

Digerud online GIS: Developing an online community GIS resource in the Frogn municipal district of Norway

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ABSTRACT

An increasing community demand for accurate, user friendly and easily accessible geographic information has lead to the development of online resources to aid in the decision making process (Craig et al, 2002, Green et al, 2002, Peng et al 2003). These resources such as interactive maps are often used as tools to plan and review imperative and non-imperative requirements of community life. The results of this study demonstrate that it is possible to access, retrieve and convert spatial data to an acceptable format for use in an Internet-accessible and community-based geographic information system (GIS) for the settlement of Digerud in Norway. An Internet-based GIS was placed on a university supplied public access server and known subjects with links to the Digerud district were approached and invited to participate in given geographic identification and measurement tasks on the Digerud GIS online applet. Following the completion of the measurement tasks the participants were surveyed in order to assess ease of use and asked to provide comments on their interaction with the program. The outcome of this study demonstrates the feasibility of such a system and that Digerud online GIS has the potential to develop as a tool for the people of the Digerud and neighbouring communities for use as either an imperative (e.g. socio-economic) or non-imperative (e.g. recreational) geographical information package.

Keywords and phrases: GIS, Digerud, Internet, ESRI® ArcIMS®, <http://b8.survey.otago.ac.nz>,

1.0 BACKGROUND AND AIM

For the past decade increasing community demands for accurate, user friendly and easily accessible geographic information has lead to the development of online resources to aid in the decision making process. These resources such as interactive maps are often used as tools to plan and review imperative and non-imperative requirements of community life. In Norway a concern in the Digerud community over the local government's plan to expropriate their land sparked a local demand of having tools to better visualise and analyse the consequences of such expropriation. The aim of this project was to develop a publicly accessible geographic

information system (GIS) for all parties who have a special interest in the Digerud locality. In a non-imperative way, this project runs alongside many initiatives around the world that are building or have built, community GIS, the development of which is public-led (commonly called Public Participation GIS – PPGIS – see Craig et al, 2002).

2.0 METHODOLOGY

A thorough review of current literature, other GIS case studies, and familiarisation with present technology allowed geographic data for the Digerud area to be retrieved, converted, analysed and included in a community specific spatial database (Plewe, B., 1997, Chrisman, N. R., 1997). A publicly accessible online GIS (Digerud online) was designed to display these data in applet format from any standard computer connected to the Internet (ESRI, 2004). Ten participants with links to the Digerud community agreed to trial the use of this database. A survey was also created to test how the people of the Digerud community responded to such a tool.

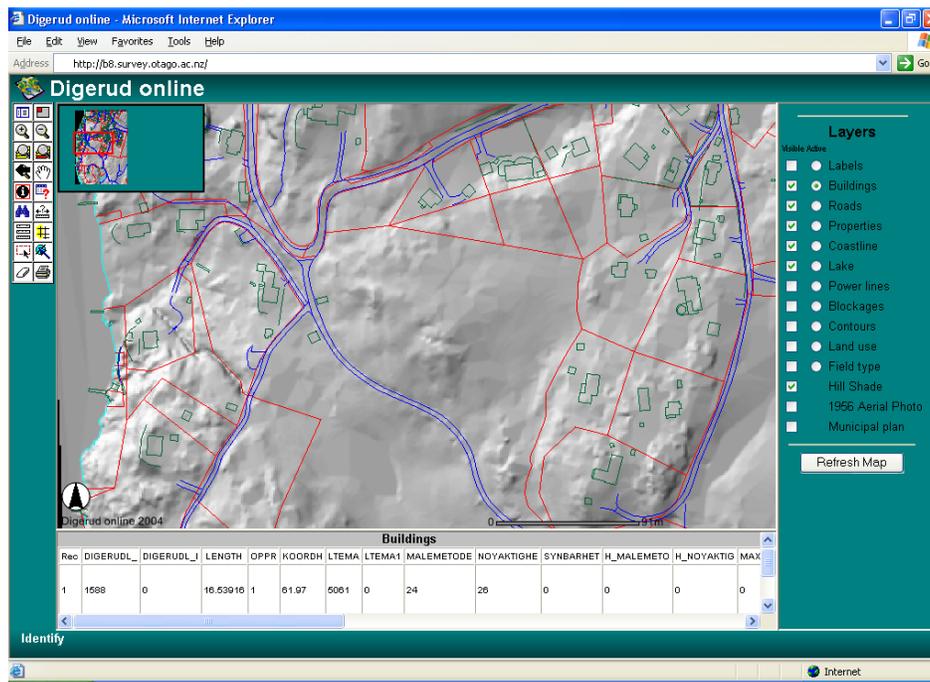


Figure 1: Screen capture example of the Digerud online GIS applet

3.0 RESULTS

The accuracy and identification tasks and the survey results suggested that the Digerud GIS was user-friendly and sufficiently accurate to fit a non-imperative purpose. Participant feedback supplied recommendations for alteration to the system to enhance its visual appearance and content.

4.0 DISCUSSION

The results of this study demonstrate that it is possible to access, retrieve and convert spatial data to an acceptable format for use in an internet accessible geographic information system (GIS). Although this study has only focussed on Norwegian spatial data to create a locality specific database for the Digerud district the software used allows the access of other public information to create further examples of GIS for other localities in many other countries (Peng et al 2003).

Using a systematic methodology the author was able to determine the software most applicable to this study and also access sufficient digital information in order to create a multi-layered Internet GIS applet using the ESRI® ArcIMS® (ESRI, 2004). These layers included government vector data of the district such as properties, boundaries, roads, lakes, coastline, buildings and powerlines. Other layers included aerial photographs, 3D

landscapes and municipal plans. The software allowed a mix of opaque and transparent overlays in ordered sequences to create a wide spectrum of choices for the potential users.

The system was placed on a university supplied public access server and known subjects with links to the Digerud district were approached via different media formats and invited to participate in given geographic identification and measurement tasks on the Digerud GIS online applet. By this method 10 participants agreed to partake in the exercise. Following the completion of given measurement tasks the participants were surveyed as to ease of use and asked to provide comments on their interaction with the programme. The measurement results indicated high levels of compliance for majority of the participants although one task had a 30% error or non-compliance outcome. The survey and commentary results suggest that the program was appropriate, relatively user friendly but also had some ambiguities that were worthy of refining. The majority of these comments suggested the use of more annotations for specific elements and generally more instructional information.

From an analysis perspective, despite a perceived lack of clarity in the intent of the survey questions, results, survey and feedback responses were considered to support the use of this GIS database as a useful tool. Whether this is a true reflection of the response of the full Digerud community is unclear and awaits further investigation. Although the programme was modified to address the concerns and comments raised by the participants, and also included further developmental refinements by the author, a lack of sufficient time precluded further testing of software.

It is planned to improve the accuracy of the Digerud online GIS by adding graphically sophisticated yet user friendly information specific to the interests of the community. In order to achieve this the system will require maintenance and further additions in the form of refining the present data layers and metadata, improving toolbox access, more clarity of annotations, a clearer instruction set and help service, and the addition of other geographic data layers as they become available. It is considered essential to incorporate some web-based links from this programme to other already established databases for districts that are in close regional proximity to Digerud.

5.0 CONCLUSIONS

The result of this study indicate that a publicly available, reliable, accurate and visually helpful geographical information system, such as the Digerud online GIS has the potential to be a valuable resource for the local community.

ACKNOWLEDGEMENTS

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REFERENCES

- Craig, W., Harris, T., Weiner, D. (2002). (eds) Community participation and geographic information systems. Taylor & Francis, London, United Kingdom.
- Chrisman, N. R. (1997). Exploring Geographic Information Systems. John Wiley & Sons, Inc. United States of America.
- ESRI (2004). <http://www.esri.com>
- Green, D., Bossomaier, T. (2002). Online GIS and Spatial Metadata. Taylor & Francis, London, United Kingdom.
- Peng, Z., Tsou, M. (2003). Internet GIS. Distributed geographic information services for the Internet and wireless networks. John Wiley & Sons, New Jersey, United States of America.
- Plewe, B. (1997). GIS Online. Information retrieval, Mapping and the Internet. OnWord Press, Albany, New York