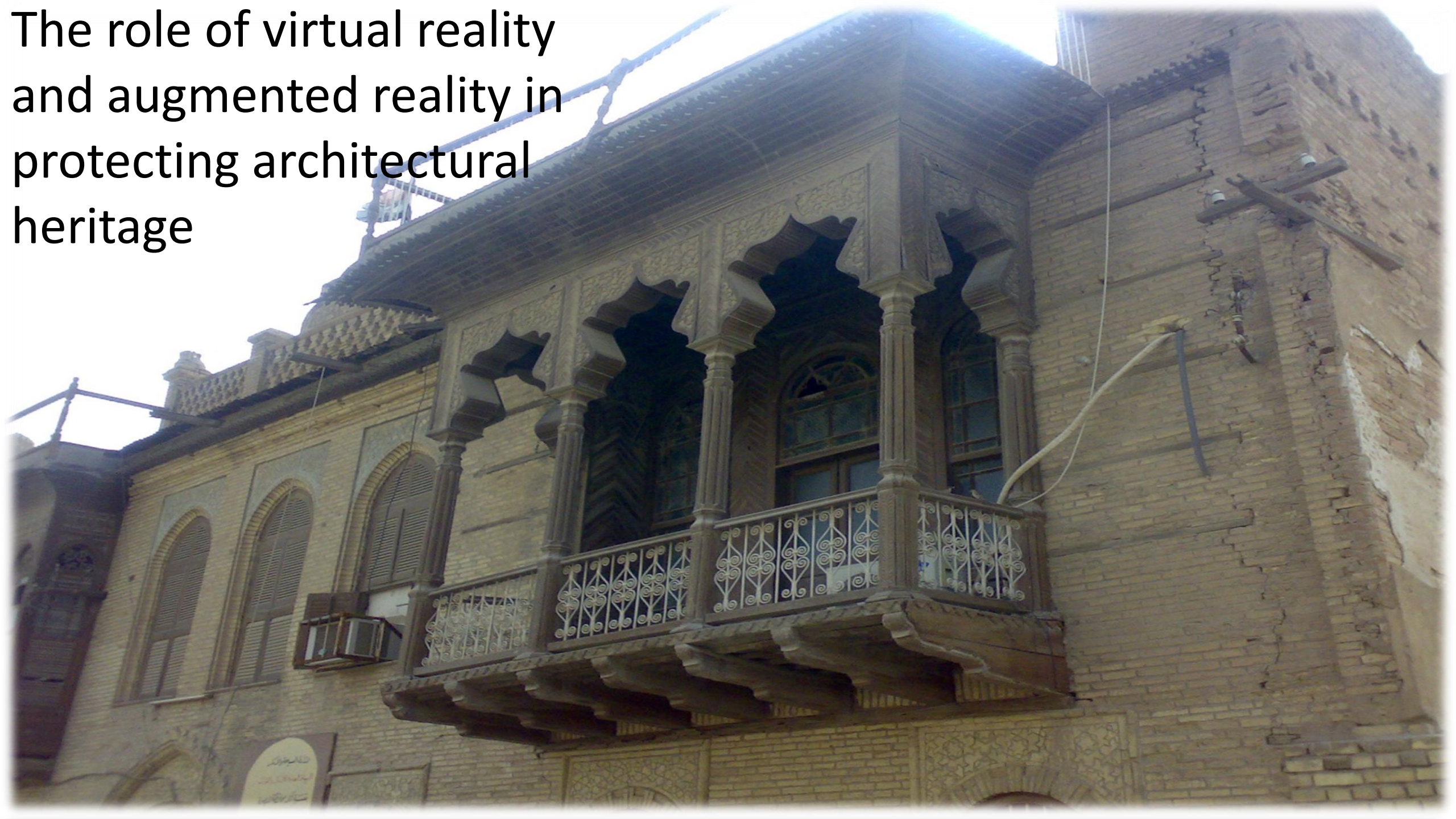
# The role of virtual reality and augmented reality in protecting architectural heritage



# Lecture Topics

1. Architectural heritage
2. Old city of Basra - Nazrin
3. Virtual Reality and Augmented Reality
4. Augmented and Virtual Reality Experiences in Architectural Heritage
5. Application of NAZRAN ( XR – **Basra Heritage )**

# 1. Architectural heritage

Architectural heritage is considered one of the most important elements of the cultural identity of any society, reflecting the history of peoples and their artistic and social developments. Through landmarks and buildings, we can understand the architectural styles used throughout the ages and the cultural and environmental influences that shaped those communities.

**However, the architectural heritage faces many challenges, including:**

- Urban Expansion
- Cultural Change
- Climate Change
- Neglect
- Conflicts and Wars
- Funding

# 1.1. **Architectural documentation**

**Architectural documentation** is the process of collecting and recording information related to architectural structures and historical sites. This includes documenting designs, materials used, dimensions, technical details, and construction history. **The goals of architectural documentation are**:

**Heritage preservation**: Maintaining information about historic buildings and appreciating their cultural value.

**Study and analysis**: Understanding the architectural methods and techniques used in the past.

## ❑ Types of architectural documentation

Photographic documentation

Graphic documentation

Written documentation

Digital documentation

Audio documentation:

- Virtual Reality and
- Augmented Reality

# 2. Old city of Basra - Nazrin

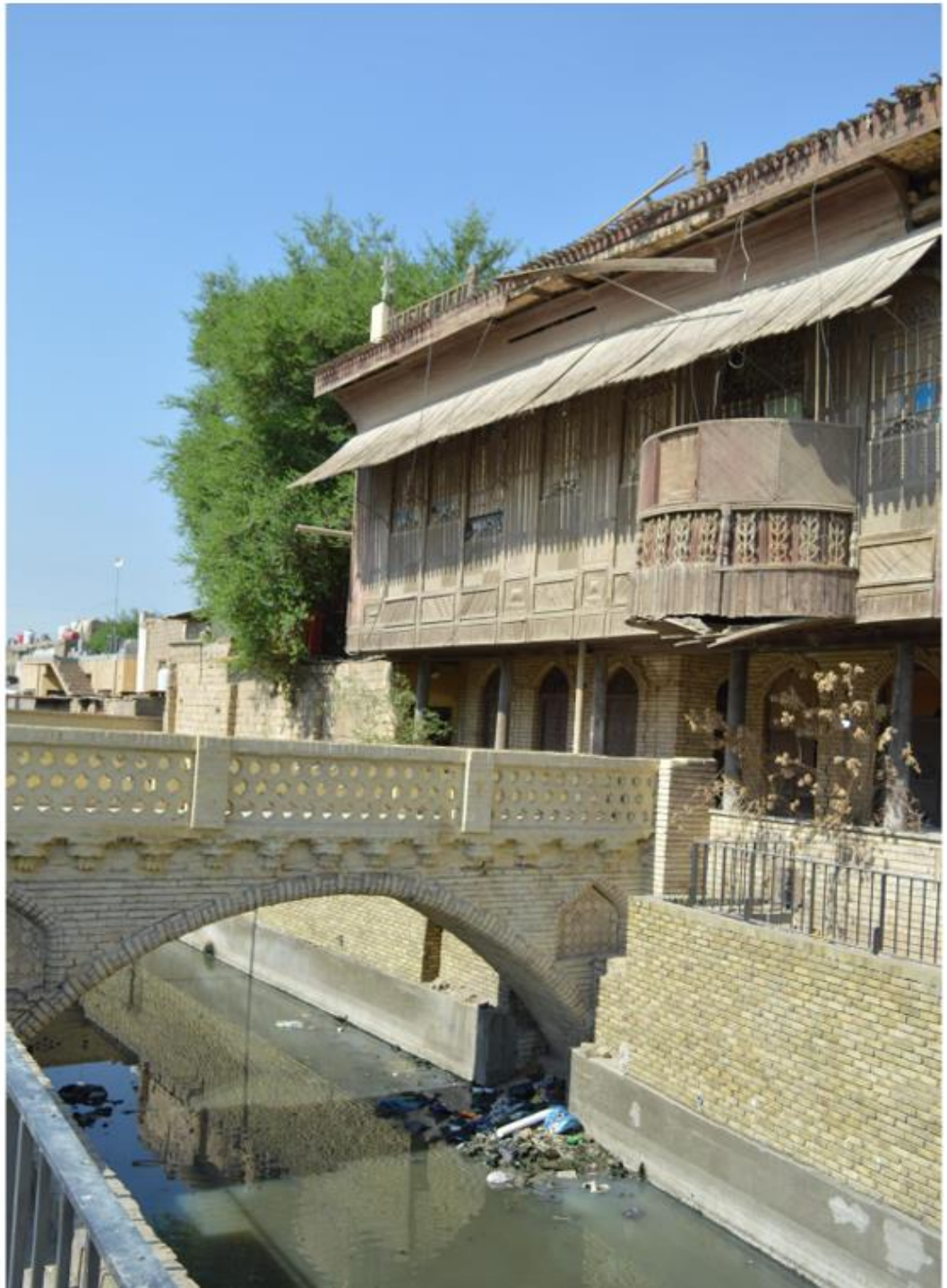
One of the main heritage areas is the old city of Basra (Nazran area), which is considered one of the main ancient centers after Al-Ashar and Al-Maqal.

Nazran is one of the oldest areas in Basra and the first to witness urbanization at that time. The name Nazran means insight in reference to the writers and poets. Rivers used to flow in the area in the past, and people used Blum-ALAshari for transportation. Nazran is famous for its important heritage houses that belong to famous figures from Basra's history (Al-Mandil, Sheikh Khazal,, Al-Wali).

**At this time the area is being developed by UNESCO.**

# Pictures of Nazran

It includes heritage houses, churches (Armenian-Chaldean), the Ashar River, and bridges.



# 3. Virtual Reality and Augmented Reality

## 3.1 Virtual Reality

Virtual Reality (VR) is a new technology that is being used innovative in architecture. It creates realistic experiences that help architects, designers, and clients see designs more clearly. Here are some important points about using.

# The importance of virtual reality in Heritage architecture

**1.visualization of architectural:** Virtual reality lets people see architectural designs before they are built and allows them to explore those spaces.

**2.User experience :**Clients can experience the design as if they are already inside the building, allowing them to provide feedback more effectively**.**

**3.Training and education:** Virtual reality is used as an educational tool for students and new architects, allowing them to learn through hands-on experiences in virtual environments.

**4.Environmental simulation:** Virtual reality can simulate the effects of the environment, such as lighting and weather.

# 3.2 Augmented Reality

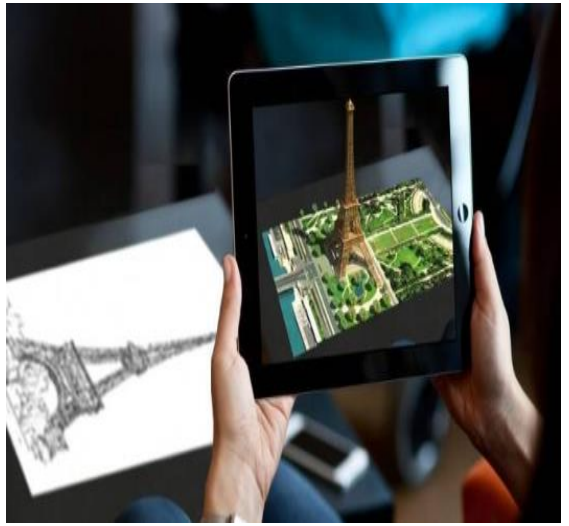
augmented reality applies to digital symbolic and graphic applications that can provide users with enhanced interaction with the design environment by merging virtual elements of design proposals with real elements of the real environment in real time and space.

**According to a number of studies on the importance of augmented reality in Architectural heritage , three main points emerge**:

1. Enhancing community participation in design decision-making

2. Enhancing the accuracy of design decisions and assist designers.

3. Enhancing City Image and Improving User Experience



# 4.Augmented and Virtual Reality Experiences in Architectural Heritage

## 1.Jordan Experience - Al-Seil River

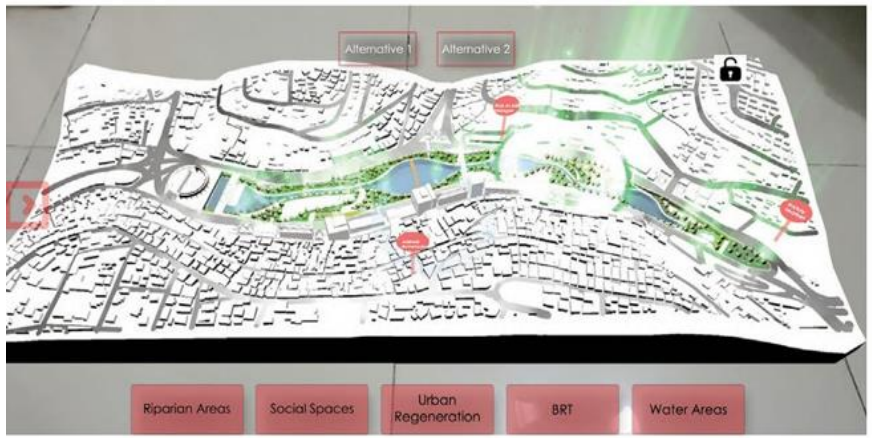
- **Location:** heritage river Al-Seil in Ras Al-Ain, Amman
- **The purpose of the experiment** :is to develop the heritage river Al-Sayl in Ras Al-Ain, Amman - and engage the community with the help of designers.
- **Application idea(Seil of Amman –AR User Feedback) :**which represents the city's natural heritage that suffers from environmental neglect because of floodings, poor rainwater management, and unsustainable urban expansion.
- Use the augmented reality experience to  reviewed two proposed scenarios for development of the areas on both sides of Siel River in Ras Al Ain, Amman, Jordan )

Seil of Amman
AR User Feedback

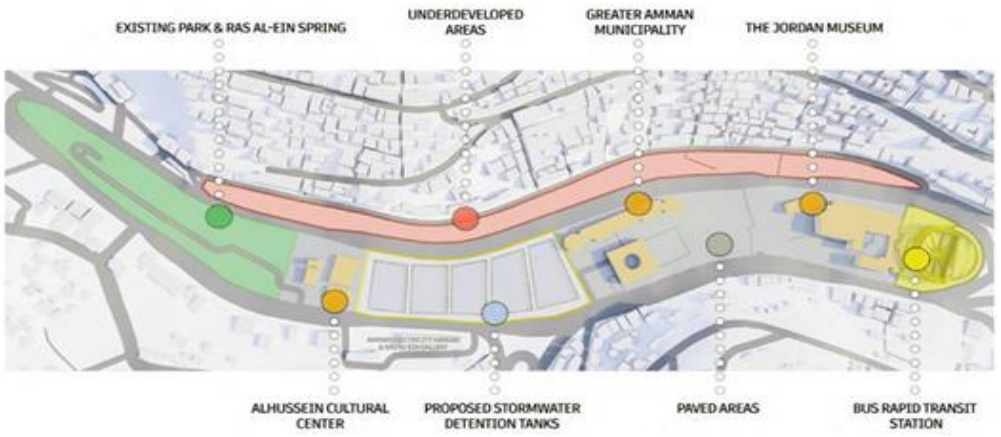
iOS

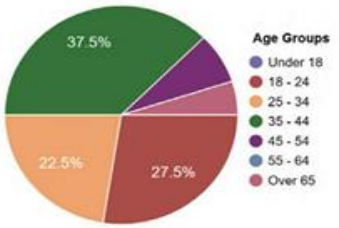
## ❑ importance of augmented reality

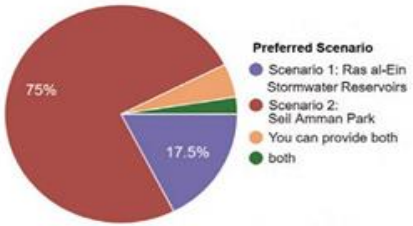
- The experience used an augmented reality application (MAR Heritage Siel River) to upload the proposed development models and share them link with the residents of the Ras Al-Ain area, allowing them to engage with the proposed development models.
- **Given the importance of the natural heritage of the area**, community engagement was very important. The experience helped to engage the community in design decisions and enhance the accuracy o f design decisions and assist designers.

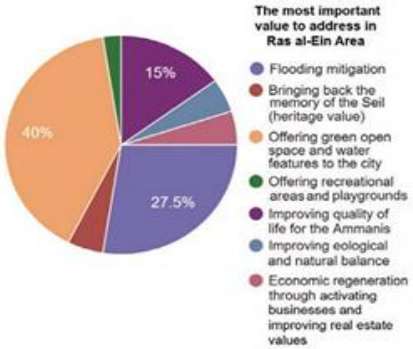




# 2. Erbil Castle  Experience

- **Location:**The Erbil Castle is a historic fortress with thousands of years of history and it is landmark in Erbil,

- **The purpose of the experiment:** Enhancing City Image and Improving User Experience.

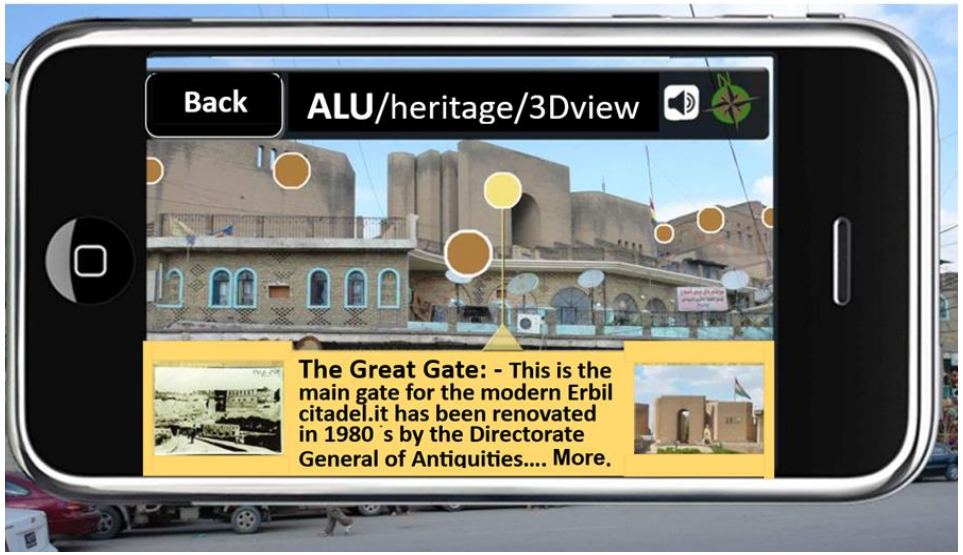
- **Application idea**

the AR application “ARBELA Layers Uncovered” (ALU) was developed to explore the memory of Erbil, Castle , and present it in an innovative way to site visitors.. The application includes a set of icons that explain the options for each image.. ALU interface includes three main modes:

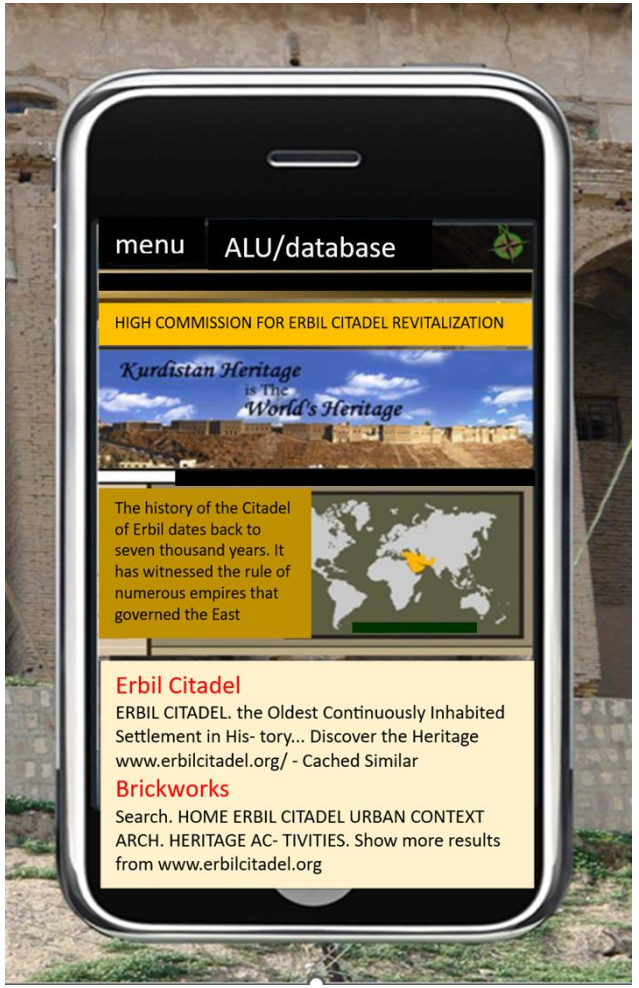
**1-Historical Mode:** That focuses on textual and audio data, video footage, and historical images (panels) related to the city's history. This information, extracted from historical sources, is presented in different languages that users can choose from.


**2.Heritage Mode:** which provides information about traditional architecture in the remaining buildings,. It offers three display options: 2D view, 3D views, and reconstruction view






**3-Database Mode**: This allows users to access all information about the Citadel by connecting to Castle various websites and databases

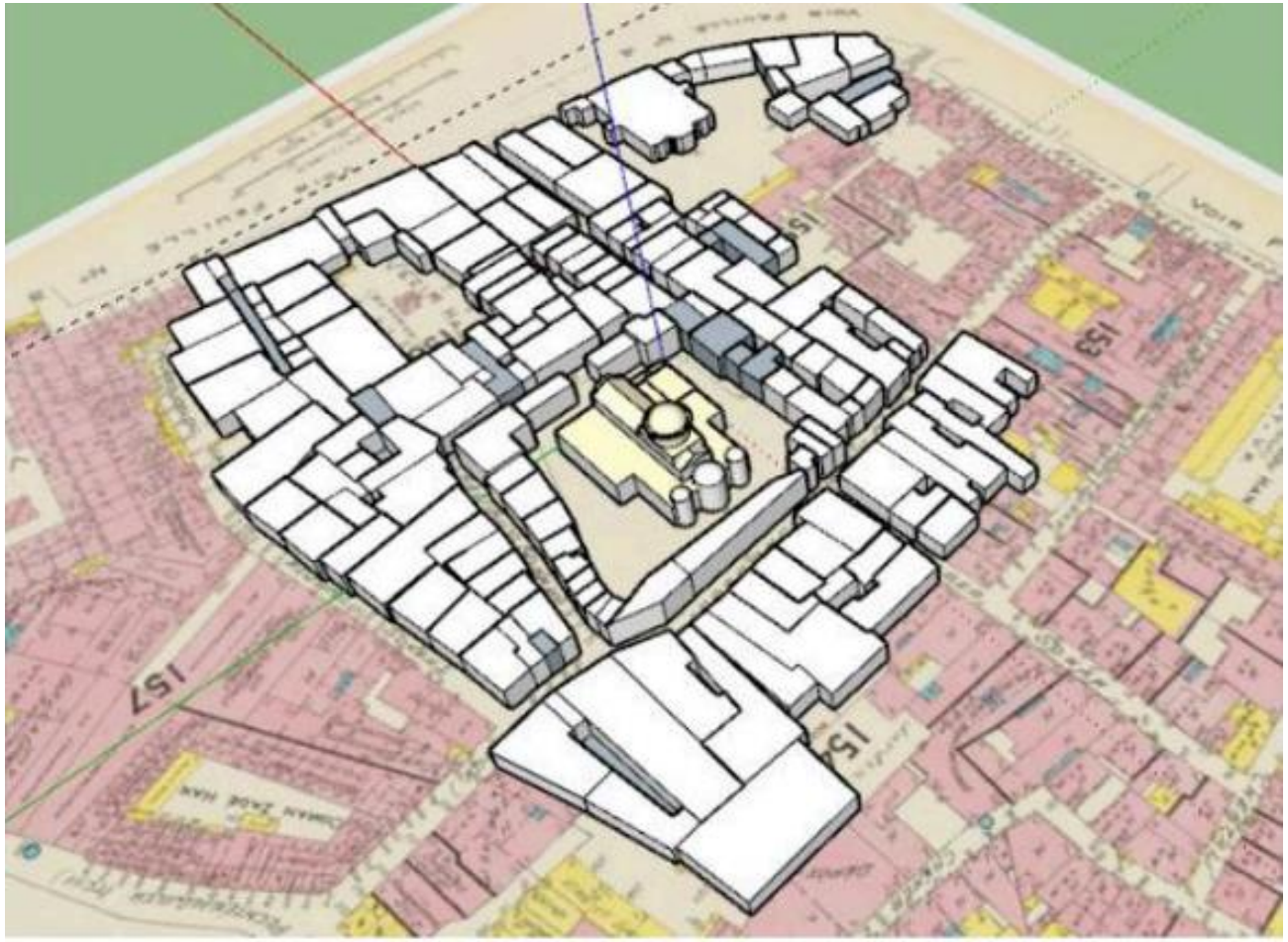
# Applications of Virtual Reality

Virtual Reality Experience of Architectural Heritage in Türkiye restoration the lost part of heritage and historical buildings in Türkiye using 3D technologies and display them to users**-(Virtual museums)**

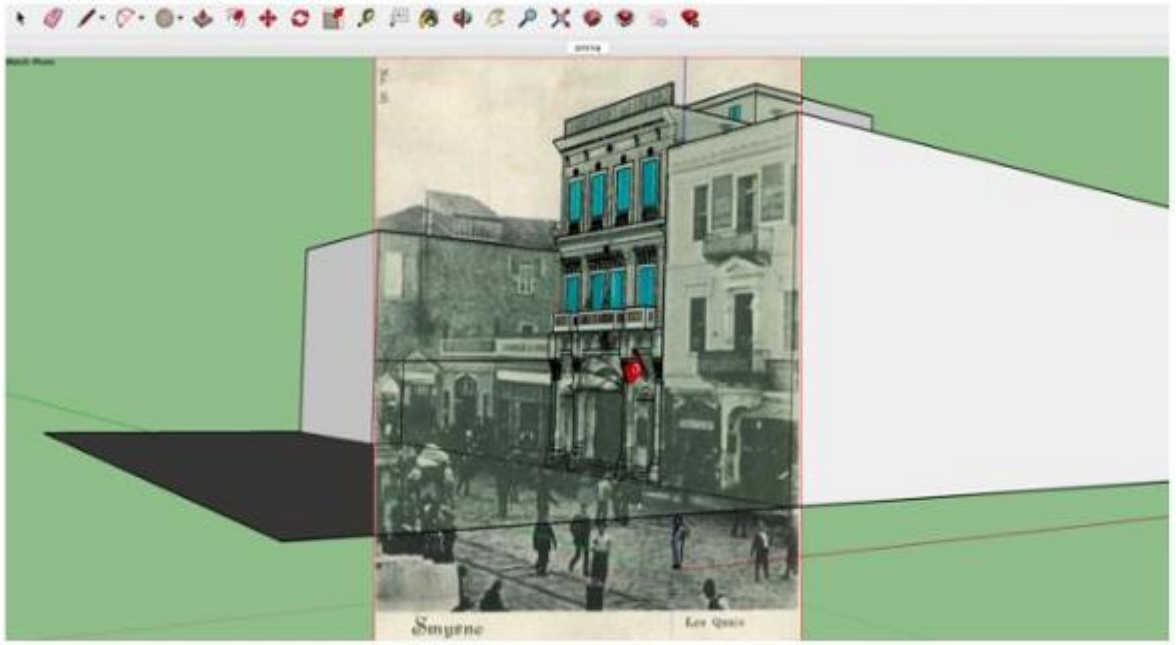
**1-church of St. George in Izmir**

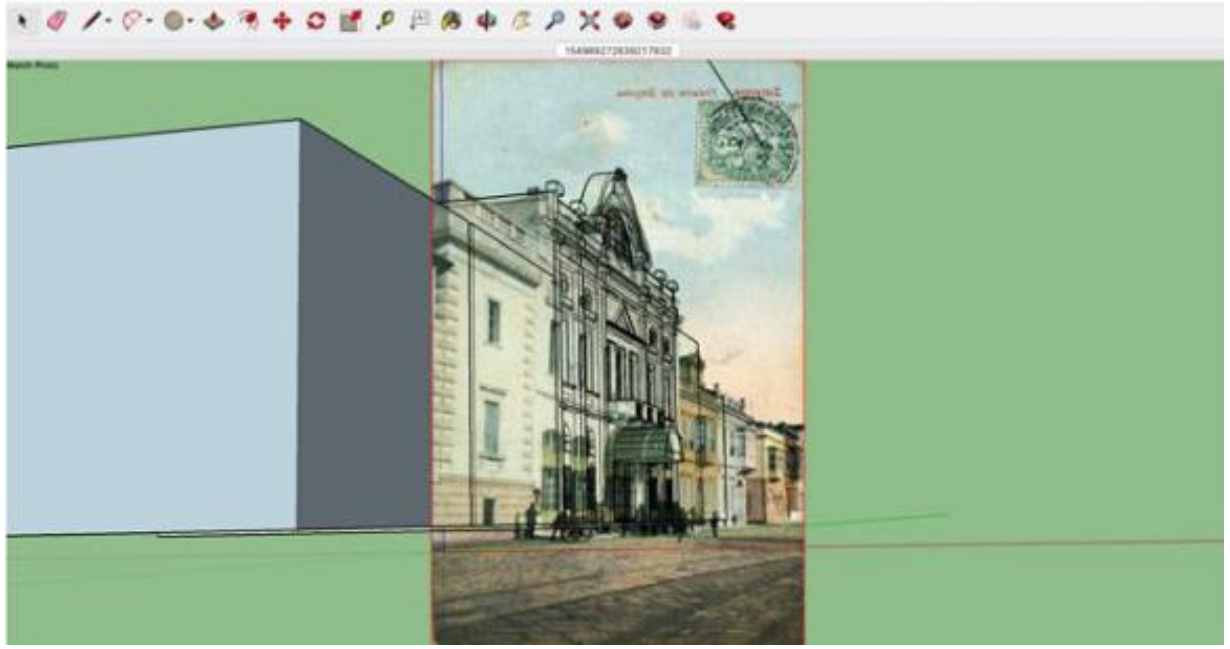
Virtual reconstruction of the heritage church of St. George in Izmir

The data has been archived and restoration in the church's digital museum, with the restoration of the missing parts of the church.

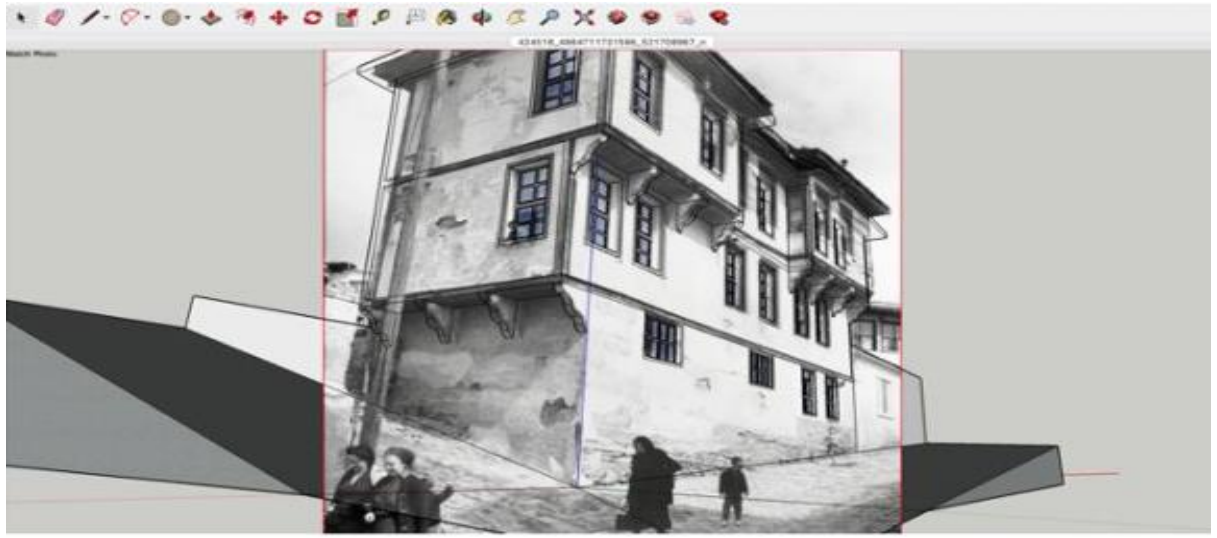


**2. London Hotel in Izmir**: Create virtual models of the lost heritage building, the London Hotel in Izmir, and attach photos for people to see the lost heritage in a virtual environment.



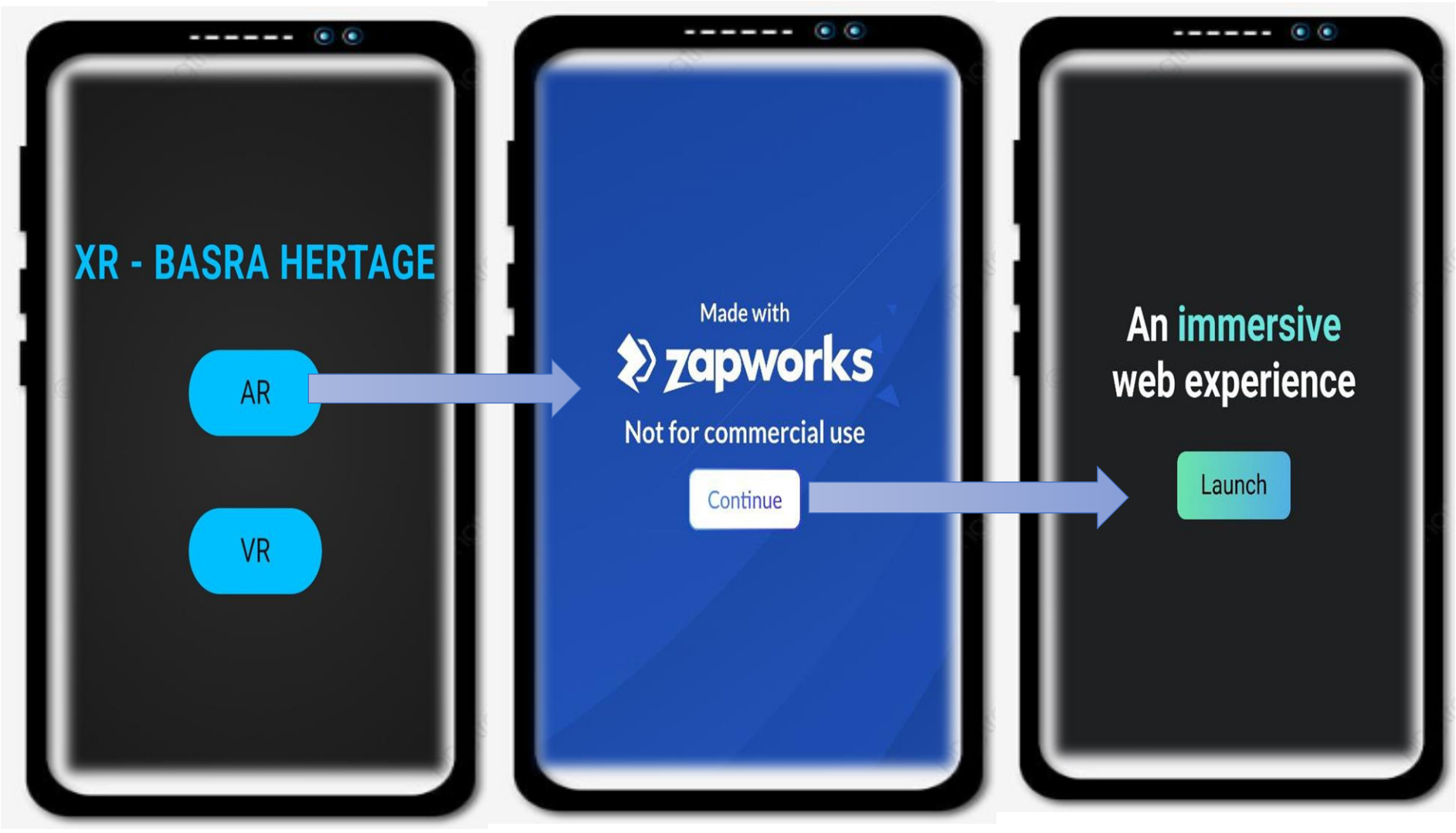
Virtual reconstruction of the hotel using 3D technologies



# 5. Application of NAZRAN ( **XR – Basra Heritage )**

**XR – Basra Heritage** :Basra Heritage application consists of two options, the first is about AR and the second is VR. https://nnnnnnn-f1dbb.firebaseapp.com/

## **AR** Application




Location
Architectural details
History
The date of construction of the church dates back to the year 1736, the oldest
and first Armenian church in the city of Basra in the Al-Saif neighborho
church was rebuilt in the year 1907. It was built
by the Yessian family and most of the family became buried within
the church. Several modifications and reconstructions were
made to the church over
the years until the year
2009, when it was covered with white
stone after it was made of bricks and the wooden roof was
replaced with concrete.

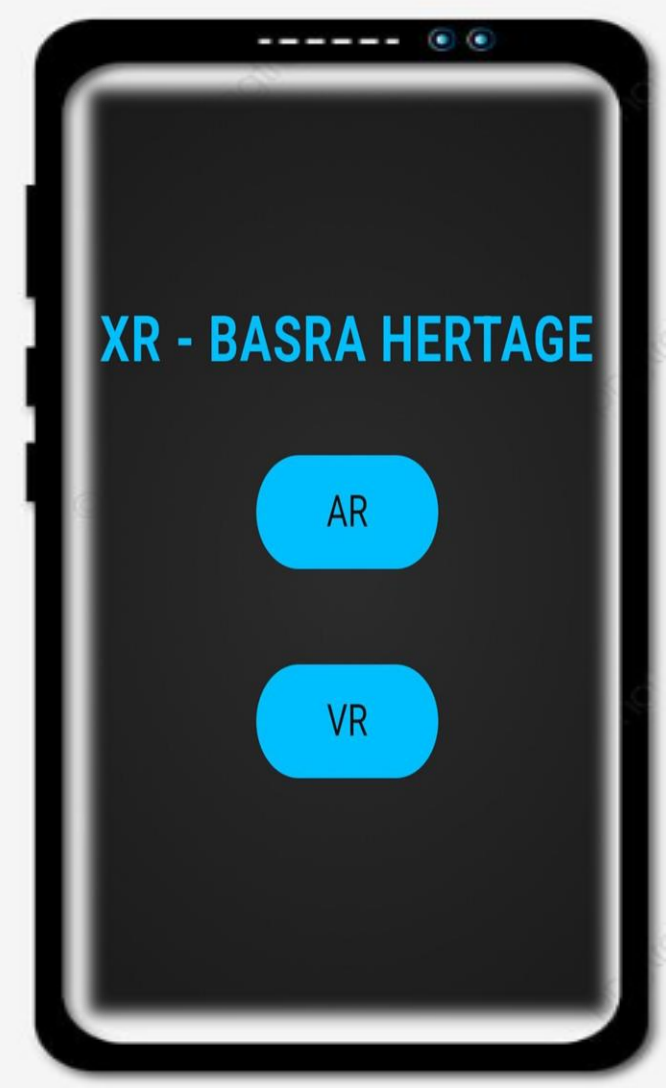
# Armenian Church

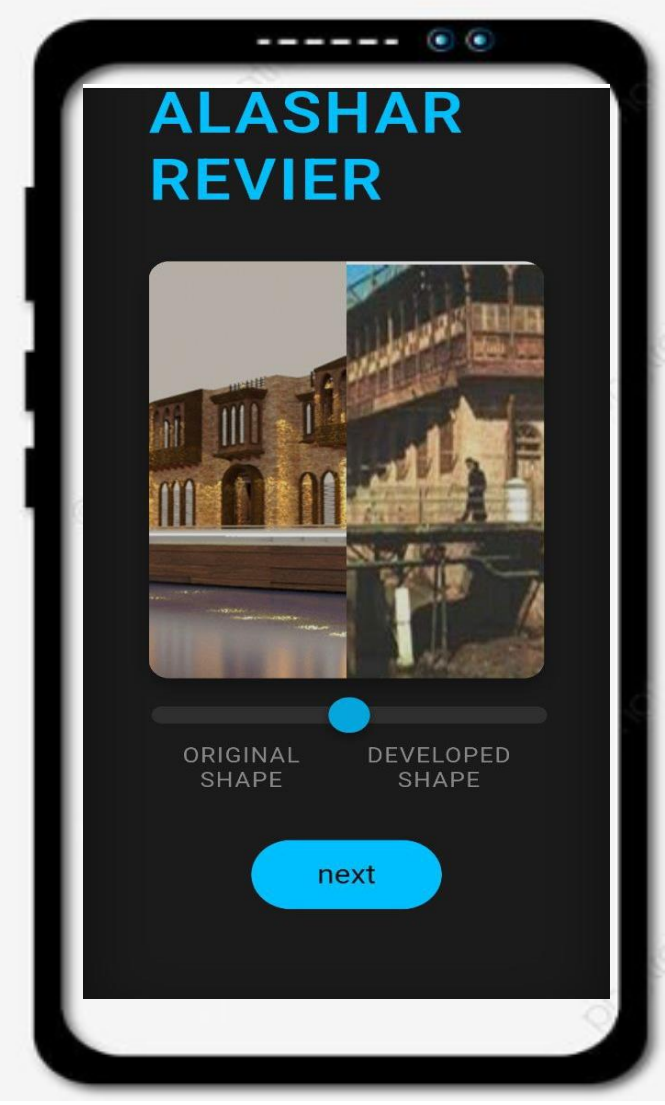
# Al-Mandil house

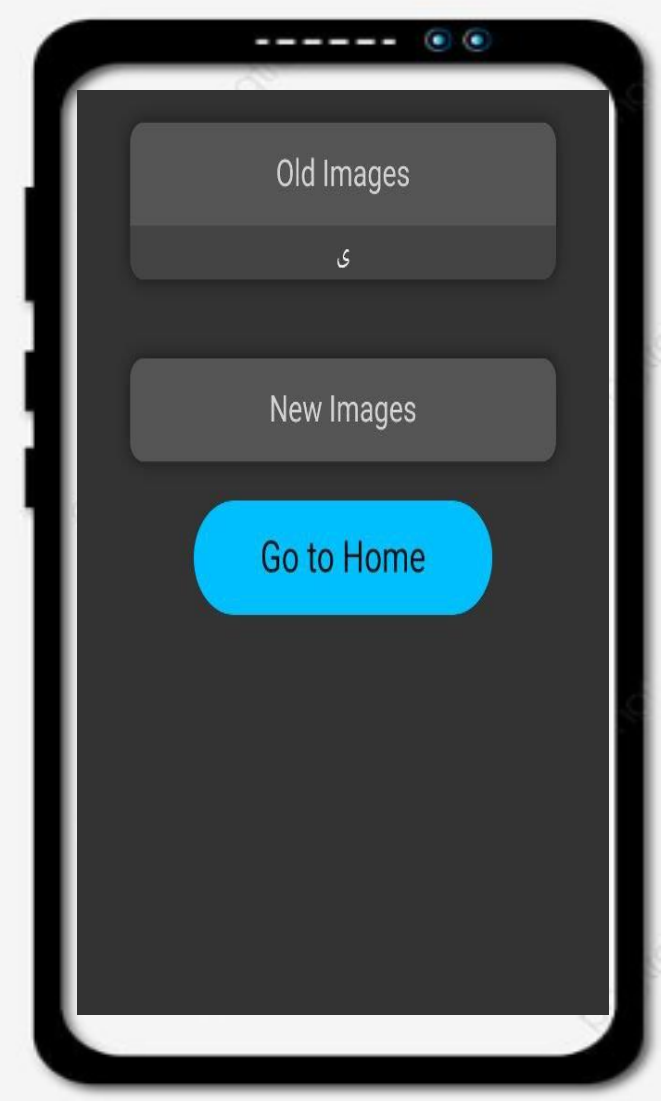
# El Wali House

# VR - Application

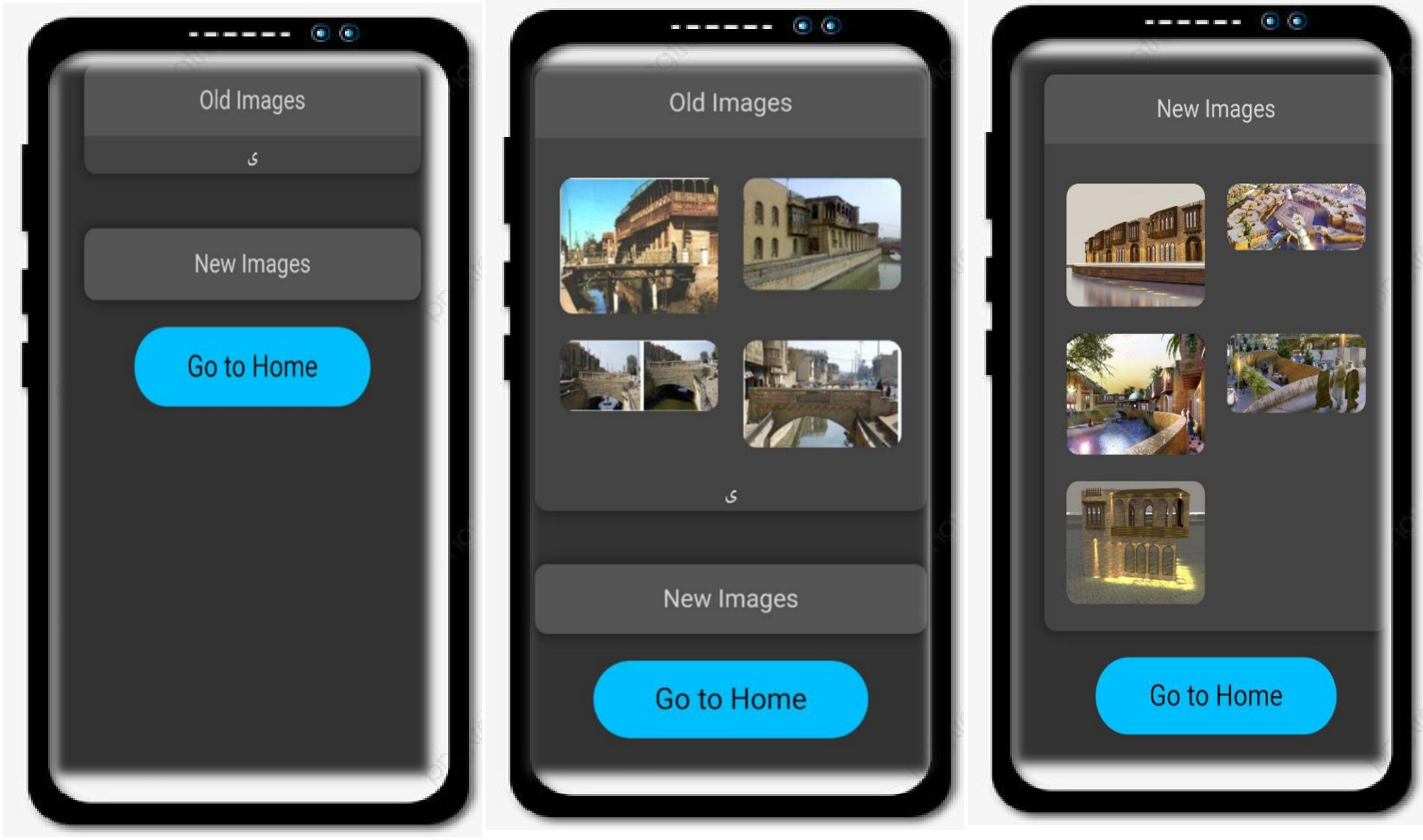
The VR application includes two parts, the first is the virtual exhibition. The VR application includes two parts: the second part includes the original images of the area, and the second part includes a development proposal.



# VR - Application



# Thank you all