TOURIST TRAILS ANALYSIS AT ST. ANA LAKE REGION USING G.I.S METHODOLOGY

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ABSTRACT

Tourist trails analysis at St. Ana Lake region using G.I.S methodology. Most of the tourist routes in Romania were marked in the first decades of the past century. Now days these routes are remarked, and represents an important segment of touristic offer. Are research are concentrated on verifying some of the routes characteristics such as length, time. For this we developed a G.I.S system, which calculates these values, based on region DEM and tourist routes positions. The developed system has a friendly interface developed in Borland Delphi and a powerful G.I.S background using IDRISI modules. The results obtained from the system is quite surprising, values of the walk time differs very much in some cases from those specified in route descriptions. After verifying the base data and calculation methods we concluded, that historical route description holds some errors and our analysis system can be a valuable tool in tourist route analysis.

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1. INTRODUCTION

Almost all tourist trails are a result of the 1920's and 1930's. These trails are reconditioned by NGO's and by ecologic associations to promote tourism.

Although today's tourism and services within tourism are much different from those in the last century, the material aspect of tourism got reevaluated and recalculated, tourist trails are a new way of discovering the beauties of the wilderness thus acquiring new knowledge. It's needless at this day to mention that covering some tourist trails is not just healthy but also relaxing and helps maintaining a healthy lifestyle.

The today's tourist demands much more information that is precise and plentiful than its predecessor in the last century, even though he or she can't use to a good extent all the received information. Starting from this necessity of the travel agencies, of the agents and holiday makers this precise and vast database can be a considerable help.

The description of tourist trails can be classified into two categories. The first part of the description is short and precise, that offers data like: the type of the marking in use, the estimated time one needs to cover it, total length, the biggest elevation level, etc. The description continues with the presentation of the important sights and elements of the trail just as we would cover the trail led by a virtual guide. In this description we will have info regarding the landscape and sights, flora, fauna, existence of springs, shelters, etc. Outlining the differences between the two descriptions is very important because they are stored and processed differently on PC and furthermore search for data in these information databases is done differently.

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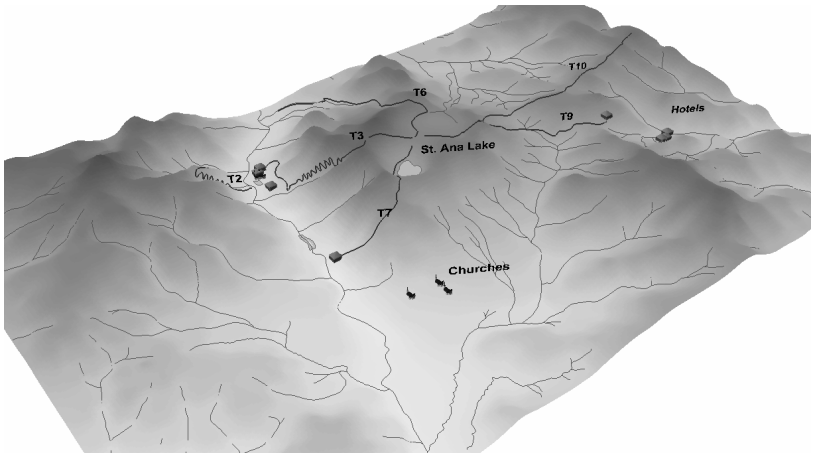

Fig. 1 ***The St. Ana Lake region with the analyzed tourist trails***

2. USAGE OF G.I.S IN THE ANALYSIS OF TOURIST TRAILS

The purpose of our research was to create an analysis system with which we can determine some of the characteristics of the tourist trail. Some of these characteristics one can find in the description of the trail, as a conclusion they are meant to be compared and verified others are new information.

As a principle the fallowing calculations can be performed with G.I.S analysis that can offer new information:

- determining the angle of the slopes to different parts of the trail
- determining the quantity of energy necessary to cover the trail's length
- longitudinal profile of the whole trail

At the same time some figures can be determined just as in the description, like:

- maximum elevation
- time needed to cover it
- distances

To be able to assess such a database we used as a starting point the digital elevation model and the exact position of the trail. Based on the topographic map of the region at scale 1:50000, combined with the touristic map the basic data structures were created. This includes the digital elevation model interpolated from the digitized contour lines and the position of tourist trails in vector files. The digital elevation model had to be converted in IDRISI raster format at 5m resolution, while the tourist trails should to be in SHP files, every trail in separate file.

The majority of G.I.S programs are made for specialists and not for any user with limited knowledge of the software. A disadvantage could be that the average user can use this software only after some specialized training.

G.I.S software offer a wide variety of calculus that refer to the angle of the slopes, exposition, visibility, profiles, but could present problems if a travel agency's agent needs to analyze it on the spot and answer to questions like: what is the average elevation along a single slope? What is the quantity off energy that one requires to cover that part of the trail? Etc. The element missing from G.I.S software is that of offering the possibility of controlled supervision that could be accomplish according to some predefined algorithms. This could

lead to the results accomplished by the user, without the user knowing the calculating methods and the steps of the analysis, but through the existence of some predetermined variables it could be personalized. So there is a need to some predefines software for G.I.S, specialized in some specific areas of research.

3. THE DEVELOPED SYSTEM AND ITS RESULTS

To develop such products we need two things: the first step is the creation of the base of the system, or to integrate some of the existing G.I.S algorithms into our own. The first method is not popular because it's not cost-effective; the second one would be accepted if we can combine multiple elements from different parent software's.

In previous research analysis software were developed for Lacu Rosu region, where the selected 6 tourist trails were hard coded in the software. In this case we modified this software giving the possibility to the user to select any desired trail to be analyzed.

To assemble the system of analysis there were used:

- programming environment Borland Delphi 7, to create the user's interface and as a frame of development for applications
- IDIRISI Andes Edition, it can be easily adapted and integrated into Delphi
- InovaG.I.S, a visualization library for many types of file.

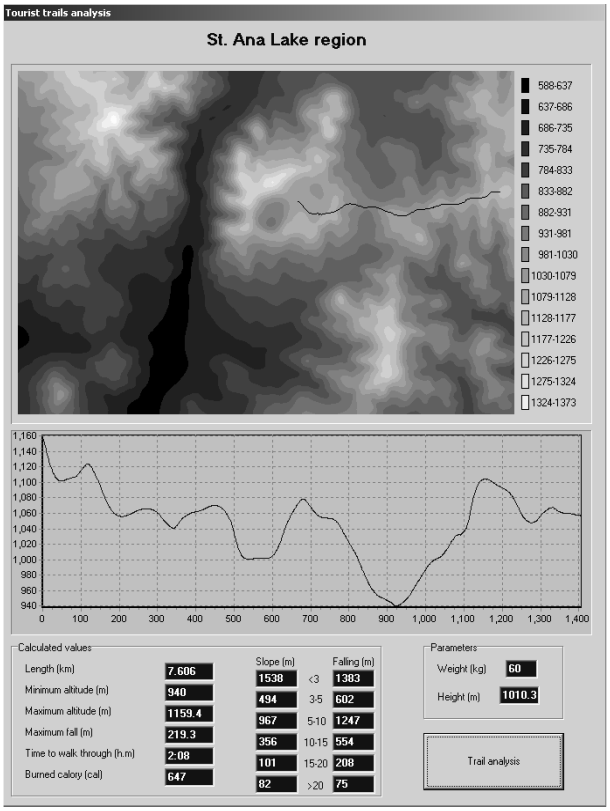

Fig. 2 ***The interface of the developed system***

This newly developed system requires from any host PC the prior installation of IDIRISI and of inovaG.I.S softwares.

The modifiable parameters of the application are: the tourist trail, the weight of the person.

By the selection of one of the trails this data is generated:

- the length of the trail, taking into consideration the elevation corrections as well
- the maximum and minimum points of the trail and the biggest elevation
- the total length of ascends and descends on different categories of slopes
- the necessary time to cover it taking the inequalities of the trail into consideration
- the calories burnt by one individual if one meal is taken into consideration

For this research 6 trails were chosen from the 10 existing one in the vicinity of the St. Ana Lake. The table bellow shows the major characteristics of these trails. In the even rows of the table there are marked the fallowing: type of marking, time to cover it, length, maximum elevation, trail's difficulty.

The characteristics of the trails around St. Ana Lake based on tourist maps

Table 1

T2. Tusnad Spa – Ciucas Lake – Howkrock				
Red triangle	11/2 hour	2,5 km	189 m	hard trail
T3. Tusnad Spa – St. Ana resort				
Red cross, blue triangle	3 hour	6 km	554 m	medium trail
T6. Varghis river – Mohos sheer – St. Ana resort				
Yellow triangle	2 hour	5,5 km	420 m	easy trail
T7. Unio motel – St. Ana resort				
Blue cross	1 hour	3,75 km	430 m	easy trail
T9. St. Ana resort – Carpati resort				
Yellow cross	2 hour	7 km	245 m	easy trail
T10. St. Ana resort – Tetelea peak				
Blue cross	4 hour	9 km	105 m	medium trail

Using the developed analysis system the following results were obtained, comparing to the given ones.

The calculated characteristics of the tourist trails near St. Ana Lake

Table 2

	T2	T3	T6	T7	T9	T10
L	3	6.7	5.9	4.1	4.9	7.6
minH	665	691	702	627	891	940
maxH	986	1213	1130	1061	1104	1159
dH	321	522	428	433	214	219
T	1:02	2.27	1:45	1:23	1:22	2:08
E	406	945	543	492	402	647

The abbreviations used in the table are:
- L - length in Km
- minH – the lowest point (meters)
- maxH – the highest point (meters)
- dH – maximum fall (meters)
- T – estimated time to cover the trail (hour, minute)
- E – the amount of calories burnt (kcal) for a person averaging 70 kg

The values used in the database and the chart are taken from the specific literature.

3. CONCLUSIONS

Comparing the resulted values we can observe that except trail T2 and T10, the others have acceptable values for maximum fall. Based on the topographic map it could be observed that the maximum fall is higher than 200m.

Regarding the length of the trails T9 and T10 have much shorter calculated values then on the touristic map. Because of the other correct values we could not stipulate that there were any problems during the analysis. The most feasible explanation is that on tourist map some frequent but relative small deviations could not be represented.

We also tried to characterize the trails based on the calculated values. As it's observable from figure 3, the most stressing trail is T2, based on the length of segments with slopes over 15 degrees. Trail 3 is classified as medium probably even if have the higher length with slopes over 20 degrees. But it also have approximately 30% with slopes under 5 degrees. Trail 7 is classified easy because of its shortness, while trail 10 is medium mostly because it's relative long length.

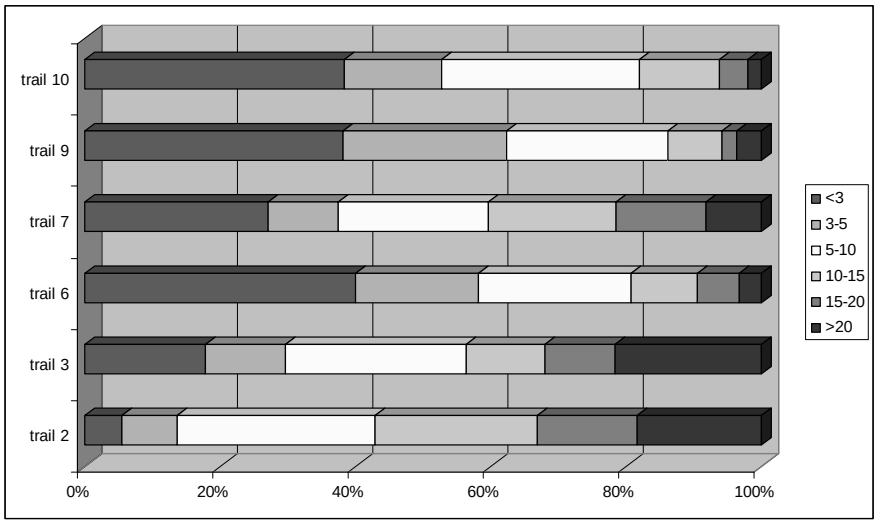

Fig. 3 ***Slope category distribution along the trails relative to their length***

The hardness of a trail can be evaluated based on the burned calories relative to unit length. From figure 4 we can observe the relative accuracy of trail hardness classification from the touristic map: trails 2, 3 and 7 are classified hard or medium, having a calories/unit

length value over 100. It's also observable that maximum fall along the trail could not be considered as a representative measure of trail hardness.

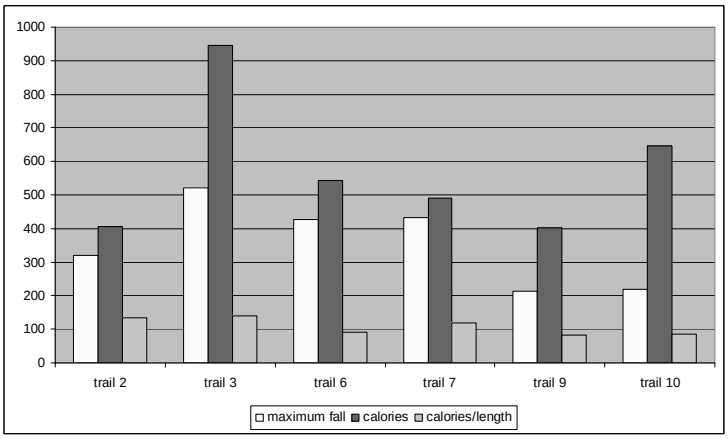

Fig. 4 ***The interface of the developed system***

Our final conclusion is that the majority of the trails – at least those in the study region – present estimated numbers and values, and were not reG.I.Stered as a result of a rigorous field study. Although with the perfecting of the existing analytic program, we consider that these inexactitudes can be corrected obtaining accurate and useful data and information for the tourists and for the organizations and agencies as well.

REFERENCES

Dombay I., Magyari-Sáska Zs. (2006), *Hegyvidéki túrautak jellemzése G.I.S rendszerek segítségével*, Volumul celei de a III. Conferințe Internaționale de Geografie,

Magyari S. Zs, Haidu I. (2006), *Posibilități de modelare spațială în mediu programat*, Editura Universității „Al.I. Cuza", Iaşi

Pándi G., Magyari-Sáska Zs. (2007), *Turismul la lacul Sfânta Ana*, Geografia în contextul dezvoltării contemporane, Presa Universitară Clujeană, Cluj-Napoca

*** (2001), *A Szent Anna-tó és környéke*, Hartă turistică, Dinmap,

http://www.cchr.ro/jud/turism/