



# Developing a Model Proposal to Evaluate the Authenticity of Traditional Housing; Malatya Case Study

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## Abstract

Anatolia has been used as a settlement area by many civilizations throughout history due to its geopolitical and geographical features. Traditional houses in Anatolia convey the thousands of years of culture and identity of the region where they are located, with their unique architectural style. In this respect, traditional houses appear as the most important cultural heritage values that convey information such as the social, cultural, economic and architectural style of the period. Historical textures have been in change and transformation in the Malatya region, as in every region of Anatolia. However, Malatya has largely lost its traditional houses and texture due to many reasons such as rapid urbanization, unconsciousness, rent, and the destructive effect of time.

In this study, which was prepared by addressing this problem, Fuzzy Logic and AHP (Analytical Hierarchy Process) analysis system was used in order to evaluate the authenticity of civil architectural examples located in traditional tissue pieces in the urban area of Malatya and to protect these structures. Thus, it is aimed to develop an authenticity assessment method together with the experts of the subject (conservation experts, architectural historians, art historians). It is aimed to determine the authenticity of the buildings numerically and proportionally with the authenticity evaluation model developed with a systematic setup. Ahmet Kökçü House, located in Yakınca Neighborhood, was chosen as the study area due to reasons such as the fact that it largely preserved its traditional texture as a field study and faced extinction as a result of the rapid urbanization of Malatya's central city wall reaching the border of Yeşilyurt district. With the authenticity assessment model developed in this context, the authenticity of the building was determined by experts and suggestions were made for the preservation of the building.

## Keywords:

Cultural heritage, authenticity, traditional Malatya houses, analytical hierarchy process (ahp), fuzzy logic

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## INTRODUCTION

Culture takes place in the lives of people and societies throughout their lives, shaping and transforming the societies under its influence. Identities of people are also shaped according to the cultural environment in which they live. As societies and groups around the world increase and diversify, the cultures they live in also diversify and differentiate. Cultural heritage; It is an important factor that connects people to a place, society or region, acts as a bridge for the transfer of knowledge and skills between past and future generations, and ensures that societies are sustainable by developing and transforming their common values and norms (Çakırca, 2010). In this context, evaluation criteria have been established in order to better understand the value of cultural heritage and to protect it more effectively. In order to define and compare the values of cultural heritage, evaluation criteria such as historical, document, aesthetic, socio-cultural, scientific, spiritual, authenticity have been determined, these criteria have changed in the historical process and their order of importance has changed. Today, it is seen that the importance of authenticity value has increased, especially in studies conducted in the context of cultural heritage. Traditional houses, which constitute a large part of our cultural heritage and are immovable cultural assets, are important values that have increased their importance until today and should be preserved and transferred to future generations.

Like many regions of Anatolia, Malatya has a rich cultural heritage with its historical structure and traditional texture that has survived to the present day. In order to understand the architecture, identity, cultural change and transformation of Malatya in the historical process, it is necessary to analyze the traditional house and texture well. Traditional houses are the most important architectural elements that tell us about the construction technique, materials and features, socio-cultural environment and experiences of the period. For this reason, understanding and protecting traditional houses is very important for our future generations. However, over the years, civil structures disappear for many reasons or their authenticity is damaged as a result of interventions and practices, and they can survive until today. It was emphasized that the architectural authenticity of these structures, which have survived until today, should be determined and studies should be carried out to protect them. It is aimed to rank, evaluate and compare the structures within themselves by revealing their values in the context of authenticity before they disappear, which constitute an important part of the cultural heritage. In this context, the logical decision making method has been adopted to evaluate the authenticity criteria of traditional houses; Fuzzy Logic analysis method and AHP (Analytical Hierarchy Process) analysis method were used to make this analysis more objective. In this study, with the help of AHP (Analytical Hierarchy Process) analysis method, it was ensured that the authentic weights of the evaluation

criteria were determined among each other. In short, an evaluation model was created by supporting the AHP analysis method and the Fuzzy Logic method in the evaluation model created for the evaluation of the authenticity of traditional houses.

In this context, unlike other studies; This study increases its importance as there is no such study in the context of evaluating the authenticity of the AHP (Analytical Hierarchy Process) and Fuzzy Logic Analysis method together with the creation of a more objective evaluation model during the creation of the authenticity evaluation model, and in the context of the evaluation of the authenticity of the district of Malatya, Yakınca Neighborhood and especially traditional houses. As a result of the study, it is aimed to develop a model that can be applied in every region of Anatolia of this authenticity evaluation model, which was created to evaluate the authenticity of traditional houses in the province of Malatya, and to make suggestions for the protection of the structures. After revealing the authenticity of traditional houses, it is thought to contribute positively to their preservation.

#### **CULTURAL HERITAGE VALUES AND THE CONCEPT OF AUTHENTICITY**

Societies can communicate with each other by living in harmony, sharing and mingling with each other thanks to their cultures (Karkin & Karaburun, 2012). Factors such as beliefs, customs and traditions, customs, lifestyle, social life, habits that make up the culture; It continues to shape and change people, the built environment and places throughout history. The phenomenon of space itself has been in a change and transformation with the changing cultures in the process (Yazgan, 2016). In this context, it can be stated that culture is everything abstract and concrete that human beings reveal, design and shape, and it is an endless interaction in which the factors formed from these phenomena shape people and their environment (Turgut, 1990). In this context, the importance of cultural heritage values is obvious, especially in the context of telling the cultural identity, experience and conditions of the period to future generations.

The concept of cultural heritage and the value attributed to it; It has varied and differed according to the past, experiences, traditions and customs of people or societies, and the way of perception and understanding (Bülbül and Urak, 2020). Overview of cultural heritage values; In the process, with the development and transformation in the concept of cultural heritage, it has differentiated and diversified according to the perspectives of people, societies and institutions. Cultural heritage values have been discussed socio-culturally, and it has been stated that there is a deep relationship between people and societies and their ties with their past (Zancheti et al., 2009). In the process, definitions and statements were made on the scope and criteria of cultural heritage values. Value criteria have been established to better

understand and evaluate the importance of cultural heritage. These value criteria differed and varied according to the period, region or study area; importance rankings were made among the value criteria. The change in the definition and scope of cultural heritage in societies over time has led to differentiation in cultural heritage values.

### **Cultural Heritage Authenticity Concept and Criteria**

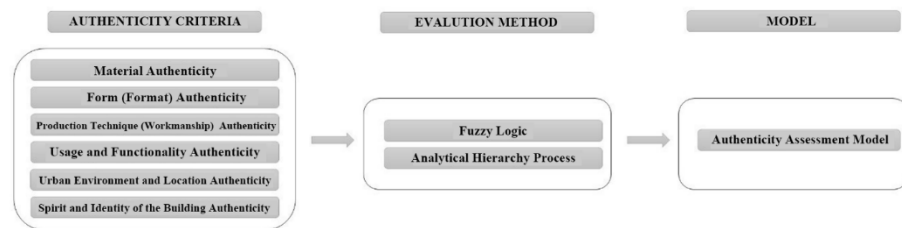
With the 19th century, the concept of protection and its diversity expanded beyond the monument, and with the 20th century; Today's conservation architecture understanding has begun to emerge, covering all kinds of cultural and natural heritage such as building communities, civil architecture, tangible and intangible heritage, industrial heritage, historical, archaeological and cultural landscape. In this context, basic concepts and values such as historical value, aesthetic value and historical document value, authenticity value have also diversified within the scope of diversity and protection of cultural heritage (Aslan, 2016). After the Venice Charter, many international conferences, papers and studies were held in the context of cultural heritage. While aesthetic, historical, scientific and social values were mainly included in the previous periods, the value of authenticity came to the fore in the late 1980s and increased its importance among heritage values in the 1990s. In the process, authenticity was followed by moral and spiritual value (Binan, 1999; Ahunbay, 2014; Korumaz, 2015).

The criterion of authenticity as architectural heritage values was first included in the World Heritage Committee in 1977; In the process, two important conferences were held on the concept of authenticity in the context of World Heritage, the value of authenticity in the international declaration and convention, in Bergen in January 1994 and then in Nara in November 1994 (ICOMOS, 1994). At the conference held in Bergen in 1994, conservation theories and criteria were decided as; authenticity in form, authenticity in material, authenticity in technique, authenticity in function, location in the city (Jokilehto, 2003; Jokilehto, 1994; Ulukan, 2014; Bülbül, 2016).

When the studies on authenticity are examined, it is seen that the authenticity criteria are similar. In this context, while determining the authenticity criteria in the study, in addition to the evaluations made by international institutions and organizations such as UNESCO, ICOMOS, the Council of Europe, ICCROM and the experts of the subject, the authenticity criteria and definitions were taken as reference by taking the authenticity criteria in the NARA Declaration on authenticity issued in Japan in 1994 was created (ICOMOS, 1994). In order to evaluate the authenticity of traditional houses, a total of 6 criteria were determined as material authenticity, form and shape authenticity, construction technique (workmanship), authenticity of use and function, authenticity of urban environment and location, and authenticity of the spirit and identity of the building form and shape

## METHODS USED IN THE STUDY

Generally, the decision-making process on a subject takes two approaches. The first of these; It is a rapidly developing, non-objective decision-making process that is based on feelings and emotions, which is expressed as an intuitive decision-making process. The second approach is the logical decision-making process. This method includes decisions made in line with an analytical and systematic calculation. In this context, the logical decision making method has been adopted to evaluate the authenticity criteria of traditional houses; Fuzzy Logic analysis method and AHP (Analytical Hierarchy Process) analysis method were used to make this analysis more objective (Figure1).



**Figure 1.** Shows the stages of the authenticity assessment model

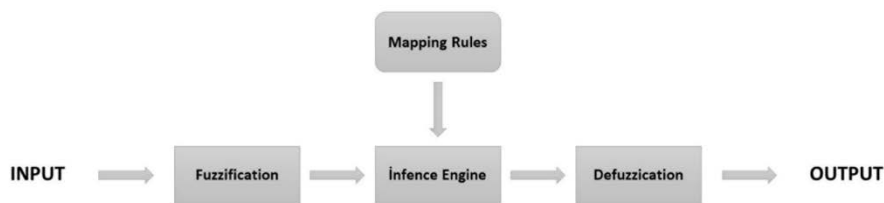
In this study, thanks to the AHP analysis method, it was ensured that the authentic weights of the evaluation criteria were determined among each other.

### Fuzzy Logic Analysis Method

Many of the situations and problems faced by human beings in the world are complex and difficult. Unlike the Aristotelian logic of computers, people can produce solutions by making approximate and uncertain approaches to the solution of this complexity (Şen, 2004). The concept of logic is described as pure, unchangeable, prime. Doğan argued that logic is concerned with the theories of philosophical and linguistic forms rather than its relationship with existence (Doğan, 1999). Classical and symbolic logic are separated from each other in the scope of the value given to the symbolic character. These two logics consist of symbolic and emblematic characters rather than semantic contents (Grünberg, 2003). Fuzzy Logic analysis method, which is against classical logic, is used in many disciplines and fields today. Fuzzy Logic was first introduced by Lotfi Zadeh (Zadeh, 1965). In this context, Zadeh; He dealt with some of the problems of philosophy and produced studies on how machines can think. The Fuzzy Logic method introduced by Zadeh revealed new solutions to classical logic and linguistic problems that came from Aristotle (Zadeh, 1965). This method is used to solve multidimensional and complex problems by bringing the uncertainty of a problem or a complex process to a certain state. The Fuzzy Logic method, which emerged against the definite sets and propositions of classical logic; It provides consistent and meaningful decision making by using uncertain and uncertain concepts (Altaş, 1999). In its simplest sense, it is a method that reveals numerical data from verbal expressions using the theory of fuzzy sets (Keskenler & Keskenler, 2017).

Against the bivalent logic of classical logic, an alternative supported by technology has been developed. Fuzzy Logic argued that there may be intermediate values for Aristotle's criteria of 'true' or 'false' or instead of '0' and '1' numbers (Ertuğrul, 1996). In Fuzzy Logic, modeling is done using linguistically average 84 data such as few, frequent, medium, low, many, a lot. Thus, it enables the data that emerges in the modeling of problems and events to present more realistic data (Nabiyev, 2010; Palabıyık & Çolakoğlu, 2012).

In Fuzzy Logic, results are obtained by applying logic rules and applications in a flexible and fuzzy way. The transfer of these symbolic and flexible expressions to machines is based on a mathematical basis. This mathematical basis is the theory of fuzzy sets (Elmas, 2003). Fuzzy set theory is the main core of Fuzzy Logic. Fuzzy set theory digitizes the uncertainties in people's perceptions of thought and linguistic expressions. In this context, with this method, it allows to make mathematical models in which every value can be expressed in accordance with the way people think (Zadeh, 1965; Zadeh, 1968; cited in Küçükyağcı, 2019). In Fuzzy Logic systems, unlike classical logic, system behaviors are divided into two and consist of four interconnected parts (Şen, 2009) (Figure2).



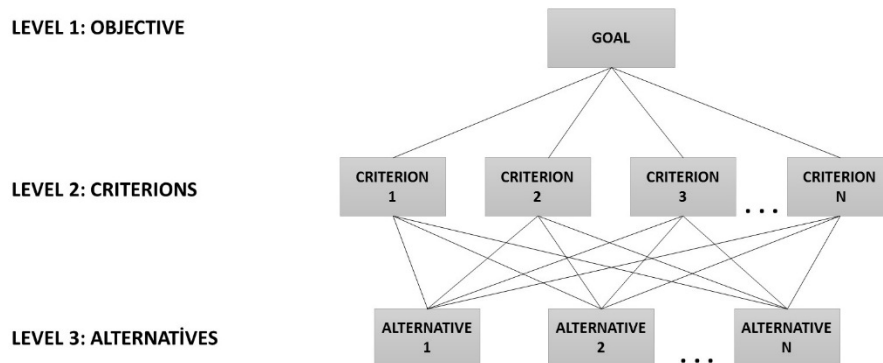
**Figure 2.** General fuzzy system diagram (Toprak, 2004)

The fuzzy logic approach essentially consists of blurring, fuzzy inference system (fuzzy inference engine) and clarification phases (Alcı & Karatepe, 2002; Ellen, 1996; Kandel & Langholz, 1993; Şen, 2004; Baykal & Beyan, 2004). Basically, the Fuzzy Logic process consists of blurring, fuzzy inference and defuzzification. In the system consisting of inputs and outputs, a model is created by creating an If-then rules base. Since the value ranges of this created system are uncertain and flexible, more meaningful and precise measurements and evaluations can be made. The Fuzzy Logic method, which has an advantage with this structure, is used in many fields (Elmas, 2011; Keskenler and Keskenler, 2017; Solak and Alaybeyoğlu, 2017).

#### **Analytical Hierarchy Selection Method from (MCDM) Multiple Criteria Decision Making Methods (AHP)**

Models were developed using multi-criteria decision-making (MCDM) methods to evaluate the priorities of complex and difficult-to-decision criteria; these models have met the priority decision-making needs in many areas such as political, financial, engineering and scientific (Mcintyre and Parfi, 1988; Bouyssou and Vincke, 1997; Wong, 1999). This method is expressed as the whole of techniques that allow people to

choose step by step criteria with more than one criterion (Yaolin, 2006). Today, many MCDM methods are used to solve complex problems. This method, in complex decision problems, by determining the relative importance of decision alternatives and criteria; It is a decision-making method that enables the decision mechanism to work. The AHP method is a more preferred method among many other methods in terms of including both objective and subjective elements (Timor, 2011). The AHP method developed by Saaty (1977) enabled people to create their own decision-making mechanisms, enabling them to make more effective decisions. The better people understand and understand the criteria with complex characteristics in the evaluation process, the clearer and more accurate their decisions will be. AHP is a method that enables the detection of complex problems during decision making and provides a systematic solution to the problems (Figure3). Thanks to this method, it systematizes an evaluation method and reveals the system structure hierarchically in order to determine the relationship between the criteria that make up the system and their effects on the system (Evren and Ülengin, 1992; Deniz, 1999).



**Figure 3.** The hierarchical scheme of the problem in the AHP method (Cheng, C.H., 1999; Timor, 2011; Satty, 1980; Satty, 1988; Saaty, 2003).

It is aimed to determine the degree weights by making pairwise comparison matrices of the determined criteria. By creating a hierarchical structure for both subjective and objective data, AHP ensures that each criterion determined by the decision makers is ranked in importance. In this context, AHP determines the relative importance order by making a pairwise comparison of each criterion determined for the solution of the problem. After the hierarchical model structure can be determined, pairwise comparisons should be made in order to reveal the authentic degrees of all criteria within themselves (Dey, 2001; Saaty, 1980; Saaty, 1988). Since the pairwise comparison is the most important step of the analytic hierarchy process, the values obtained in the AHP are expressed in matrixes. In this process, while creating the pairwise comparison matrix and comparing the criteria; Judgments such as "equally important", "moderately important", "strongly important", "very strongly important", "definitely more important" are used (Dey, 2001; Saaty, 1990; Saaty, 2003; Timor, 2011; Ekinci, 2014).

In this context, the solution of a problem in the analytic hierarchy process consists of three main constructs, respectively; It can be

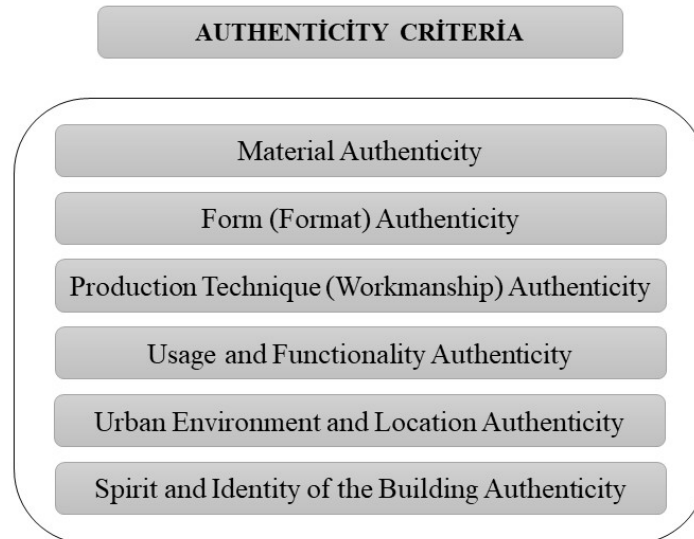
described as creating a hierarchy model structure for solving the problem, determining the degree weights by making pairwise comparison matrices of the determined criteria, and selecting and ranking the alternatives using decision matrices (Saaty, 1980; Saaty, 1988). Thus, the effect weights of the determined criteria can be determined and the best alternative can be selected. In this study, the effect of the authenticity criteria determined using the AHP method on traditional houses and their order of importance is to determine.

#### **FORMATION SCHEME AND IMPLEMENTATION OF THE AUTHENTICITY ASSESSMENT MODEL**

It is necessary to preserve and revitalize historical heritage values for the preservation of traditional structures and their transfer to future generations and for cultural continuity. Therefore, the goal of protection is; should revive the cultural heritage while evaluating its architectural, historical, environmental, visual and aesthetic features (Semerci and Gümüş, 2017). The traditional structures in the study area; Since they have similar historical, document, aesthetic and cultural values, it is aimed to evaluate the traditional houses in the study area and scope within the scope of authenticity value. In the light of these data, an evaluation model consisting of Fuzzy Logic and AHP analysis methods was developed in the presence of experts in order to reveal the authenticity values of the buildings in the context of the protection of traditional houses; Evaluations were made by experts in the field of study. Thanks to this evaluation model, it is aimed to divide the traditional houses into two separate sections as interior space and architectural façade, and to enable them to be evaluated in a way that reveals their authenticity in numerical and qualitative data. Bülbül (2016) and Ulukan (2014) benefited from Zadeh's Fuzzy Logic and Fuzzy Cluster Theory in their studies. In the works of Bülbül(2016) and Ulukan(2014), he divided the authenticity criteria (design/form, material, construction technique, function, location and environment, identity and spirit of the building) into 6 groups and evaluated these criteria by dividing them into certain value ranges. The authenticity criteria used to create this method and the application stages of the methods are given. In order to determine the authenticity criteria of the cultural heritage to be used in the study, the authenticity criteria determined at the Nara Conference (ICOMOS, 1994) were used(Figure4). In order to understand the values of historical buildings and to make correct determinations, it is necessary to perceive and comprehend the evaluation criteria well. As the authenticity criteria of cultural heritage in the study; The criteria of material, form (form), construction technique (workmanship), use and function, urban environment and location, spirit and identity of the building were adopted.



**Figure 4.** It shows the architectural authenticity criteria determined by reference to the Nara Declaration (1994) within the scope of the study (ICOMOS, 1994; Lemaine and Stovel, 1994).



In the study, the model table created to determine the authenticity values of the building, accompanied by the authenticity criteria, consists of the following stages (These stages are explained in detail with the tables).

1. Definition of the authenticity criteria that make up the model, value ranges and formation of the systematic,
2. Making the definitions of the degrees of authenticity and authenticity values within themselves in order to establish the decision-making mechanism that constitutes the main skeleton of the model,
3. Selecting the Mandalin decision-making method of the Fuzzy Logic model to be used in the model, creating the input and output sections,
4. Entering the value ranges of the criteria determined for the evaluation model together with the groupings made into the system one by one,
5. Creating a rule database with the criteria of the Fuzzy Logic method used in the model, (As the rule database will directly affect the result of the study, it should be created correctly by experts.)
6. While creating the rule database, the AHP method was used to determine the authentic weights of the authenticity criteria in order to make the study more authentic and quantitative. (Thanks to the AHP method, the authentic weight values of these criteria are determined and a rule data table is created, which provides more accurate results). Evaluation of the authenticity of traditional houses with on-site experts, accompanied by the model created (Figure 5).

The operation flow of the authenticity assessment model, which was created by using Fuzzy Logic and AHP analysis methods in the study, is given in the diagram below.

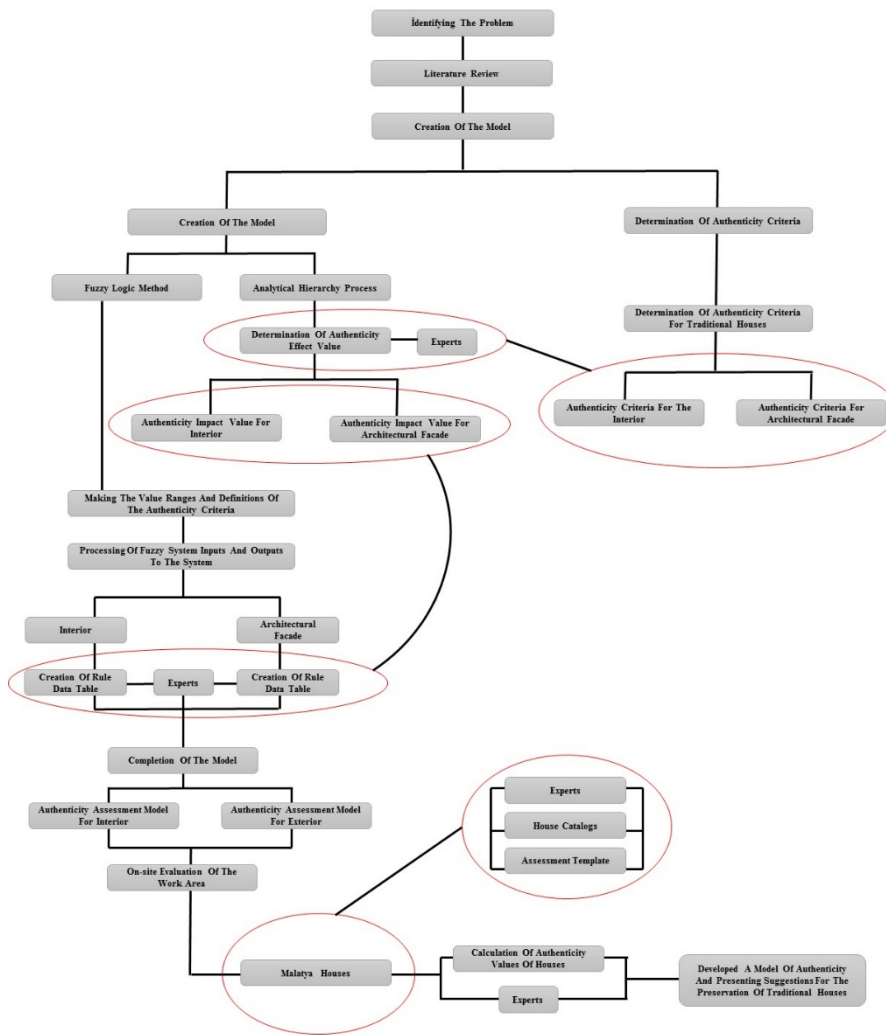


Figure 5. The scheme of operation of the methods used in the study

In the study, the model table created to determine the authenticity values of the building, accompanied by the authenticity criteria, consists of the following stages.

**In the first stage:** In the scope of the study, on-site evaluations will be made by the experts in order to compare and measure the authenticity of traditional houses. In this context, in order to be able to evaluate the general authenticity of the buildings more clearly, the authenticity assessment was made in two parts, the interior space and the architectural façade. In this context, it is aimed to divide the traditional houses into two parts and evaluate the authenticity evaluation criteria in the table below (Table 1).

Table 1. Authenticity evaluation criteria for traditional houses

AUTHENTICITY ASSESSMENT CRITERIA	
ARCHITECTURAL FAÇADE CRITERIA	INTERIOR ARCHITECTURAL CRITERIA
<ul style="list-style-type: none"> <li>Material Authenticity</li> <li>Form (Format) Authenticity</li> <li>Production Technique (Workmanship) Authenticity</li> <li>Urban Environment and Location Authenticity</li> <li>Spirit and Identity of the Building Authenticity</li> </ul>	<ul style="list-style-type: none"> <li>Material Authenticity</li> <li>Form (Format) Authenticity</li> <li>Production Technique (Workmanship) Authenticity</li> <li>Usage and Functionality Authenticity</li> <li>Urban Environment and Location Authenticity</li> <li>Spirit and Identity of the Building Authenticity</li> </ul>

Zadeh's Fuzzy Logic and Fuzzy Clustering Theory was used for the value ranges of the determined authenticity criteria, and the evaluation criteria were divided into certain degrees (Zadeh, 1965). In this context, the authenticity value criteria; material authenticity, form (shape) authenticity and construction technique (workmanship) authenticity criteria: None (0), Very Little (1-20), Little (21-40), Moderate (41-60), Good (61- 80) Very Good (81-99), Full (100) 7 divided into sections. With authenticity value criteria; criteria of use and function authenticity, urban environment and location authenticity, and building spirit and identity: None (0), Less (1-35), Moderate (36-66), Good (67-99), Full (100) 5 divided into sections.

**In the second stage:** At this stage of the study, the definition and value ranges of Material Authenticity Value, Form (Format) Authenticity Values, Construction Technique (Workmanship) Authenticity Value, Use and Function Authenticity Value, Urban Environment and Location Authenticity Value and Spirit and Identity of the Building. Within the scope of the study, on-site evaluations will be made by the experts in order to compare and measure the authenticity of traditional houses. In this context, in order to be able to evaluate the general authenticity of the buildings more clearly, the authenticity assessment was made in two parts, the interior space and the architectural facade. In this context, it is aimed to evaluate the traditional houses by dividing them into two parts (Table2).

**Table 2.** It shows the specificity criterion value ranges for traditional houses to evaluate the architectural facade and interior authenticity.

Evaluator: .....		Name of Building and Region: .....	
<b>EVALUATION TEMPLATE OF BUILDING AUTHENTICITY CRITERIA</b>			
<b>A-Architectural Facade Authenticity Criteria Value Ranges And Value</b>			<b>Value</b>
Authenticity Criteria	Value Ranges of Criteria		General Floor / Column
1 Material Authenticity	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	
2 Form (Format) Authenticity	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	
3 Production Technique (Workmanship) Authenticity	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	
4 Urban Environment and Location Authenticity	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	
5 Spirit and Identity of the Building Authenticity	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	
<b>B-Interior Architectural Authenticity Criteria Value Ranges and Value</b>			<b>Value</b>
Ozelliklik Kriterleri	Value Ranges of Criteria		General Floor / Column
1 Material Authenticity	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	
2 Form (Format) Authenticity	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	
3 Production Technique (Workmanship) Authenticity	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	None (0) Very Little (1-20) Little (21-40) Moderate (41-60) Good (61-80) Very Good (81-99) Full (100)	
4 Usage and Functionality Authenticity	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	
5 Urban Environment and Location Authenticity	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	
6 Spirit and Identity of the Building Authenticity	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	None (0) Less (1-35) Moderate (36-66) Good (67-99) Full (100)	

A detailed explanation of the authenticity criteria and value ranges has been made so that more accurate decisions can be taken during the evaluation phase of the buildings. In this context, authenticity evaluation tables have been created in order to enable the on-site evaluation of traditional houses (Table 3). Experts evaluated the structures in situ with these tables.

**Table 3.** Shows detailed descriptions of the value ranges of the authenticity criteria for assessing the architectural facade and interior authenticity of traditional houses.

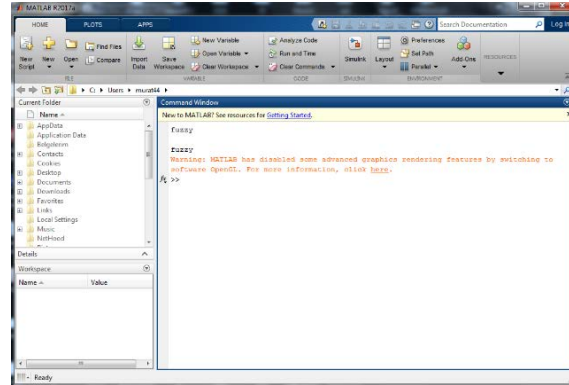
VALUE RANGES AND DEFINITIONS OF CONSTRUCTION AUTHENTICITY CRITERIA																													
<p><b>Material Authenticity Values</b></p> <ul style="list-style-type: none"> <li>The material's original creation covers all of the building elements such as walls, ceilings and floors.</li> <li>Walls and Facades: It covers the originality value of the wall elements that make up the spaces and facades of the buildings and consist of local materials such as stone, adobe and wood.</li> <li>Floors and Ceiling: It is a factor that evaluates the materials that make up the upper and lower floors of the building spaces and the changes that have occurred since the first time it was built.</li> <li>Other Elements: It covers elements such as niches, niches, benches, beams, ceilings, bay windows, windows, and doors in building spaces and facades.</li> <li>Ornamentation and Decoration: Found in the spaces and facades of the buildings, window, door, overhang, screens, It includes vegetal and geometric decorative motifs used in items such as cabinet handles and jewelry.</li> <li>All items mentioned in this table, by including a holistic evaluation within itself, it formed the material authenticity value.</li> <li>The holistic value of the above-mentioned criteria gives the material originality of the building. These criteria can be increased or decreased according to the diversity and characteristics of the structures evaluated in the studies.</li> </ul> <table border="1"> <tr> <td>None (0)</td> <td>Complete reconstruction of the building (Reconstruction).</td> </tr> <tr> <td>Very Weak (1-20)</td> <td>The situation where a small amount of authentic materials remain in the general mass of the building.</td> </tr> <tr> <td>Weak (21-40)</td> <td>The state of having unique materials in the general mass of the building as a result of interventions.</td> </tr> <tr> <td>Moderate (41-60)</td> <td>Considering the overall context and elements of the building, it is the case that the building has moderately original materials as a result of interventions.</td> </tr> <tr> <td>Good (61-80)</td> <td>When looking at the mass and elements of the building in general, the state of preservation of most of the authentic materials.</td> </tr> <tr> <td>Very Good (81-99)</td> <td>When looking at the space and elements of the building in general, it is the case that the authentic materials are preserved almost as a whole.</td> </tr> <tr> <td>Excellent (100)</td> <td>The state of being completely authentic.</td> </tr> </table>	None (0)	Complete reconstruction of the building (Reconstruction).	Very Weak (1-20)	The situation where a small amount of authentic materials remain in the general mass of the building.	Weak (21-40)	The state of having unique materials in the general mass of the building as a result of interventions.	Moderate (41-60)	Considering the overall context and elements of the building, it is the case that the building has moderately original materials as a result of interventions.	Good (61-80)	When looking at the mass and elements of the building in general, the state of preservation of most of the authentic materials.	Very Good (81-99)	When looking at the space and elements of the building in general, it is the case that the authentic materials are preserved almost as a whole.	Excellent (100)	The state of being completely authentic.	<p><b>Production Technique (Workmanship) Authenticity Values</b></p> <ul style="list-style-type: none"> <li>The construction technique should not be considered as an authenticity criterion alone, but should be evaluated in conjunction with other criteria. It should be determined by taking into account the effects of these two criteria. If the various repair and intervention techniques that occurred in the building during the process are integrated with the building, the construction technique can be considered authentic.</li> </ul> <table border="1"> <tr> <td>None (0)</td> <td>It is the absence of the authentic construction technique of the building.</td> </tr> <tr> <td>Very Weak (1-20)</td> <td>When we look at the building as a whole, there is very little original construction technique and materials are used in many non-original techniques.</td> </tr> <tr> <td>Weak (21-40)</td> <td>When we look at the building in general, it is the case that the original construction technique and materials are less in the middle, and the non-original techniques are excessive.</td> </tr> <tr> <td>Moderate (41-60)</td> <td>When we look at the building in general, the situation where the original construction technique and materials are used in a similar manner.</td> </tr> <tr> <td>Good (61-80)</td> <td>When we look at the building in general, it is the situation where the original construction technique and materials are predominantly high, and it is seen in non-original techniques.</td> </tr> <tr> <td>Very Good (81-99)</td> <td>When we look at the building as a whole, it is the case that almost all of the original construction technique is used in the building.</td> </tr> <tr> <td>Excellent (100)</td> <td>The state of having a completely original construction technique.</td> </tr> </table>	None (0)	It is the absence of the authentic construction technique of the building.	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<p><b>Form (Format) Authenticity Values</b></p> <ul style="list-style-type: none"> <li>The originality of the form of the building can create a complex integrity with the original material. While comparing the form originality of the building, it would be more appropriate to make an evaluation by considering the material authenticity.</li> </ul> <table border="1"> <tr> <td>None (0)</td> <td>It is the situation where the authentic design of the building is not in the middle.</td> </tr> <tr> <td>Very Weak (1-20)</td> <td>Considering the building materials, it is the case that there are very few remains of the authentic form and materials.</td> </tr> <tr> <td>Weak (21-40)</td> <td>When we look at the building in general, it expresses the situation where few spaces and materials have a unique form.</td> </tr> <tr> <td>Moderate (41-60)</td> <td>Considering the spaces and elements of the building in general, the situation where the original spatial form and materials are equal to the ratio of four authentic forms and materials.</td> </tr> <tr> <td>Good (61-80)</td> <td>When we look at the spaces and elements of the building in general, it is the case that the authentic form and materials are mostly preserved.</td> </tr> <tr> <td>Very Good (81-99)</td> <td>Considering the overall space and elements of the building, the authentic form and materials are largely preserved.</td> </tr> <tr> <td>Excellent (100)</td> <td>The state of having a completely authentic form of the building.</td> </tr> </table>	None (0)	It is the situation where the authentic design of the building is not in the middle.	Very Weak (1-20)	Considering the building materials, it is the case that there are very few remains of the authentic form and materials.	Weak (21-40)	When we look at the building in general, it expresses the situation where few spaces and materials have a unique form.	Moderate (41-60)	Considering the spaces and elements of the building in general, the situation where the original spatial form and materials are equal to the ratio of four authentic forms and materials.	Good (61-80)	When we look at the spaces and elements of the building in general, it is the case that the authentic form and materials are mostly preserved.	Very Good (81-99)	Considering the overall space and elements of the building, the authentic form and materials are largely preserved.	Excellent (100)	The state of having a completely authentic form of the building.	<p><b>Use and Functional Specificity Values</b></p> <ul style="list-style-type: none"> <li>In case of creating new spaces by completely or partially changing the position of the walls that make up the spaces, or giving different functions to the building by changing the architectural elements of the spaces, the situation in which the building uses its original function has been taken into consideration.</li> </ul> <table border="1"> <tr> <td>None (0)</td> <td>The situation where the building loses its original function as a result of the original design being given a completely different function.</td> </tr> <tr> <td>Weak (1-35)</td> <td>When we look at the building as a whole, it is the case that only one or very few spaces fulfill their original function and the other spaces serve different functions.</td> </tr> <tr> <td>Moderate (36-60)</td> <td>The situation where a few of the spaces that make up the building fulfill four original functions and more spaces serve different functions than the original function.</td> </tr> <tr> <td>Good (61-99)</td> <td>The situation in which almost all of the spaces of the building serve their original function, and almost all of the building preserves its originality.</td> </tr> <tr> <td>Excellent (100)</td> <td>The case where the structure is used entirely in its original function.</td> </tr> </table>	None (0)	The situation where the building loses its original function as a result of the original design being given a completely different function.	Weak (1-35)	When we look at the building as a whole, it is the case that only one or very few spaces fulfill their original function and the other spaces serve different functions.	Moderate (36-60)	The situation where a few of the spaces that make up the building fulfill four original functions and more spaces serve different functions than the original function.	Good (61-99)	The situation in which almost all of the spaces of the building serve their original function, and almost all of the building preserves its originality.	Excellent (100)	The case where the structure is used entirely in its original function.				
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<p><b>Urban Environment and Location Authenticity Values</b></p> <ul style="list-style-type: none"> <li>The buildings and building groups that make up the environment convey the style and characteristics of the environment and the way of life of the people living in it. The authenticity criteria are determined by taking into account the information on many subjects such as the architecture, experiences, customs and traditions of that period.</li> <li>For this reason, it is very important to protect not only the structure but also the issue with its environment and transfer it to future generations.</li> </ul> <table border="1"> <tr> <td>None (0)</td> <td>The matter of not being in the location and environment where the building was originally built.</td> </tr> <tr> <td>Very Weak (1-35)</td> <td>Although the building is still in the location where it was originally built, its environment has completely changed.</td> </tr> <tr> <td>Moderate (36-60)</td> <td>The situation in which the building remains partly unchanged, although it is still in the location where it was originally built.</td> </tr> <tr> <td>Good (61-99)</td> <td>The situation where the building is completely in its original location and its environment is largely preserved and reflects the characteristics of the period.</td> </tr> <tr> <td>Excellent (100)</td> <td>The building is preserved in its original location and its environment is completely preserved by the community.</td> </tr> </table>	None (0)	The matter of not being in the location and environment where the building was originally built.	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While evaluating the identity of the building, an evaluation was made by taking into account the function, environment and material criteria of the building.</li> <li>These specified criteria, according to the changing conditions and regions, changes can be made in the future. In this context, we can reduce or increase these criteria according to the diversity of the study area and structures.</li> </ul> <table border="1"> <tr> <td>None (0)</td> <td>The absence of any element to reflect the identity and spirit of the building, the reconstruction of the building.</td> </tr> <tr> <td>Weak (1-25)</td> <td>The presence of very few or only one of the above-mentioned criteria and original elements that will reflect the identity and spirit of the building.</td> </tr> <tr> <td>Moderate (26-60)</td> <td>The condition that the above-mentioned criteria and original elements that will reflect the identity and spirit of the building are equal to the ratio of four authentic forms and materials.</td> </tr> <tr> <td>Good (61-99)</td> <td>The situation where the above-mentioned criteria and original elements that will reflect the identity and spirit of the building are mostly found throughout the building and the original elements that will reflect the identity and spirit of the building are mostly preserved.</td> </tr> <tr> <td>Excellent (100)</td> <td>The fact that the specified criteria and original elements that will reflect the identity and spirit of the building are completely found throughout the building in the state of the building in compliance with the originality and in a completely original way.</td> </tr> </table>	None (0)	The absence of any element to reflect the identity and spirit of the building, the reconstruction of the building.	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**In the third stage:** At this stage, the authenticity criteria, the methods chosen for the evaluation of the authenticity of traditional houses, the functioning systematic of the methods used, and the chronology of the model's formation began to be explained.

- Since we can choose intermediate values instead of clear expressions such as yes or no, black or white, long or short, not authentic or authentic in evaluation situations that cannot be expressed in clear numbers numerically,
- Because it allows obtaining numerical expressions using verbal expressions.

- Fuzzy Logic method was chosen in the study because the decisions are taken as a result of the opinions of the experts and the errors can be easily corrected during the decisions or during the results by means of the return in the rule table and it allows easy changes in the new entries and rule table (Figure 6).

**Figure 6.** Area showing the location and opening window of the Fuzzy Logic system in Matlab2017a program



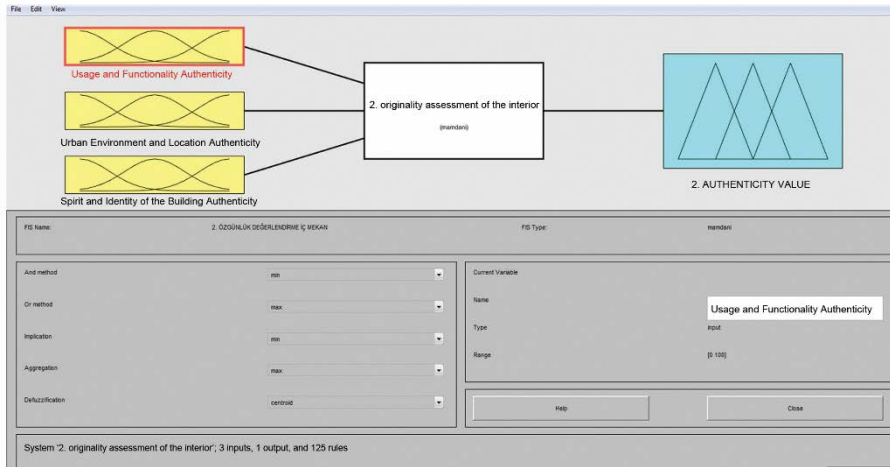
**In the fourth stage:** At this stage, the Fuzzy Logic program was used within the matlab program. In the Fuzzy Logic analysis method, in order to evaluate the authenticity of traditional houses, the criteria to be used are divided into two main categories: interior space and architectural façade. The grouping and value ranges of the authenticity criteria determined in these categories were determined. With this method, a three-stage system was created to create the architectural façade and interior authenticity evaluation model of traditional houses. The operating scheme and grouping of the criteria determined in the Fuzzy Logic system are explained in detail in the table below (Table 4).

**Table 4.** shows the value ranges of the structure specificity criteria in the rule database in the Fuzzy Logic method and the application stages of the grouped criteria in the system.

VALUE RANGE OF CONSTRUCTION AUTHENTICITY CRITERIA TEMPLATE															
A-Architectural Façade Authenticity Criteria Value Ranges					B-Interior Architectural Authenticity Criteria										
Stage 1 Originality Criteria		Value Ranges of Criteria			1.Authenticity Value	Stage 1 Originality Criteria		Value Ranges of Criteria			1.Authenticity Value				
1	Material Authenticity	None (0)	Very Weak (1-20)	Weak (21-40)		Medium (41-60)	Good (61-80)	Excellent (81-100)	None (0)	Very Weak (1-20)		Weak (21-40)	Medium (41-60)	Good (61-80)	Excellent (81-100)
2	Form (Formal) Authenticity	None (0)	Very Weak (1-20)	Weak (21-40)		Medium (41-60)	Good (61-80)	Excellent (81-100)	None (0)	Very Weak (1-20)		Weak (21-40)	Medium (41-60)	Good (61-80)	Excellent (81-100)
3	Production Technique (Workmanship) Authenticity	None (0)	Very Weak (1-20)	Weak (21-40)	Medium (41-60)	Good (61-80)	Excellent (81-100)	None (0)	Very Weak (1-20)	Weak (21-40)	Medium (41-60)	Good (61-80)	Excellent (81-100)		
Stage 2 Originality Criteria		Value Ranges of Criteria			2.Authenticity Value	Stage 2 Originality Criteria		Value Ranges of Criteria			2.Authenticity Value				
1	Urban Environment and Location Authenticity	None (0)	Weak (1-35)	Medium (36-60)		Good (61-85)	Excellent (86-100)	None (0)	Weak (1-35)	Medium (36-60)		Good (61-85)	Excellent (86-100)		
2	Spirit and Identity of the Building Authenticity	None (0)	Weak (1-35)	Medium (36-60)	Good (61-85)	Excellent (86-100)	None (0)	Weak (1-35)	Medium (36-60)	Good (61-85)	Excellent (86-100)				
Stage 3 Originality Criteria		Value Ranges of Criteria			General Authenticity Value	Stage 3 Originality Criteria		Value Ranges of Criteria			General Authenticity Value				
1	1.Authenticity Value	None (0)	Very Weak (1-30)	Weak (31-40)		Medium (41-60)	Good (61-80)	Excellent (81-100)	None (0)	Very Weak (1-30)		Weak (31-40)	Medium (41-60)	Good (61-80)	Excellent (81-100)
2	2.Authenticity Value	None (0)	Weak (1-35)	Medium (36-60)	Good (61-85)	Excellent (86-100)	None (0)	Weak (1-35)	Medium (36-60)	Good (61-85)	Excellent (86-100)				

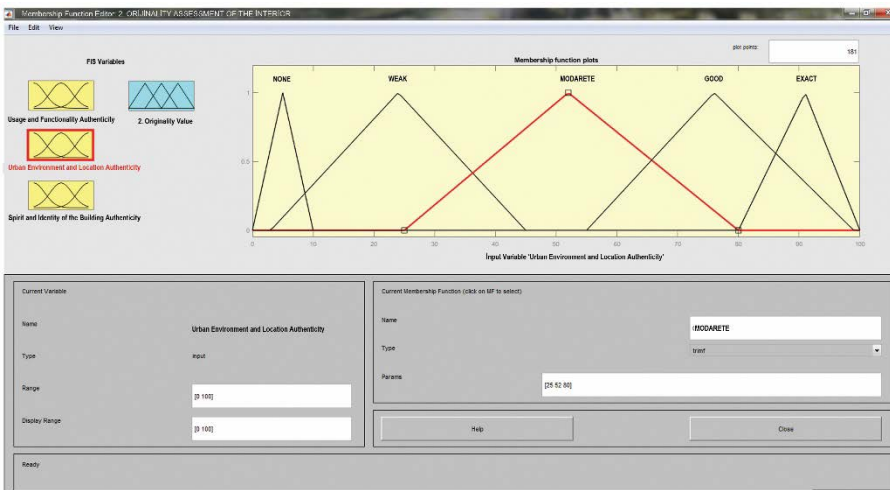
After determining the value ranges of each criterion in the groupings created to evaluate the authenticity of the interior and architectural Façades of traditional houses and the stages of their operation into the system, the criteria of the determined authenticity values were entered in the input section in the Fuzzy Logic system. The value ranges of each criterion were entered into the system step by step, and the input part of the method was formed. In the same way, the criteria in the grouping were entered into the system by creating an output section with similar logic. These processes were carried out separately for architectural

façade authenticity criteria and interior authenticity criteria. In the Fuzzy Logic method, examples of the input and output criteria determined for the interior and architectural façade are indicated with visuals (Figure 7).



**Figure 7.** The 2nd authenticity value stage of the interior, which is one of the authenticity criteria determined in the Fuzzy Logic system, shows the input-input and output sections.

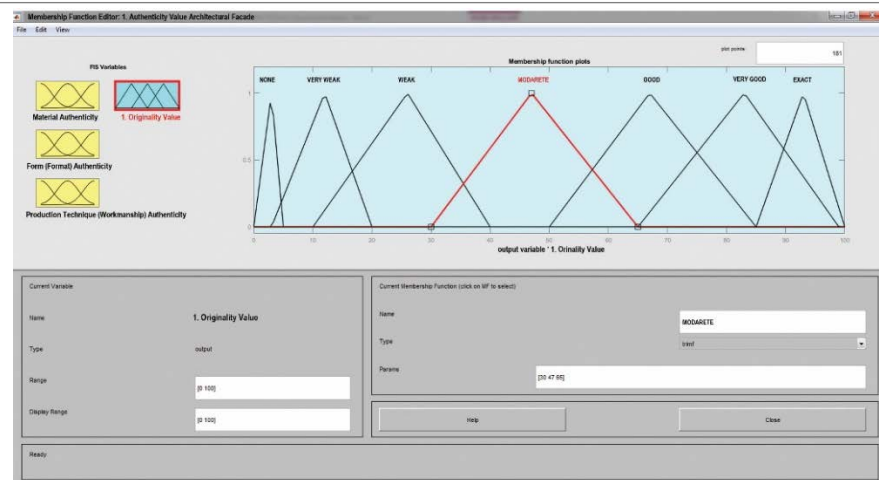
At this stage, the interior and architectural façade authenticity criteria are entered into the system one by one in the input and output section. After this process, the number of values and ranges of the criteria specified in figures 7 and 8 are specified in the system. (Figure 8).



**Figure 8.** An example showing the value ranges of the input criteria in the Fuzzy Logic system, where the values are entered verbally and numerically

This process is done for all the criteria in the input and output sections. Then, the value ranges of each criterion were processed into the Fuzzy Logic system in line with the expert opinion. This stage coincides with the fuzzy and defuzzification houses, which are the stages in the Fuzzy Logic method. In this context, in short, the input and output criteria and value ranges of the model are processed into the system.

In the next stages, after processing the input criteria of the Fuzzy Logic system, the value ranges of the criteria in the output section and the data are entered (Figure9).



**Figure 9.** An example showing the value ranges of the output criteria in the Fuzzy Logic system, where the values are entered verbally and numerically

At this stage, after the criteria and values are processed in the input section, the rule table should be processed for each criterion and its values. In this phase of the system, a separate rule table was created for the groupings made in accordance with the criteria determined. In this context, the rule table of the criteria created for the interior and architectural façade authenticity model has been determined (Table 5). As can be seen in the table below, the authenticity evaluation criteria are evaluated in groups, and the authenticity evaluation rule shows the operation scheme.

**Table 5.** shows the architectural façade and interior authenticity value criteria and the rule table that will be applied in the Fuzzy Logic analysis method of these criteria.

BUILDING AUTHENTICITY EVALUATION CRITERIA RULE TEMPLATE							
A-Architectural Façade Authenticity Criteria				B- Interior Architectural Authenticity Criteria			
Stage 1 Originality Criteria	Material Authenticity	Rule Table (343 Rules)	1. Authenticity Value	Stage 1 Originality Criteria	Material Authenticity	Rule Table (343 Rules)	1. Authenticity Value
	Form (Format) Authenticity Production Technique (Workmanship) Authenticity				Form (Format) Authenticity Production Technique (Workmanship) Authenticity		
Stage 2 Originality Criteria	Urban Environment and Location Authenticity Spirit and Identity of the Building Authenticity	Rule Table (25 Rules)	2. Authenticity Value	Stage 2 Originality Criteria	Usage and Functionality Authenticity Urban Environment and Location Authenticity Spirit and Identity of the Building Authenticity	Rule Table (125 Rules)	2. Authenticity Value
	1. Authenticity Value 2. Authenticity Value				1. Authenticity Value 2. Authenticity Value		
Stage 3 Originality Criteria		Rule Table (35 Rules)	General Authenticity Value	Stage 3 Originality Criteria		Rule Table (35 Rules)	General Authenticity Value

This stage is the most important stage of the Fuzzy Logic method and the authenticity assessment model. The probabilities of each criterion in the rule table divided into phases, which are determined according to the value ranges, should be processed one by one into the system. At this stage of the system, the AHP method comes into play in order to make a more quantitative and authentic evaluation while creating the rule table systematically.

In the fifth stage: At this stage, the authentic value weights of the criteria were determined by using the AHP method to create a rule table with a certain systematic in the authenticity evaluation model. As a result of these values, a rule table was created. In this way, it is aimed that the model that will emerge will make more objective and correct decisions. In this context, it was decided to take the opinions of the experts on the subject, accompanied by the evaluation template created to find out the authenticity criteria determined for the interior and architectural façade

and the weight of the effect on the general authenticity of the traditional houses. The purpose of using the AHP method has been tried to be explained with the following tables (Table 6).

**Table 6.** An example showing the decision-making phase in the Fuzzy Logic system when the authenticity of the form changes in the rule table and the other criteria remain the same.

An example showing the case when Form authenticity is <b>good</b> when calculating the 1st Authenticity Value of the Structure in the rule table in the Fuzzy Logic method									
Material Authenticity	Form (Format) Authenticity	Production Technique (Workmanship) Authenticity	None	Very Weak	Weak	Modarete	Good	Very Good	Exact
Good	<b>Good</b>	Very Weak	None	Very Weak	Weak	<b>Modarete</b>	Good	Very Good	Exact

An example showing the case when Form authenticity is <b>Very good</b> when calculating the 1st Authenticity Value of the Structure in the rule table in the Fuzzy Logic method									
Material Authenticity	Form (Format) Authenticity	Production Technique (Workmanship) Authenticity	None	Very Weak	Weak	Modarete	Good	Very Good	Exact
Good	<b>Very Good</b>	Very Weak	None	Very Weak	Weak	Modarete	<b>Good</b>	Very Good	Exact

As stated in the example table 5, when creating the rule table in the Fuzzy Logic analysis method, in a situation where one of the authenticity evaluation criteria is different and the others are the same, how to determine whether the value result is the same or not. In this context, the authenticity criteria; It was decided to make the rule table with this systematic, by determining whether there is an equal effect on the general authenticity value of a building. At this stage of the study, instead of making the rule table according to the current knowledge and perception of the experts, the authentic weights of each criterion were calculated by using the AHP method. In this context, the authenticity criteria were evaluated in two separate sections as the architectural façade authenticity criteria and the interior architectural authenticity criteria, by creating a template using the AHP method (Table 7).

**Table 7.** The template created to determine the authentic weight values of the Authenticity Criteria with the AHP analysis method

AHP (ANALYTICAL HIERARCHY PROCESS) ASSESSMENT SCALE		
REFERENCE SCALE	DEFINITION	EXPLANATION
1	Equally Important	The two options are equally important.
3	Moderately Important	Experience and judgment make one criterion slightly superior to the other.
5	Strongly Important	Experience and judgment make one criterion highly superior to the other.
7	Very Strongly Important	One criterion is considered as far superior to the other.
9	Definitely Important	Evidence showing that one criterion is absolutely superior to the other has great reliability.
2,4,6,8	Intermediate Values	They are values between two consecutive judgments to be used when compromise is needed.

VALUE ORDER FORM OF THE AUTHENTICITY CRITERIA OF THE ARCHITECTURAL FAÇADE	
Material Authenticity	Form (Format) Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Production Technique (Workmanship) Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Production Technique (Workmanship) Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Production Technique (Workmanship) Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Production Technique (Workmanship) Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Urban Environment and Location Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9

INTERIOR ARCHITECTURAL AUTHENTICITY CRITERIA VALUE ORDER FORM	
Material Authenticity	Form (Format) Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Production Technique (Workmanship) Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Usage and Functionality Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Material Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Production Technique (Workmanship) Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Usage and Functionality Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Form (Format) Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Production Technique (Workmanship) Authenticity	Usage and Functionality Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Production Technique (Workmanship) Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Production Technique (Workmanship) Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Usage and Functionality Authenticity	Urban Environment and Location Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Usage and Functionality Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9
Urban Environment and Location Authenticity	Spirit and Identity of the Building Authenticity
9 8 7 6 5 4 3 2 1	1 2 3 4 5 6 7 8 9

In the context of the template created within the scope of the study, 30 experts were asked about the effect of interior and architectural façade



criteria on authenticity, and the authenticity effect values of the criteria were determined. The effect value weights of the authenticity criteria determined as a result of the evaluation were tabulated and used in the formation phase of the rule table in the Fuzzy Logic system (Table 8).

**Table 8.** shows the results of the authenticity effect weights of the architectural façade authenticity criteria by the experts using the AHP method.

Impact Values Of Architectural Façade Authenticity Criteria		
Arrangement	Authenticity Criteria	Impact Values
2	Material Authenticity	0,25
3	Form (Format) Authenticity	0,24
1	Production Technique (Workmanship) Authenticity	0,30
5	Urban Environment and Location Authenticity	0,07
4	Spirit and Identity of the Building Authenticity	0,14

In this context, in accordance with the purpose of the study with the AHP method; In the accompaniment of the data of the experts of the subject, the impact weights of the architectural façade authenticity criteria of traditional houses were revealed (Table 9).

**Table 9.** shows the results of the authenticity effect weights of the interior architectural authenticity criteria by the experts using the AHP method.

Impact Values Of The Interior Authenticity Criteria		
Arrangement	Authenticity Criteria	Impact Values
2	Material Authenticity	0,23
3	Form (Format) Authenticity	0,20
1	Production Technique (Workmanship) Authenticity	0,26
4	Usage and Functionality Authenticity	0,13
6	Urban Environment and Location Authenticity	0,06
5	Spirit and Identity of the Building Authenticity	0,12

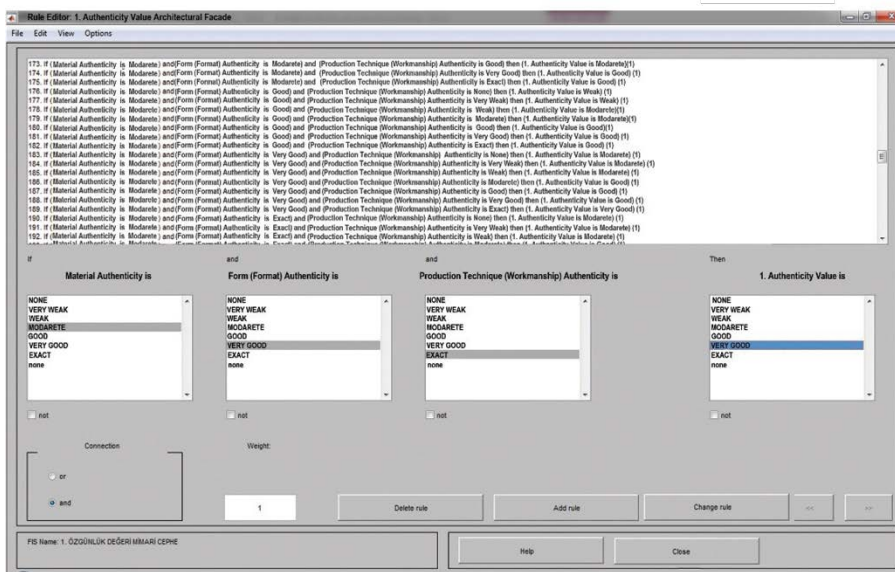
In this context, in accordance with the purpose of the study with the AHP method; In the light of the data of the experts of the subject, the effect weights of the interior and architectural façade authenticity criteria of traditional houses were revealed. After calculating the value weights of the authenticity criteria with the AHP method, the average value of each criterion in each row in the rule table in the Fuzzy Logic system was calculated by multiplying the authentic value weights and the resulting rule value was obtained. In this way, while the rule database was created in the authenticity evaluation model, it was created in accordance with the specified systematic (Table 10). For example; To calculate the value of the 50th rule line of the 1st authenticity evaluation rule table in the architectural façade authenticity evaluation model;  $((\text{material authenticity effect value} \times \text{material essence. value range avg.}) + (\text{form form authenticity effect value} \times \text{form shape essence. value range avg.}) + (\text{construction technique workmanship authenticity effect value} \times \text{construction technique workmanship essence value range avg.})) / ((\text{sum of effect values of criteria})) = ((0.25 \times 70.5) + (0.24 \times 50.5) + (0.30 \times 10.5)) / ((0.25 + 0.24 + 0.30)) = 41,639$ .

**Table 10.** During the creation of the architectural façade authenticity evaluation rule table with the Fuzzy Logic Method; An example showing the calculation of the value range by taking into account the value weights of the criteria determined by the AHP method

Rule order	Material Authenticity	Form (Format) Authenticity	Production Technique (Workmanship) Authenticity	Average value of the row	1. Authenticity value range						
50	Good (61-80) (Impact value)x (Good value avg.) (0,25x70,5)	Moderate (41-60) (Impact value)x (Moderate value avg.) (0,24x50,5)	Very Weak (1-20) (Impact value)x (Very Weak value avg.) (0,30x10,5)	Average Value (41,639)	None (0)	Very Weak (1-20)	Weak (21-40)	Moderate (41-60)	Good (61-80)	Very Good (81-99)	Exact (100)

In this context, a rule table was created by applying these processes to each rule in the arid table of the authenticity assessment model created by using the Fuzzy Logic method.<sup>1</sup> As a result of the processing of these created rules into the system, the rule database was completed and the system was enabled to work (Figure10).

<sup>1</sup> For the formation stages of the authenticity model created by using Fuzzy Logic and AHP method in the study and the rule table forming the main fiction of the study, see (Şahin, 2021).



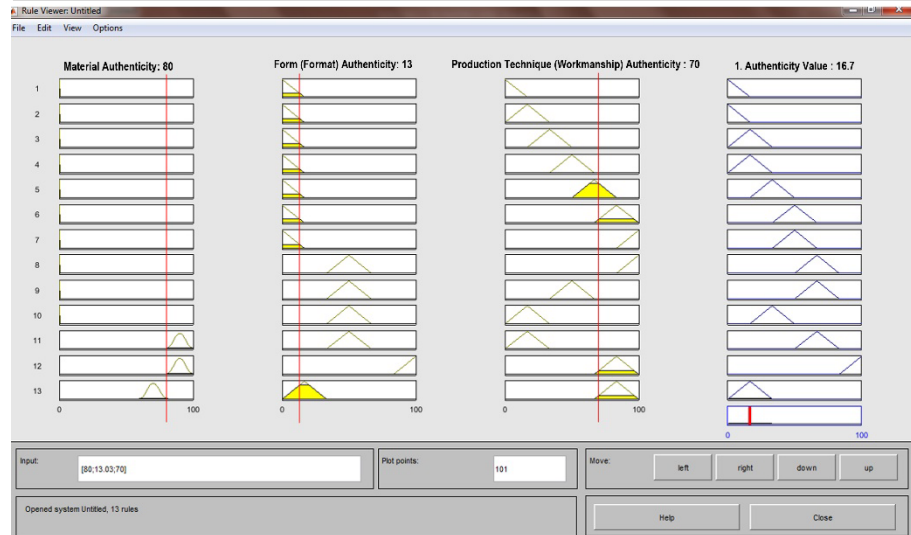
**Figure 10.** An example showing the stage where each probability of the criteria and value ranges in the rule table in the Fuzzy Logic system is processed separately into the system.

Thus, for example, by determining the effect value of material authenticity criteria and construction technique or urban environment and location criteria on the authenticity of traditional houses, more objective decisions were made by experts.

In the sixth stage: In the Fuzzy Logic system, the authenticity model of interior and architectural Façades and the authenticity evaluation model were completed by creating the rule table as specified. After the rule table was completed, the authenticity assessment model was created. Each floor of the interior and architectural Façades of the traditional houses to be evaluated was evaluated separately and the architectural façade authenticity values and interior architectural authenticity values of each floor were calculated. In this context, the values of the authenticity criteria determined by examining the structures of each house on site by experts were processed into the model and the general authenticity values of the building were calculated (Figure11).<sup>2</sup>

<sup>2</sup> For the data of the rule table in the Fuzzy logic method, which is the main element of the authenticity evaluation model, see(Şahin, 2021).

**Figure 11.** An example showing the result of the 1st uniqueness value as a result of the given values of the authenticity criteria in the authenticity evaluation model



Thanks to the evaluation model created within the scope of the study, the interior and architectural façade authenticities of the traditional house in the study area were determined and their numerical values were revealed.

### EVALUATION OF THE AUTHENTIC ANALYSIS OF AHMET KÖKÇÜ HOUSE IN THE STUDY AREA

Due to its geographical and topographic features, trade routes have been established and developed by various societies and groups throughout history in Anatolia, and the infrastructure of today's cities has been established at the intersections of these roads (Tuncer, 2007; Bayram, 2003). These established cities have been the places where all kinds of activities such as socio-cultural, architectural, economic and commercial activities took place and were shaped by those societies and the region. In this context, Malatya region stands out as the best examples of this formation and development (Demirbağ and Fırat, 2013). Yakınca region, which is the study area, is a neighborhood of Yeşilyurt district (Figure 12). Yeşilyurt district's campus history M.S. It is thought to date back to the Byzantine Period between 395-697. The settlement of Turks in this area started in the Dulkadiroğlu Principality period between 1378-1399 (Temiz, 1990; Külahçı and Temiz, 1993; Aytaç, 2015).



**Figure 12.** It shows the locations of Yeşilyurt district and Yakınca Mahallesi campuses.

Yeşilyurt and Yakınca houses stand out as examples that best reflect their cultural heritage, as they have preserved their authenticity and texture in the context of street texture. The construction dates of these traditional houses are XIX. midcentury to XX. It is dated to the first quarter of the century.<sup>1</sup>(Temiz, 1990; Külahçı ve Temiz, 1993).

### Evaluation of Ahmet Kökçü House

In order to evaluate the Ahmet Kökçü House within the scope of the study, the floor plans were created by taking the surveys of the ground and upper floor plans of the building. In the floor plans created, it was made in accordance with the needs and conditions of the period; Architectural elements such as cupboards, jewellery, niches, hearths, cedars, doors, and windows have been elaborated in detail. Every region including the interior, courtyard, garden and exterior, including the architectural elements in all spaces of the building, is illustrated. In this context, a building evaluation catalog was created including the site plan, floor plans, interior, architectural façade pictures and general information of the building (Table 11).

<sup>1</sup> For detailed information about the general characteristics of Malatya Yeşilyurt Houses that make up the study area, see (Şahin, 2021).

**Table 11.** Ahmet Kökçü House Architectural Evaluation Analysis and Building Catalog

Building Catalogue: Ahmet KÖKÇÜ House Yakınca / MALATYA										
<b>Location</b> 			<b>Ground Floor Plan</b> 							
<b>Front</b> 	<b>Template</b> <ul style="list-style-type: none"> <li>WALL</li> <li>Original Material</li> <li>Originally Changed Material</li> <li>New Material</li> <li>WINDOW-DOOR-LADDERS</li> <li>Wood Original Material</li> <li>Pimapen-Plastic Material</li> <li>Iron Material</li> <li>Concrete-Reinforced Concrete Material</li> <li>CONSTRUCTION SECTION APPEARANCE</li> <li>COLORS</li> <li>cross-sectional areas</li> <li>Places of Appearance</li> </ul>		<b>Upper Floor Plan</b> 							
	<b>Structure Authenticity Evaluation Criteria</b>									
<b>A- Architectural Façade Authenticity Criteria</b>										
1	Material Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact	Value	
2	Form (Format) Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
3	Production Technique (Workmanship) Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
4	Urban Environment and Location Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
5	Spirit and Identity of the Building Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
<b>B- Interior Architectural Authenticity Criteria</b>										
1	Material Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
2	Form (Format) Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
3	Production Technique (Workmanship) Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
4	Usage and Functionality Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
5	Urban Environment and Location Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		
6	Spirit and Identity of the Building Authenticity	None	VeryWeak	Weak	Medium	Good	VeryGood	Exact		

XX. The building, which is dated to the first quarter of the 19th century, consists of a ground floor and an upper floor. On the ground floor of the building, spaces such as rooms, warehouses and barns were designed to meet the needs of the period. On the upper floor of the building, spaces

were designed to serve two families, and the rooms were designed according to the needs and conditions of the period; Architectural elements such as cabinets, niches, jewellery, hearths and cedars were frequently used. The building has a space organization in which the inner sofa and the outer sofa are used together(Figure13).



**Figure 13.** Shows interior pictures of Ahmet Kökçü House.

The outer sofas are designed to serve two families by connecting the courtyard with a staircase. Although there is only one entrance from the street, the structures designed to serve two families indoors are frequently encountered in Yakınca houses. The building has two entrances with a wooden double-winged door, one from the front and one from the courtyard on the side. In the courtyard of the building surrounded by a high wall, there are architectural elements such as a hearth, a niche and a fountain for the users to spend some of their time. From the ground floor entrance on the front of the building, a connection is provided from the iwan to the upper floor, the back courtyard and the outer sofa stairs. The building, which was built in an adjacent order and corner, has a room-length overhang on the front façade facing the street and above the iwan. While the main walls of the building, which is positioned on a stone foundation, were built with a mud brick masonry system, the protrusion and interior walls were made of mud brick and wooden materials using the civet technique. Today, the building, which maintains its authentic function, is not actively used. The building has not undergone any intervention or approach in the context of conservation(Figure14)



**Figure 14.** Views from Ahmet Kökçü House

In order to evaluate the authenticity of the interior and architectural façade of Ahmet Kökçü House, the interior and architectural Façades of the building were examined in detail by making on-site observations, with the building catalog (Table 11) and the building evaluation form (Table 2-3) created in the company of experts. While the authenticity of the building is evaluated by experts, each floor on the interior and architectural façade includes the hearth, tandoor, sofa, door, window; A special, general evaluation was made for each floor, covering the architectural elements such as walls, floors, ceilings, and the whole of the materials. The evaluations of the experts are detailed in the table below (Table 12).

**Table 12.** shows the values of the authenticity criteria evaluated by experts on the ground floor and upper floor architectural Façades and interiors of Ahmet Kökçü House.

Ahmet Kökçü House- Ground Floor- Yakınca/Malatya							
Architectural Façade Authenticity Evaluation							
Architectural Façade Evaluation	Expert A	Expert B	Expert C	Expert D	Expert E	Expert F	Expert G
Material Authenticity	95	90	58	97	90	90	95
Form (Format) Authenticity	95	85	55	95	95	95	90
Production Technique (Workmanship) Authenticity	95	90	55	95	90	90	90
Urban Environment and Location Authenticity	95	90	55	97	90	97	97
Spirit and Identity of the Building Authenticity	95	95	58	97	95	97	97
Interior Authenticity Evaluation							
Indoor Evaluation	Expert A	Expert B	Expert C	Expert D	Expert E	Expert F	Expert G
Material Authenticity	95	80	55	95	90	95	95
Form (Format) Authenticity	95	90	58	90	85	90	90
Production Technique (Workmanship) Authenticity	90	90	55	97	90	90	90
Usage and Functionality Authenticity	97	85	55	90	90	97	97
Urban Environment and Location Authenticity	97	95	55	97	95	97	97
Spirit and Identity of the Building Authenticity	95	95	58	97	95	97	97
Ahmet Kökçü House- Upstairs - Yakınca/Malatya							
Architectural Façade Authenticity Evaluation							
Architectural Façade Evaluation	Expert A	Expert B	Expert C	Expert D	Expert E	Expert F	Expert G
Material Authenticity	95	90	55	97	90	95	95
Form (Format) Authenticity	95	90	55	95	95	95	90
Production Technique (Workmanship) Authenticity	95	90	55	95	95	95	90
Urban Environment and Location Authenticity	95	90	55	97	95	97	97
Spirit and Identity of the Building Authenticity	95	95	55	97	95	97	97
Interior Authenticity Evaluation							
Indoor Evaluation	Expert A	Expert B	Expert C	Expert D	Expert E	Expert F	Expert G
Material Authenticity	95	85	55	95	90	95	95
Form (Format) Authenticity	95	90	55	90	90	90	90
Production Technique (Workmanship) Authenticity	90	90	55	97	90	90	90
Usage and Functionality Authenticity	95	95	55	85	95	97	97
Urban Environment and Location Authenticity	97	95	55	97	95	97	97
Spirit and Identity of the Building Authenticity	95	95	55	97	95	97	97

When the authenticity data of Ahmet Kökçü House, determined by the experts with the on-site authenticity criteria, were processed in the authenticity evaluation model developed, the authenticity values of the interior and architectural Façades were revealed for each floor of the building. These determined authenticity values are expressed in tabular form (Table 13).

**Table 13.** Authenticity values in the authenticity assessment model of Ahmet Kökçü Evi

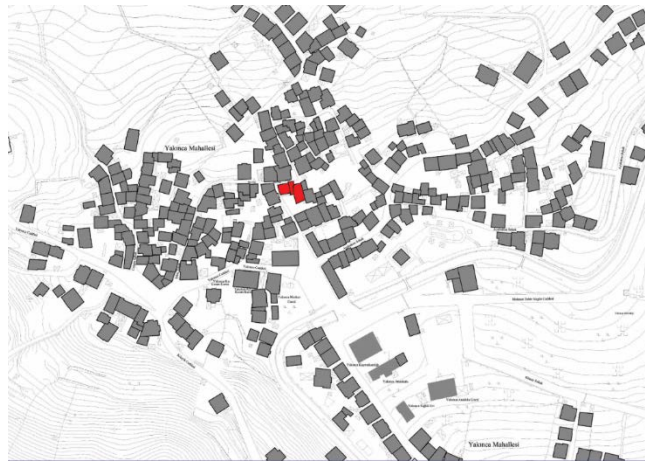
Evaluation of the Originality of Ahmet Kökçü House - Yakınca / Malatya									
Experts		Expert A	Expert B	Expert C	Expert D	Expert E	Expert F	Expert G	Ave.
Architectural facade authenticity values	Ground floor	87.5	81.5	87.5	87.1	81.5	82.4	81.1	81.9
	Upstairs	82.5	81.3	80.7	82.1	81.2	82.5	81.1	81.6
Interior authenticity values	Ground floor	84.8	82.9	84.9	84.4	82.9	82.9	82.9	81.6
	Upstairs	84.8	82.9	82.3	84.4	82.9	82.9	82.9	83.3

As a result of the authenticity values that emerged, although the interior authenticity value of Ahmet Kökçü House was slightly higher, the interior and architectural façade authenticities were found to be similar in general and it was determined numerically and proportionally that they preserved their authenticity at a very good level. On the ground floor of the building, a space was created by using unique materials for only one room in the process, while in another room; Kitchen, WC, bathroom spaces have been added using today's materials. These kind of additions and changes have negatively affected the authenticity of the building. It is understood that the building has preserved its authenticity value very well as a result of factors such as the fact that there is almost no intervention on the exterior of the building, the building maintains its authentic function, and the surrounding of the building has been preserved to a great extent. The building has a unique position in terms of its spatial setup, architectural elements, material properties, façade and ornamental features.

## DISCUSSION AND CONCLUSION

Traditional houses, which form an important part of the cultural heritage, provide data on many cultural norms such as the architectural style of the period, terms and conditions, construction techniques. Traditional Turkish house; It is one of the architectural examples that

transfers the rich material and structure of the period and the region to future generations, shaped according to the cultural diversity, geographical and climatic conditions. These residences are healthy, useful and low cost, but perishable buildings. This is the main reason why they wear out over time. The main element of preserving the authenticity of buildings is through constant maintenance. Preserving these valuable cultural heritages and transferring them to future generations in an authentic way has become a subject that increases its importance day by day. traditional residences; It is gradually disappearing in our age due to many reasons such as rent, unplanned urbanization, wear of the material, neglect and unconsciousness, or it can survive until today by losing its cultural heritage values as a result of interventions and practices. Malatya central region has lost its traditional texture and identity to a great extent. The Yakinca Region, which constitutes the scope of the study, is one of the rare regions that has largely preserved its traditional texture and identity. This cultural texture reflecting the traditional housing culture of Malatya; It disappears due to reasons such as rent, irregular settlement, unconsciousness(Figure 15).



**Figure 15.** It shows the organic texture of Yakinca District and the location of Ahmet Kökçü House.

<sup>1</sup> Survey drawings of a total of 20 houses in figure 15 were made and their authenticity was evaluated. For detailed information, see (Şahin, 2021).

Looking at the site plan in Figure 15, it is understood that the Yakinca region has survived to the present day by preserving its organic street texture and identity. These cultural heritage values need to be protected with a holistic approach<sup>1</sup>. This rich culture and values of traditional houses have been tried to be conveyed and examined in the context of Malatya traditional houses. In order to reveal the architectural values of traditional houses, which constitute an important part of the cultural heritage, an evaluation model was developed based on the criteria of authenticity values, and the authenticity of the buildings was evaluated. As a result, with the evaluations made, it has been revealed that the Ahmet Kökçü House in the Yakinca Neighborhood has largely preserved its authenticity. In this context, as a result of the field study, in the light of the data obtained from the authenticity assessment model, it has been revealed that all kinds of interventions applied to the structures greatly damage the authenticity. It has been determined that practices such as street rehabilitation, restoration, re-functioning and landscaping applied to the buildings damage the authenticity of the buildings.

In the study, as a result of the application of the authenticity evaluation model, which was created by using AHP and Fuzzy Logic analysis methods, in the evaluation of the authenticity of traditional houses, the following suggestions about the system were developed:

- Using the AHP method, which is a part of the authenticity evaluation model, the impact weights of the authenticity criteria for traditional houses were determined in the presence of experts, and the effect on the general authenticity of the buildings on the interior and architectural Façades was calculated. In this context, the impact weights of the said criteria, accompanied by experts in the subject; It can be easily recalculated and integrated into the model as a result of variables such as the subject, scope, field and experts studied.
- As a result of the developed authenticity assessment model, it is possible to evaluate the authenticity of traditional houses in every region of Anatolia.
- The authenticity assessment model developed; authenticity value criteria, value ranges, definitions, impact values and rule database forming the main backbone of the model; The system can be reconfigured by changing the factors specified by the experts as a result of variables such as the subject, area and scope to be studied. Thus, using this model in all kinds of traditional and monumental structures, the authenticity of the structures can be evaluated.

From this point of view, the suggestions developed after the data revealed in the light of the field studies carried out with the authenticity assessment model are as follows:

- Traditional houses need to be protected in a sustainable way, with minimal intervention to the façade, space and architectural elements, preserving their authentic functions and environmental texture as much as possible. Every intervention applied damages the authenticity of the structures. As can be seen in the study, the authenticity of the Ahmet Kökçü House in the Yakınca Neighborhood, which has seen almost no intervention, has been determined to be very high.
- In this process, where the residential periphery of the city of Malatya extends rapidly to Yeşilyurt district and Yakınca District, local administrators and relevant institutions should take steps to protect these structures in a holistic way, before the traditional texture and structures in the Yakınca District are destroyed and lose their authenticity.

As a result, it is thought that the evaluation model developed within the scope of the study can be used and applied for historical and traditional buildings in every region of Anatolia, and it will lead to similar studies in the context of traditional houses within the scope of the study area.

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## Resume

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