



APPLICATION OF MODERN METHODS IN THE IN-DEPTH STUDY OF ARCHAEOLOGY

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Abstract: This article analyzes the role and importance of modern scientific research methods in the in-depth study of archaeology. During the research, methods such as remote sensing, ground-penetrating radar (GPR), LIDAR technology, 3D modeling, and DNA and bioarchaeological analysis were examined. The results show that these innovative approaches increase the efficiency of archaeological research and help preserve historical objects.

Keywords: archaeology, scientific research, innovative technologies, GPR, LIDAR, 3D modeling.

Introduction

Archaeology is an important scientific field that studies the ancient stages of human history. It helps us understand past societies through material remains. In recent years, the development of science and technology has had a strong impact on archaeology and has led to the use of new research methods.

Traditional archaeological excavations often require a lot of time and money, and in some cases, they may damage cultural layers. Therefore, the use of modern, non-invasive methods has become an important task today.

Research Methodology

The following scientific methods were used in this study:

analytical method — studying and summarizing scientific sources

comparative method — comparing traditional and modern methods

systematic approach — analyzing archaeological research in a comprehensive way

These methods helped to evaluate the effectiveness of modern technologies in archaeology.

The Need for Modern Archaeological Methods

Today, achieving high accuracy and efficiency in archaeological research is very important. Modern technologies play a key role in reaching this goal.

The advantages of modern methods include:

studying large areas in a short time

identifying underground objects without excavation

preserving historical heritage

improving the reliability of scientific results



Remote Sensing Technology

Remote sensing is one of the most widely used modern methods in archaeology. It is based on the use of satellite images and drones to study the Earth's surface.

With this method, it is possible to identify ancient roads, irrigation systems, and remains of cities. It is especially effective for studying large areas.

Ground-Penetrating Radar (GPR)

GPR technology allows researchers to detect objects under the ground using electromagnetic waves. It is very useful in locating archaeological structures.

With GPR, researchers can:
detect ancient buildings
map underground structures
improve excavation planning

LIDAR Technology

LIDAR (Light Detection and Ranging) uses laser beams to create accurate models of the Earth's surface. It is especially useful in forested areas.

Studies show that LIDAR has helped discover many hidden archaeological sites that were not known before.

3D Modeling and Digitization

3D modeling allows archaeologists to digitally reconstruct and preserve artifacts. This method is useful not only for research but also for education and museums.

With 3D technology:

artifacts can be stored digitally
damaged objects can be reconstructed
interactive presentations can be created

DNA and Bioarchaeological Analysis

DNA analysis helps study the genetic structure of ancient humans. It provides information about their origin, migration, and health.

Bioarchaeological studies examine human remains to understand lifestyle, diet, and diseases.

Results and Discussion

The results show that the use of modern technologies significantly improves the efficiency of archaeological research. Non-invasive methods are especially important for preserving historical objects.

A combined approach, using several methods together, provides the best results.

Conclusion

The use of modern research methods is essential for the in-depth study of



archaeology. These technologies make it possible to study history more accurately while preserving cultural heritage.

In the future, further development of these methods is expected to lead to new discoveries.

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