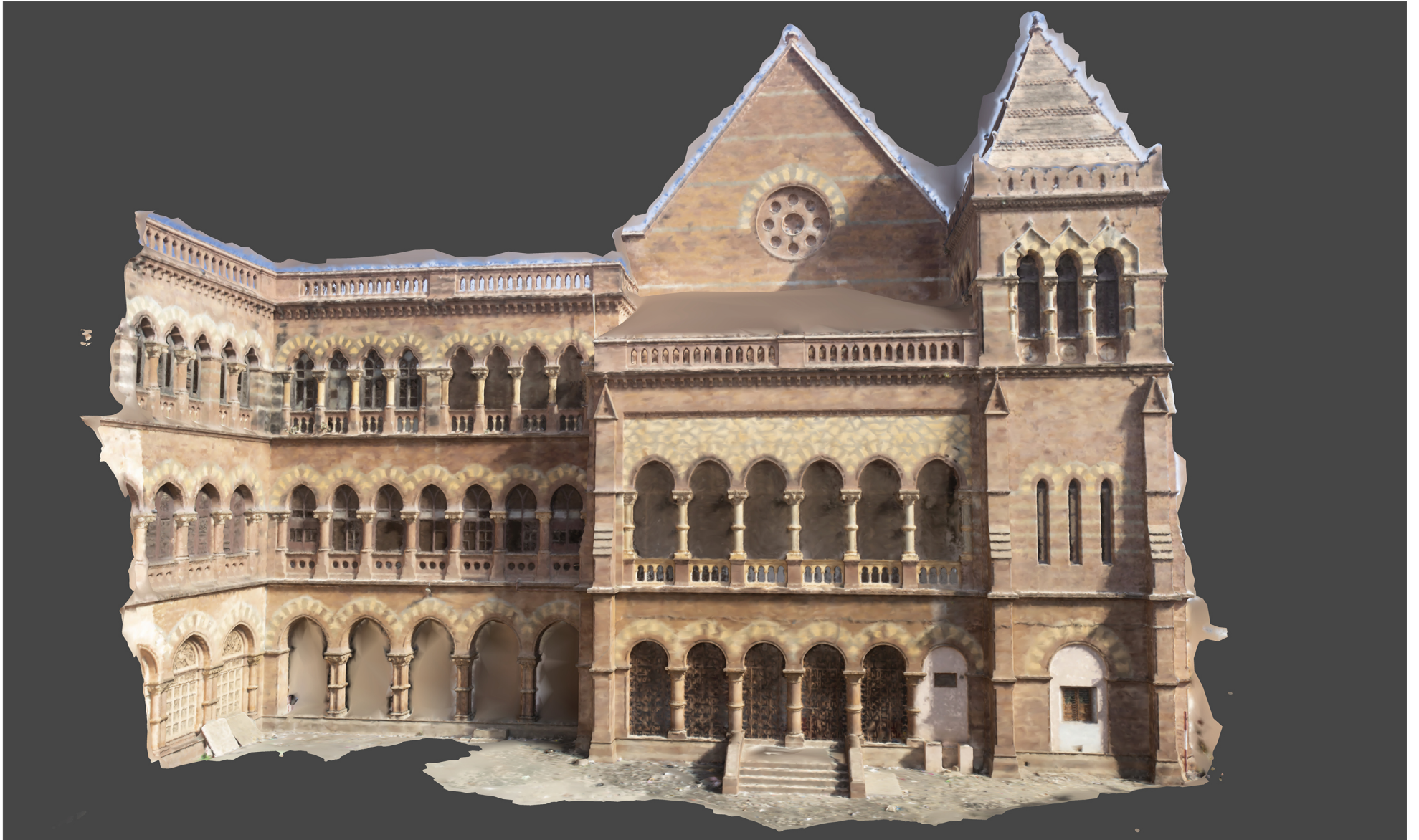




Author: P. Ghorpade



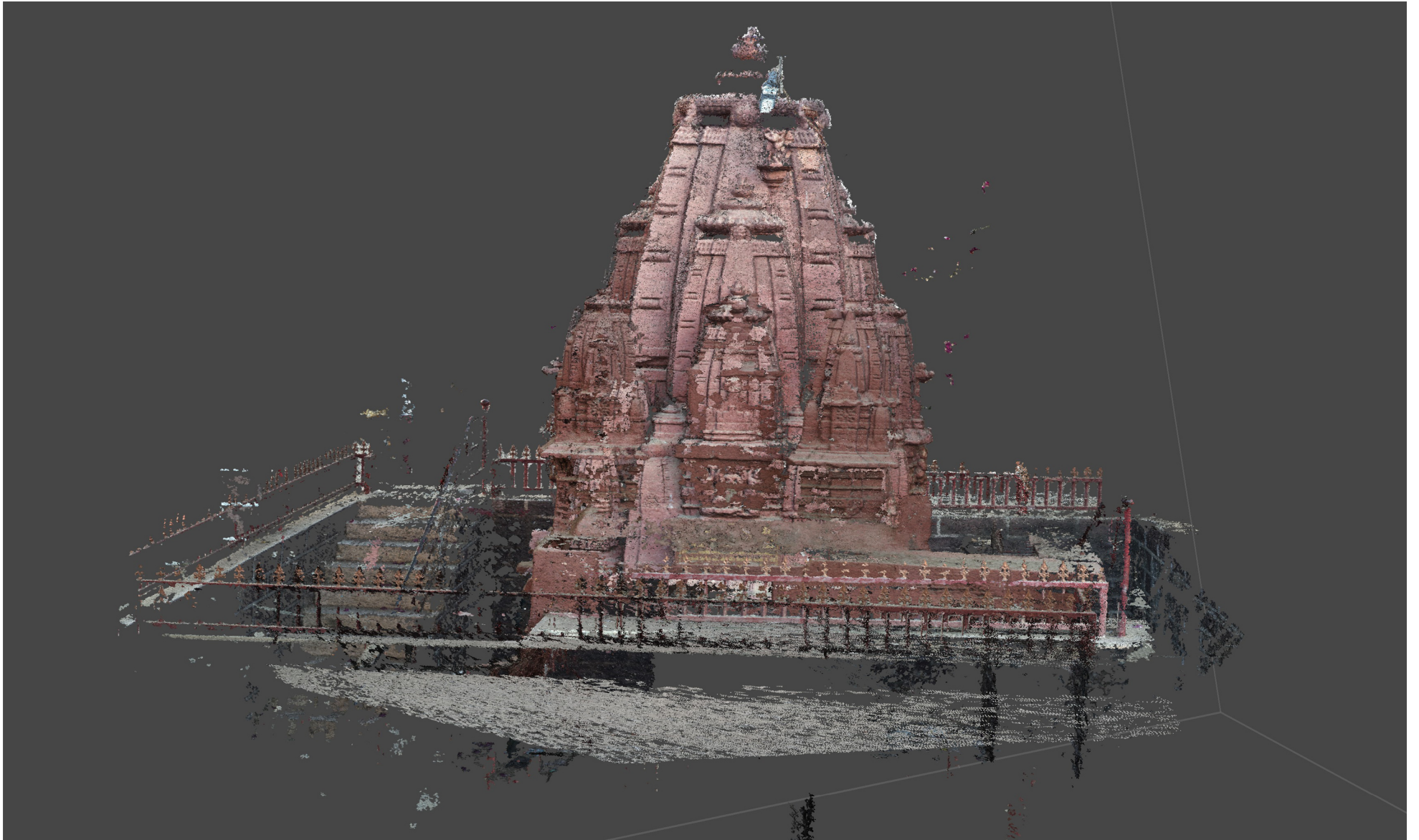
Author: Gayathri.S S



Author: P. Ghorpade



Author: S. Ladpatil



Author: N. Gujar, S. Khanderao, B. Singh



Author: A. Dev, K. Gaikwad, V. Chheda

3D Laser scanning

Program Faculty: Mrudula Mane

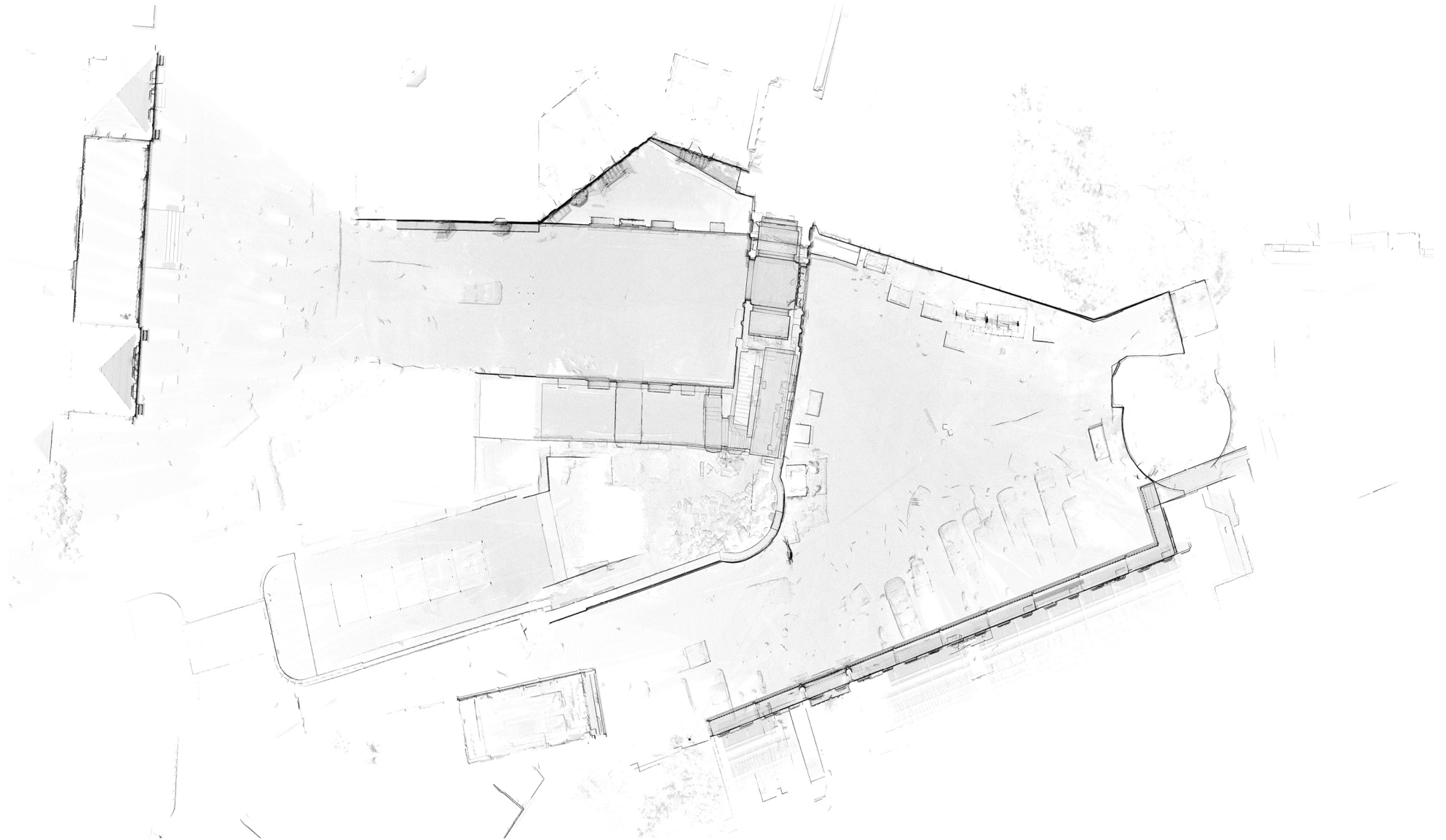
Conservation Architect, Digital Documentation Expert for Built Heritage,
CHC - CRDF, Ahmedabad
Email id: mrudula.mane@cept.ac.in

Program Faculty: Zeus Pithawalla

Research Associate, CHC -CRDF, Ahmedabad
Email id: zeus.pithawalla@cept.ac.in

3D Laser Scanning workshop involved the understanding of the scanner and its interface, planning for data collection as per the site conditions, managing quantity and quality during data capture, and the post-processing of data that includes the demonstration of data transfer, registration and creation of a base model for vectorisation and quantification.





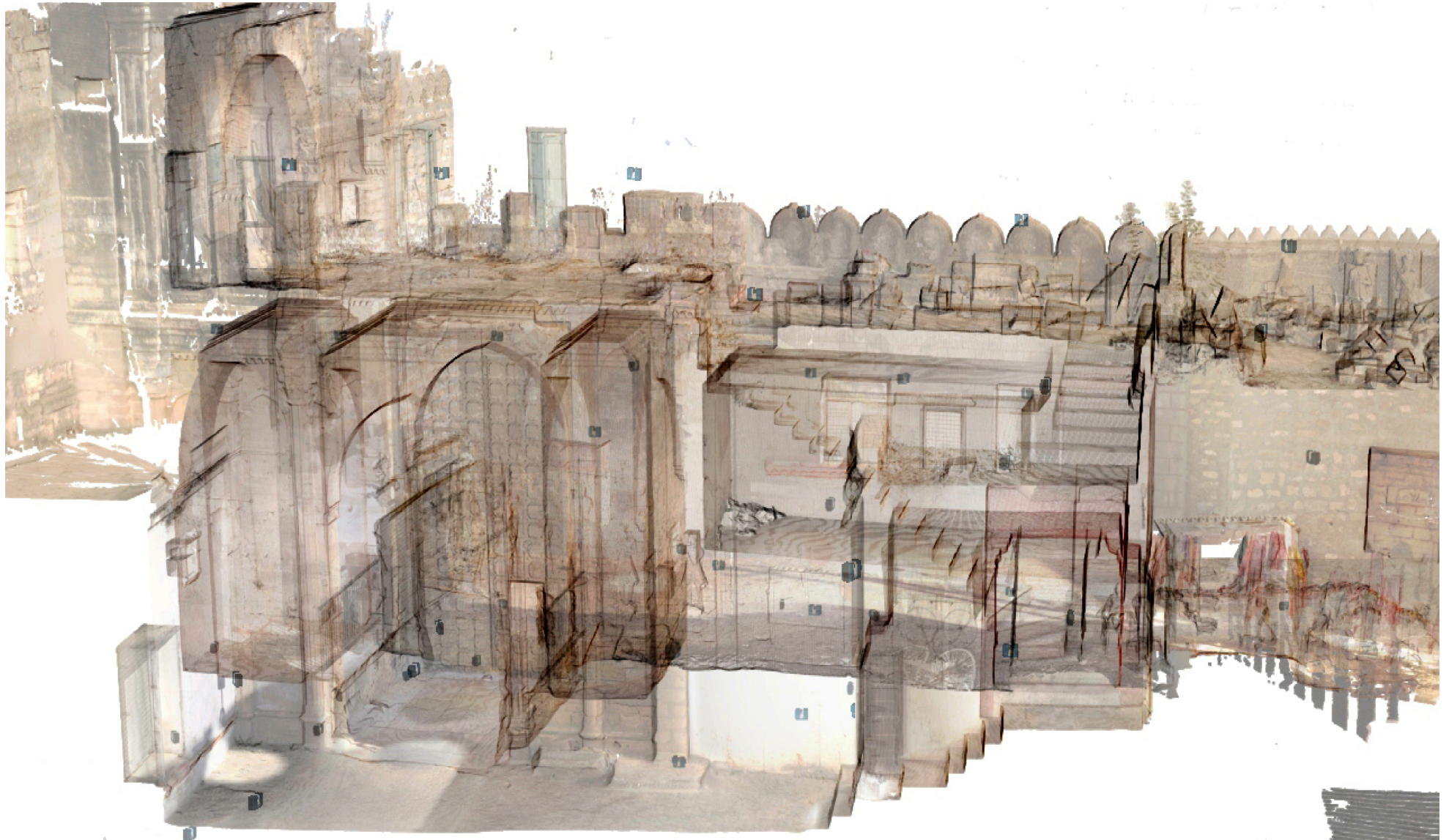
Overview map generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF



View generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF



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Clear view generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF



Clear view generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF



Sectional view generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF



Sectional view generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch by V. Purohit as part of MCR 2021, CEPT University. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF.



Sectional view generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch by V. Purohit as part of MCR 2021, CEPT University. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF.



Elevation view generated from the 3D point cloud model of Nagarkhana, Darbargadh, Kutch by V. Purohit as part of MCR 2021, CEPT University. Data collected by workshop participants under the guidance of M. Mane, Z. Pithawalla, D. Nakrani. Post processing and Visualization by M. Mane, Z. Pithawalla, and D. Nakrani for CHC - CRDF.

Contact us:

CPP (CEPT Professional Programs), CEPT University

Kasturbhai Lalbhai Campus
University Road, Navrangpura
Ahmedabad - 380009, Gujarat, India

Email id: cpp@cept.ac.in

Website: <https://cpp.cept.ac.in/>

Follow on:



@cpp.cept



@CEPT Professional Programs

CHC (Center for Heritage Conservation), CRDF

Near AES Boys Hostel Campus,
University Ground, Navrangpura,
Ahmedabad - 380 009, Gujarat, India

Email id: chc@cept.ac.in

Website: <https://crdf.org.in/center/center-for-heritage-conservation>

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