



The Missing Resolution In Geographic Information Systems (GIS)

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Outlines



- **Objective**
- **GIS data**
- **Types of resolution**
- **The missing resolution**
- **Indications of missed resolution**
- **Conclusion**

OBJECTIVE



Introducing a new GIS resolution that has been overlooked for years due mainly to the lack of understanding and modeling.

GIS Data



- **Spatial data**
- **Non-spatial data**

Man vs Machine wrt data treatment



	Man	Machine
Spatial	Difficult	Easy
Nonspatial	Easy	Difficult

Characteristics and status of spatial and non-spatial data



	Spatial	Nonspatial
Information	Numerical	Textual
Model	Mathematical	Semantic
Interpretation	Good	Poor
Integration	Good	Poor
Automation	Advanced	Weak
Education	Emphasized	Overlooked

Types of well-known Resolution



- **Temporal Resolution**
- **Spectral Resolution**
- **Radiometric Resolution**
- **Spatial Resolution**

Improvement in resolutions



Satellite	Coverage (km ²)	Spectral Bands	Radiometric Resolution	Temporal Resolution (days)	Spatial Resolution (m)
MSS	185x185	4	$2^8 = 256$	16	80
TM	185x185	7	$2^8 = 256$	16	30
IRS-ID	141x141 C 70x70 B/W	3 color 1 B/W	$2^8 = 256$	24 color 12 B/W	23.5 5.8
SPOT	60x60	4 color 1 B /W	$2^8 = 256$	26	10 2.5
IKONOS	11x11	4 color 1 B/W	$2^{11} = 2028$	1.5	4 1
QuickBird	16.5x16.5	4 color 1 B/W	$2^{11} = 2028$	1-3.5	2.44 0.60

Accuracy and Automation



- Resolutions are improving rapidly.
- High Resolutions lead to high accuracy.
- Accuracy is increasing in space era
(1:10000000)
- Automation in measuring and evaluating spatial information is noticeable.
- etc

Where is the problem?



- **Despite all of these improvements in measurements and evaluations of spatial information, autonomous systems are lacking, Why.**
- **All of the previous resolutions are to measure the spatial information.**
- **No resolution is assigned to the non-spatial information.**

The missing Resolution



- A serious resolution is missing which is that of the non-spatial information.
- Hence, the “accuracy measure” of such information is missing.

Indications of the missing Resolution



- There many ways to prove that non-spatial resolution is missing (see my book). However, some indications are given here just to highlight the problem.

Different Terms form different disciplines



	Discipline
Feature	Remote Sensing (RS)
Concept	Computer Vision (CV)
Entity	CV, Digital Photogrammetry
Hypothesis	CV
Object	RS, DP
Target	Military & Surveying

Feature

- Spatial data
- Quantitative
- Locational
- Graphical
- etc

- Non-spatial data
- Aspatial
- Qualitative
- Non-locational
- Non-graphical
- Attribute
- Textual
- Descriptive
- Footprint
- Metadata
- Semantic
- etc.

WHERE

WHAT

WHAT is WHERE



Different disciplines and one concept



<i>Discipline</i>	<i>Concept</i>	
Computer Vision	Entity-Based	Field-Based
Photogrammetry	Feature-Based	Area-Based
GIS	Vector	Raster

One abbreviation for Different Technologies



Technology	Abbreviations
<ul style="list-style-type: none">1. Global Positioning System2. Global Positioning Surveys3. Global Problem Solving	GPS
<ul style="list-style-type: none">1. Geographic Information System2. Geographic Information Science3. Geographic Information Services	GIS

Conclusion



- ◆ GIS is built of two equally important types of data: Non-spatial and Spatial (what is where).
- ◆ The concentration has been on the spatial part, the non-spatial part is abandoned.
- ◆ GIS is in need of new courses form relative fields such as computational linguistics, cognitive science, geomorphology, ontology, etc.

Conclusion (Cont.)



- ◆ **Non-spatial resolution must be introduced. It can be named “lingual Resolution”.**
- ◆ **Automation will always be amazing but with some sort of deficiency, due to the lack of lingual resolution.**
- ◆ **This concept is treated in my new coming book (Project # 46/426, College of Eng. Research Center, KSU, Riyadh).**

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كلمة ترحيبية :

لا إله إلا الله ما أجهل الإنسان وما أعظمه. إذا عم شيئاً، وإن عسر، أبدع فيه وأجاد، رغم ضحائه ما يعرفه منه. وإن جهل شيئاً، وإن سهل، عبث فيه كما يعبث الطفل بالتراب. فسبحان خالقه ومصوره ومعلمه؛ علمه ليرشد فتصبح علاقته به جل في علاه.

أحييك أيها الزائر الكريم إلى موقع لا يحبذ صاحبه تجزئة المعرفة، وإن جزأها حسب السائد المألوف ليفهم منها ما يمكن أن يفهمه؛ وليحيط منها بما قل وإن ظنّه كثيراً. فالتجزئة، ليست دليل مهارة وقدرة وإتقان، بل هي دليل ضعف وعجز ونقصان. أما ترانا نوجد الحقل المعرفي ونحدده ونراد يقوم بذاته، ثم ما نلبث أن نلمس حاجتنا إلى روافد كثيرة من غيرد لفهمه فهماً جيداً؛ فإذا ما ذهبنا نطلب هذه الروافد تهنأ وتشعبت بنا السبل ولم ندرك منها شيئاً ذا بال، وعدنا إلى القليل مما نعرفه مرغمين، فسبحان من وسع علمه كل شيء.

ثم أقول لمن طمأ في خضم هذه الشبكة الهائلة:

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