History and development of GIS

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Introduction

- History is little more than anecdotal.
- The field evolved through sets of interactions of many other fields, mainly cartography, computer science, geography, surveying, remote sensing, commercial data processing, mathematics and statistics. Thus essence of GIS is found with a multidisciplinary characters
- No strict progression has been observed towards development and implementation of GIS, but rather a mixture of failures, set-backs, diversions and successes

Past history of map production

- From the earliest civilizations, maps have been used to portray information about the earth's surface
- Navigators, land surveyors and the military used maps to show the spatial distribution of important geographic features
- Land surveying and map making were an integral part of Roman Government. With the decline of the Roman Empire, surveying and map making declined as well.
- It was until the 18^{th} century, that map making again rose to prominence in Europe as Governments realized the value of mapping asa means of recording and planning the use of their lands
- National institutes were commissioned to produce map coverage of entire country
- General maps showing the topography of the land and boundaries of national and administrative units were produced
- As the study of natural resources developed, thematic maps were used to portray the spatial distribution of such features as geology, geomorphology, soils and vegetation

Coppock and Rhind (1991) has categorically distinguished the history and development of GIS into four overlapping phases

1. **Phase-1 :** Individual Efforts
2. **Phase-2 :** Initiatives by national agencies
3. **Phase-3 :** Commercial dominance
4. **Phase-4:** User dominance

Phase-1 : Individual Efforts

Period : From 1950- Mid 1970s

Characteristics:

- Period of "research frontier" where development of GIS is characterised as individual efforts by some brilliant pioneers who struggled to use and development of GIS among organizations, universities and enterprises.
- Among many others, the four individuals who played the most significant role to surface up the GIDS technology are:

1. Howard Fisher in the Harvard Laboratory of Computer Graphics (LCG)
2. Roger Tomlinson in the Canada Geographic Information System (CGIS)
3. Jack Dangermond in the Environmental Systems Research Institute (ESRI) in North America
4. David B Pickmore at the Experimental Cartography Unit (ECU) in the UK

- Analytical capabilities in this phase were very primitive
- Professional acceptance was very low
- Public cynicism was quite high
- High cost of hardware was the disadvantage in competition with manual system

Phase-2 : Initiatives by national agencies

Period : From 1973- Early 1980s

Characteristics:

- Role of individuals was diminished in the context of the initiatives taken by national and international agencies
- A number of national institutes, mostly in USA, Canada, UK, Japan and France have taken formal experiment and research on GIS as cost-effective replacement of traditional manual cartography and geographical analyses
- Particular individuals and institutions played key roles acting as examples or as sources of expertise, advise and often some skilled personnel
- Also effects of individuals persisted strongly at local level

Phase-3 : Commercial dominance

Period : From early 1980s- late 1980s

Characteristics:

- Phase of rapid development of GIS technology
- Both software & hardware were found to be accepted widely by various professionals and thus a strong competition was also found among the vendors
- This phase is also characterised by introduction of smaller and by far less expensive computers with user friendly programs
- Successful attempts for the development of spatial statistics and geographical display have been made in this phase (particularly in the middle and late 1980s)
- For the same function , considerable duplication was also found by different agencies due to poor contact between the software developers

Phase-4: User dominance

Period : Started from the late 1980s

Characteristics:

- Use of GIS is seen as the routine activities by the user
- Development of powerful software coupled with the availability of inexpensive computers permitted many researchers to test new ideas and applications for the first time
- The strengths and weaknesses of many information technologies are now becoming apparent, and researchers began to work together to cultivate the most promising applications on a large scale
- The new technology now lacks appropriate application model severely
- There is a danger that the growing imbalance between the availability of geographic data and the limited range of analytical technology will slow the growth of GIS and result in a failure to make full use of the information collected

Conclusion

- In depicting the history of GIS, it is suspected that the role of those who did not contribute to the formal literature has been underplayed, especially those working in the military. While regrettable, this is probably unavoidable - history very often consists of what has been written down
- To see GIS as merely a software or hardware systems is to miss the crucial role it can play in a comprehensive decision-making process.