DIGITAL PRESERVATION OF HERITAGE MONUMENTS

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About the Design Department

• The department envisions to creatively engage in the space between technologies and people.
• Multi disciplinary approach
• Innovation led approach
• Practice based research
• Learning by doing
Department of Design – DIC has been working towards the infrastructure of the ecosystem, in which Designers and Engineers in academia interact with real world problems and stakeholders to give shape to creative entrepreneurial cooperation and collaboration.
India and Heritage

• India is land of rich culture and heritage.

• It has been portrayed beautifully through ancient texts, architecture and monuments.

• We get in-depth knowledge historical and political information of our past through these monuments and architecture.

• These monuments are the treasures of a nation and symbol of pride of Indian civilisation.
DIGITAL PRESERVATION OF MONUMENTS

Introduction

- India’s rich heritage transcends in-depth knowledge of our historical and political past. Heritage monuments and architecture are the treasures of a nation and symbolize the pride of Indian civilization. Monuments are connected over the past, and it also has an emotional attachment to the people living around the space.

- We have seen destruction of culturally important heritage monuments due to climate change, weather and human activity; these threaten many heritage sites of national and international significance. Therefore, documenting, preserving and conserving these monuments are very important. It is important to digitally document, appropriately record and document it the culturally significant.

Objective

- The physical experience obtained when people visit the monuments, will be translated to the digital medium. And the aim is to recreate the digital experience much nearer to the original experience of the physical monument. And to create a knowledge base for the future, parallely communicating the form, style, design, culture and history to next generation.

- To preserve the rich cultural heritage in India without altering the physical structures.

- Presenting the structures in virtual reality space is an excellent for promoting the tourism in India.
Different conditions of the Monuments
Need for Documentation

• Part of heritage conservation and Understanding of culture

• Create a knowledge base for the future, parallel communicating the form, style, design, culture and history to next generation.

• Maintain Infrastructure Efficiently and Effectively – Through Monitoring – Rennovation and Restoration

• Understand how structures were built, the current conditions and threats they face.
• Scientific research
• Technical Innovation (new tools)
• Digitisation (catalogues and documents)
• Dissemination and publishing
• to foster economic development, education, tourism, art creation, social relations…
Field of Study

Qutub Shahi Tombs, Hyderabad, Telangana

Tomb of Hayat Bakshi Begum

Qutab Shahi Tombs

Charminar

Golconda fort
Hayat Bakshy Begum

The city of Hyderabad was founded by the fifth ruler of Golconda, Sultan Muhammad Quli Qutb Shah.

Daughter, intelligent wife and wise mother - this woman, who meant the world to three successive rulers of Golconda, is buried under an imposing tomb along with the rest of her family in the Qutb shahi tomb complex.
Effects on heritage monuments

- Natural disasters - Change in climate conditions, earthquake, rain and other factors which affects the monuments.

- Man made effects - Attitude towards cultural spaces (Scribbling on monuments, Spiting on the walls of the monument, and other anti-social activities.)
Method & Process

- The digital 3D acquisition of objects and structures is generally performed by means of
  - Passive techniques (image-based methods) such as photogrammetry
  - Active sensors (range-based methods) such as laser scanner
- For the project we have adopted an integration of active and passive techniques for a complete digital documentation & preservation of the heritage monuments.
Traditional Documentation Method

- Manual survey
- Photography
- Drawings
- Writings
Current trends in documentation

- Lidar scanning
- Digital photography
- 360 degree photography
- Ariel scanning
- Photogrammetry
Process involved in the documentation of Hayat Bakshi Begum tomb
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Point Cloud data Acquisition

• Mapping of areas where we can get the maximum surface area of the monument.

• Acquiring point cloud data was divided into first and second floor.

• This helped in better placement of scanner to acquire dense & accurate point cloud
Mapping

GROUND FLOOR

FIRST FLOOR
Point Cloud Data
Point Cloud Data
Modelling of the Monument
MONUMENT MODELING POINT CLOUD AS REFERENCE
Modeling
Generated Real time terrain

Step 1: Generate height map according to the terrain. Then texturing.

Step 2: Convert the height map into a height map with mesh, detail, and UV maps.

Step 3: Import the file into Unity and assign the new file with a terrain detail file in Unity.

Textured (real-time) terrain generated

Shaded (real-time) terrain generated

Mesh (real-time) terrain generated

Qutub Sahi Tombs real time generated Terrain
Base Plan of Hayat Bakshi Begum Tomb
THANK YOU