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Spatial Planning and Tourism Development with Sustainability Model of the Territorial Tourist with Land Use Approach

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***Abstract*—**In the last decade, with increasing tourism destinations and tourism growth, we are witnessing the widespread impacts of tourism on the economy, environment and society. Tourism and its related economy are now undergoing a transformation and as one of the key pillars of business economics, it plays a vital role in the world economy. Activities related to tourism and providing services appropriate to it in an area, like many economic sectors, require the necessary context on its origin. Given the importance of tourism industry and tourism potentials of Yazd province in Iran, it is necessary to use a proper procedure for prioritizing different areas for proper and efficient planning. One of the most important goals of planning is foresight and creating balanced development in different geographical areas. This process requires an accurate study of the areas and potential and actual talents, as well as evaluation and understanding of the relationship between the indicators affecting the development of the region. At the global and regional level, the development of tourist resorts and the proper distribution of tourism destinations are needed to counter environmental impacts and risks. The main objective of this study is the sustainable development of suitable tourism areas. Given that tourism activities in different territorial areas require operational zoning, this study deals with the evaluation of territorial tourism using concepts such as land use, fitness and sustainable development. It is essential to understand the structure of tourism development and the spatial development of tourism using land use patterns, spatial planning and sustainable development. Tourism spatial planning implements different approaches. However, the development of tourism as well as the spatial development of tourism is complex, since tourist activities can be carried out in different areas with different purposes. Multipurpose areas have great important for tourism because it determines the flow of tourism. Therefore, in this paper, by studying the development and determination of tourism suitability that is related to spatial development, it is possible to plan tourism spatial development by developing a model that describes the characteristics of tourism. The results of this research determine the suitability of multi-functional territorial tourism development in line with spatial planning of tourism.

***Keywords*—**Land use change, spatial planning, sustainability, territorial tourist, Yazd.

I. Introduction

TODAY, the tourism industry in the world is one of the most important sources of income and has a special place as the world's largest service industry [1]. Therefore, each tourism destination has to compete directly with other tourism destinations at different levels: international, national, regional, provincial, urban and local [2].

Environmental quality, including environmental education, cultural attractions, tourism infrastructure and natural resources, is important contributor to enhancing competitiveness of tourism destinations [3]. Accordingly, tourism causes social, economic and environmental changes, changes in environmental and functional aspects can be examined in the context of land use change. Evidence shows that tourism development increases land use and diversity of land use, so satisfying the needs of important tourists and ignoring the needs of local people [4].

In order to achieve the goals of sustainable development, tourism areas must be reconciled and land-use policy must be changed based on the model and goals of land use [5]. Also, tourism development in natural landscapes causes spatial interference. Land regulation policies have a positive and active effect on ignoring this intervention, so flexible policy rather than a combination of strict individual policies will lead to a balanced model for better land use [6].

In view of the above, this research is conducted using spatial data of province Yazd and has used various tools of Geographic Information System (GIS) analysis, Remote Sensing (RS) and spatial statistics and the results are presented as maps.

The remainder of this paper is structured as follows. Section II reviews the relevant literature. Sections III and IV describe the research methodology and case study. Section V offers the results. The conclusions are offered in Section VI.

II. Literature Review

Tourism is a combination of activities, services, and industries that provide travel experiences to people in the transport, accommodation, catering, shops, resorts, facilities and other catering services [7]. Therefore, investigating land use status for tourism purposes is of great importance, as tourism is a basic resource activity; therefore, it is essential from an environmental-sensitive point of view and conservation of resources is essential for the prosperity and sustainability of tourism areas [8]. This issue is not specific to one country and covers many countries. These changes are more pronounced in more developed areas, including the United States, as many of the country's farms, forests, and deserts in 1900 are now occupied by human settlements. On the other hand, in today's world, tourism is the largest source of international trade and it is economically very important

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and valuable [9].

The development of tourism areas differs in terms of natural features, continuity, sensitivity and importance. Lands in the areas of destination tourism attract tourists because of their natural features and environmental features.

The sight of beautiful landscapes, natural wonders, recreational environments and pleasant weather are some of the major tourist attractions that affect land use change in destination areas. On the other hand, tourism resources are relatively sensitive and susceptible. Also unique to the expansion of tourism systems is that tourism activities are intended not only for tourism purposes but also for the host community, but also as a source of travel and transportation [10].

There are four broad approaches to measure land use change reports: 1) Superficial changes (calculating the amount of profit or loss in space), 2) Transformation (to measure the pattern of transition from one land use to another), 3) dynamics (to measure the extent and variability of spatial or spatial variability of the region); and 4) Forecasting (generating modeling of spatial and temporal patterns of change) [11].

In summary, land-use change can include: (a) conversion from one type of land use to another, changes in the composition and pattern of land-based carburetors in the region) or (b) modification of the land-use environment. Land use is the interaction between the biophysical and human environment, affecting the structure, function and dynamics of ecosystems at the local, regional and global levels of the ecological organization [12].

Human impacts on the Earth through ecological impacts are increasing, now threatening many of the world's ecosystems, and human activities such as tourism that make changes to the earth's cover are the main cause of the ecological impacts [11].

In general, land use change is justified as a factor of economic growth and as a major factor in environmental damage. This bilateral impact is compounded by problems in many tourism areas where the tourism economy is heavily dependent on environmental resources. Therefore, in order to minimize the negative impacts and maximize the benefits of interest, land use should be well monitored, well anticipated and appropriately planned and managed. But doing so is complicated for both researchers and implementers because of the nature of the land use system [13].

III. The Case Study

Yazd province is one of 31 province Iran, it is located in center of the country. It is surrounded by the provinces of Isfahan, Fars, Khorasan, Semnan and Kerman. It has an area 76,469 km². shirkouh is the tallest mountain in the region at 4,075 m above sea level. The historical city of Yazd is the capital of Yazd Province that since 2017, is recognized as a World Heritage Site by UNESCO [14]. According to the 2016 census, Yazd province had population of about 1,211,150; this province is divided into ten counties: Abarkuh County, Ardakan County, Bafq County, Behabad County, Khatam County, Mehriz County, Meybod County, Ashkezar County, Taft County, and Yazd County [15].

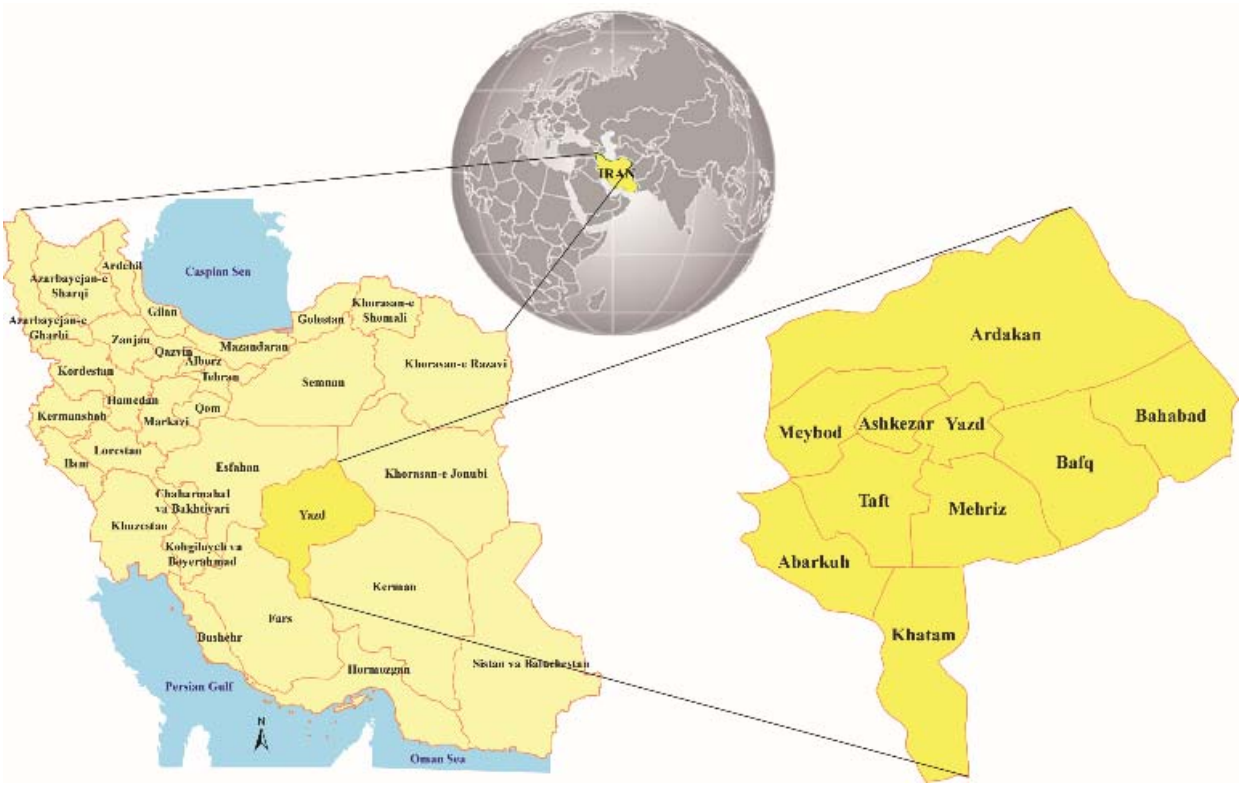

Fig. 1 Geographic location of Province Yazd, Iran

Percentage of land use types in Yazd province are: desert (9.8%), plains and salt marshes (24.33%), hills and sand dunes (1.43%), forest cover (82.1%), agriculture and garden (2.7%)i residential areas (0.05%) and the rest are pastures.

TABLE I
LAND USE AREA OF YAZD PROVINCE

Land use	Area (km²)	Percent of total
desert	6577	9.8%
lowland and saline lands	17624	24.33%
dunes and sand dunes	1038	1.43%
forest cover	1320	1.8%
agriculture and gardens	1500	2.7%
residential areas	348	0/5%
pastures	35704	49.28%

The diverse nature of this province is often interesting for tourists and non-natives, so the diverse and completely different nature of this area is one of the most fascinating attractions of the province. On the one hand, desert zones and sandy hills, on the other hand, the beautiful Shirkouh highlands and lush countryside, its valleys and slopes, and the variety of weather, are attractions for the enjoyment of nature. In this province, historical buildings and spaces, markets and other places located in different parts of the province are themselves tourist and tourist attractions.

IV. RESEARCH DESIGN AND DATA

This research is an applied study based on studies and analysis of spatial data and has used various tools of GIS analysis, RS and spatial statistics. In this study, land use and vegetation density were extracted using AVHHR images and other land related parameters were obtained from a digital model of Aster with a resolution of 90 m.

In order to investigate the suitability of widespread tourism by univariate analysis, we extracted the elevation levels suitable for widespread tourism. In the analysis of centralized tourism areas, land use adaptation, landforms and vegetation density of the study area are considered. By field surveying and reviewing tourism resources and atlases and the Global Positioning System, we developed coordinates for tourist attractions. Then, with an integrated index, we integrate tourism suitability layers and extract the results of tourism spatial development. Finally, the integrated tourism analysis index of Yazd province for each group of basic indicators is calculated using (1):

$$CT_j = \left(\sum_{i=1}^{n_j} a_{ij} . S_{ij}^{\ p_j} \right)^{1/p_j} \quad (1)$$

where the TC_i is the integrated Territorial Tourist Complex proportion of the study area, S_{ij} is the normalized value i is the results of indices j, n_j is number of input data, a_{ij} is relative weight of data and layers, P_i is factor of equilibrium between layers.

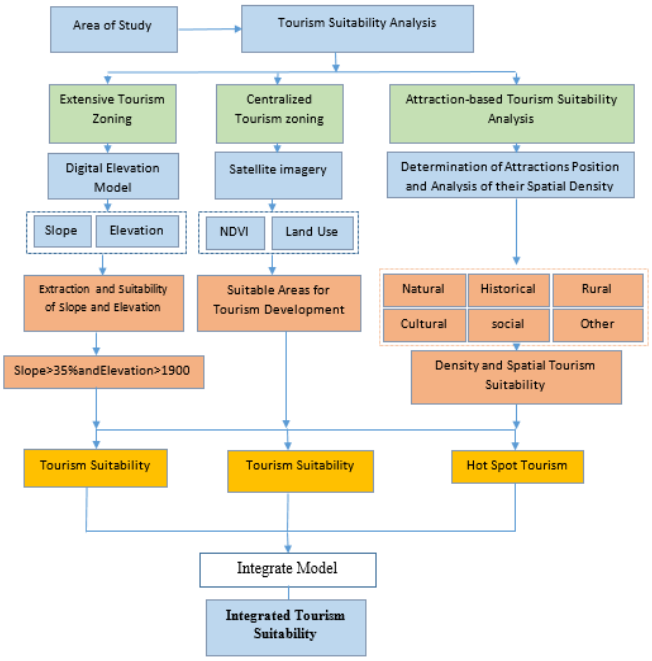

Fig. 2 Conceptual framework

V. RESULT

A. Extensive Tourism

For widespread use in land use planning, two slope and elevation layers with slopes greater than 35% and elevations above 1900 m were used. Due to the fact that a large part of the region is covered by desert, plains and hills and there are few mountainous areas and mountain tourism in this region, extensive tourism is located in the central regions of the region and near large cities such as Yazd. In addition, other tourist areas in the south of the province are very limited.

B. Intensive Tourism

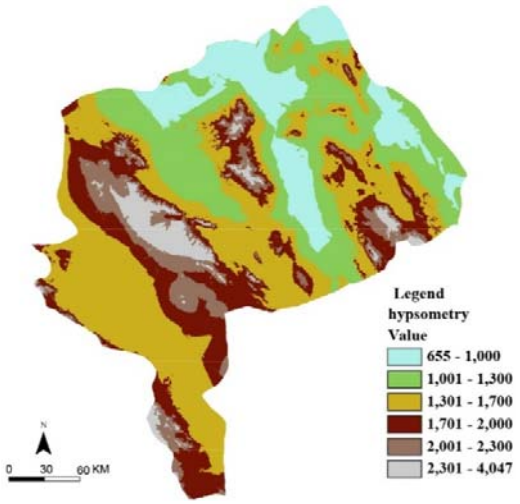

Fig. 3 Map of elevation levels suitable for extensive tourism development

In spatial planning for intensive tourism, the study area was extracted using Landsat satellite imagery, area land use map

and vegetation density. Then the classification and verification of the desired layers were performed. Based on the sample tourism points and resource reviews and the ratio of the frequency of tourist land use, it is then weighted and normalized.

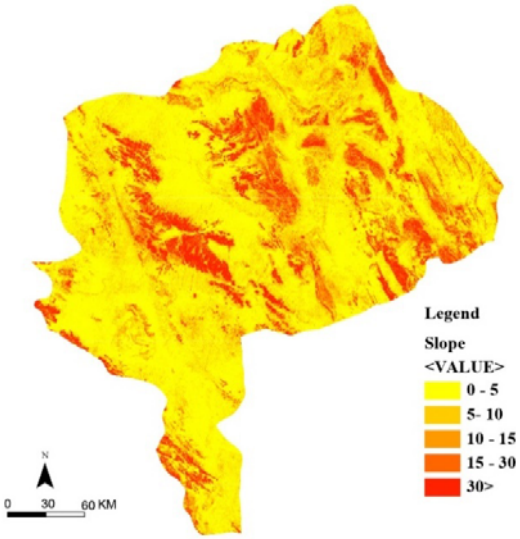

Fig. 4 Map of slope suitable for extensive tourism development

The criteria for the highest weights, respectively, are: infrastructure Highest weight (0.28), Grassland (0.23), Forest (0.22), Agriculture (0.21), Desert (0.03), Sand hill (0.002), Sand areas (0.01) and wasteland (0.001).

C. Spatial Analysis of Tourism Attraction

Spatial analysis of tourism points such as historical attractions, villages, natural areas, springs, sand dunes, gardens, agriculture has been used to measure the tourism development potential of Yazd province.

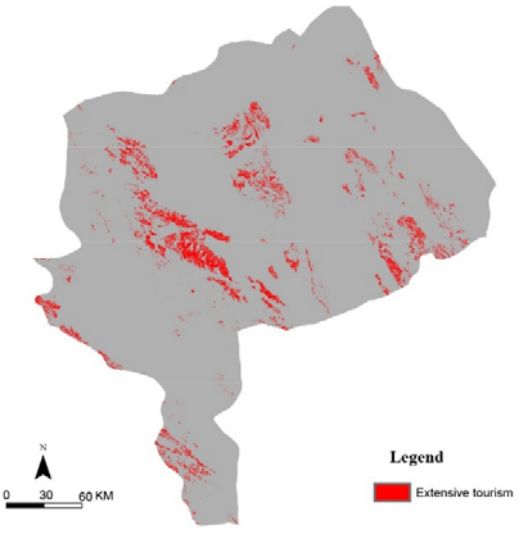

Fig. 5 Map of suitable places for extensive tourism development

Spatial planning analysis for tourism is based on spatial data, tourism data, their location and spatial density per unit area. First the collected tourist attractions have become congestion levels in the GIS. Then, according to the density pattern, the points with the highest density are separated and introduced using the hot spot analysis as the most attractive tourist zones.

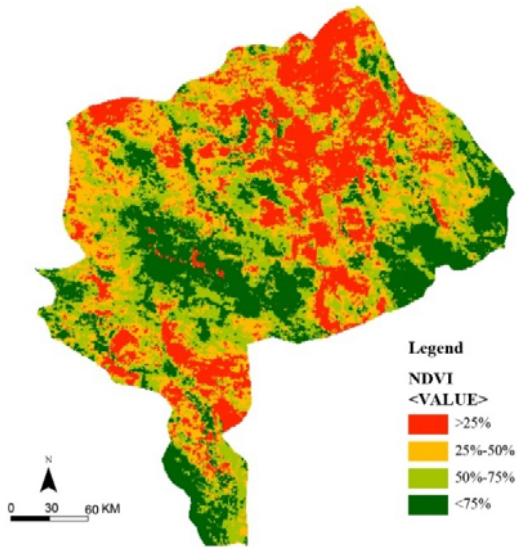

Fig. 6 Map of Vegetation density

D. Integrated Tourism Analysis

Finally, using the indicator (1), with Overlay and their integration, we analyzed and classified the integrated tourism suitability area in the study area. According to the Integrated Tourism Index in the study area, areas around large cities and areas with adequate water and access are important tourism areas. In this way, we can minimize the environmental impacts and conflicts of the space in the creation of tourism areas, while also having access to all different types of tourism.

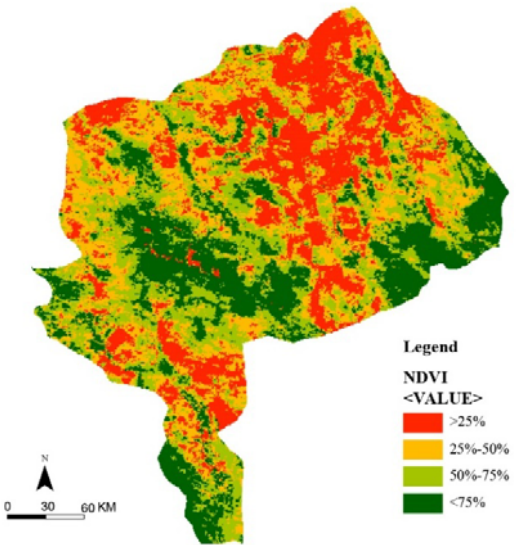

Fig. 7 Map of Vegetation density

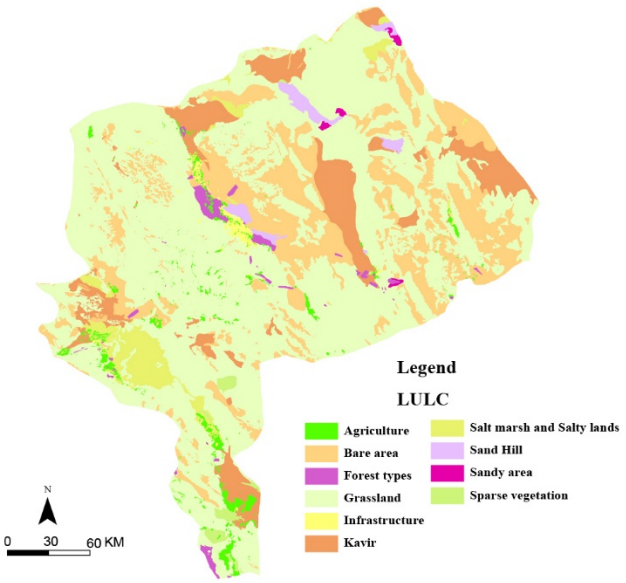

Fig. 8 Map of land use

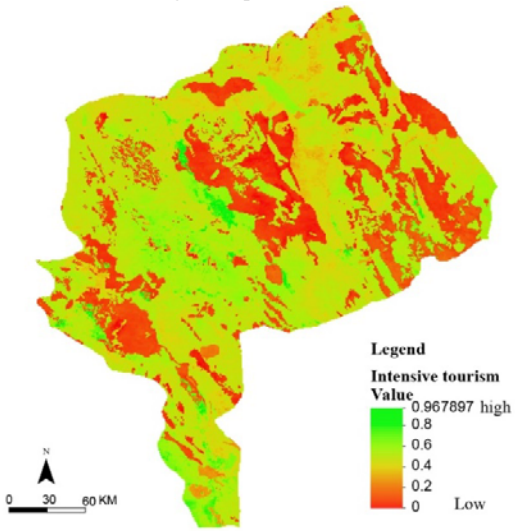

Fig. 9 Map of Intensive tourism development

VI. Conclusion

In this study, due to the fact that the development potential in the study area was incorrect for economic benefits, it is necessary to pay attention to the proper use of nature by managing resources and spatial structure of resources for tourism development at all times.

During the review of the research literature, it is observed that spatial, environmental, social and economic structures in tourism are ignored [15]-[17]. Yazd province is a tourist and historical region with different tourism backgrounds and it occurs in different tourism seasons, thus creating an integrated tourism structure in order to pay full attention to tourism spatial development and spatial planning is one of the requirements for tourism development.

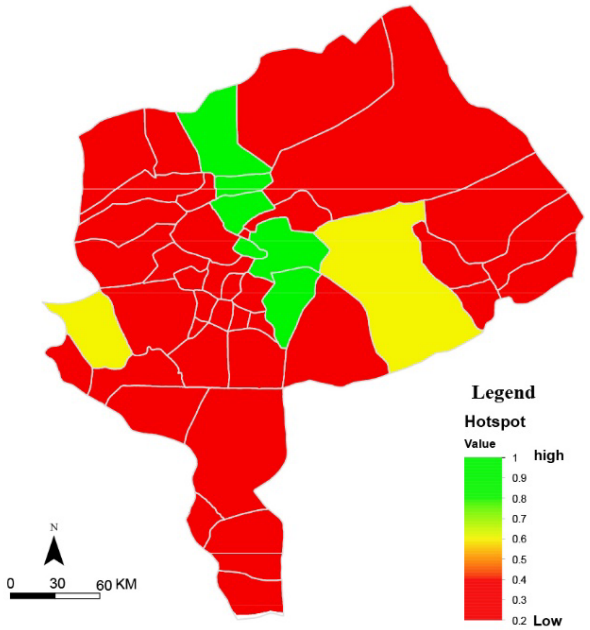

Fig. 10 Map of the spatial suitability of tourism area attraction

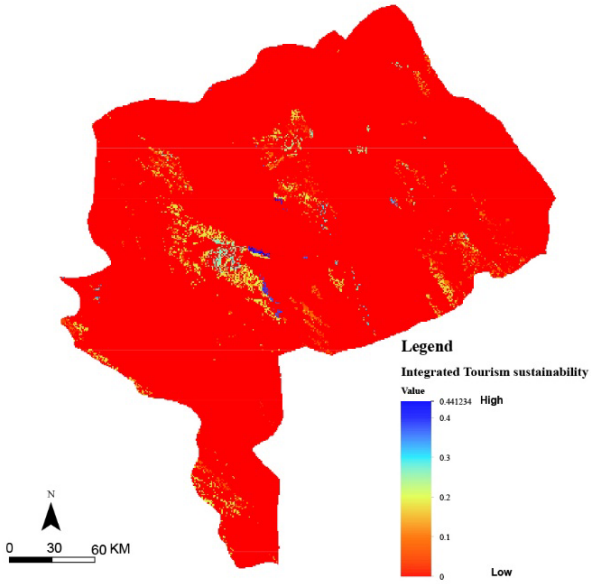

Fig. 11 Map of the end result of suitability analysis integrated tourism area

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