

ESTABLISHMENT AND APPLICATIONS OF DIGITAL MINING MAP DATABASE*

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With the implementation of sustainable development in mining areas and mining industry and the proposal of Digital Mine(or Digital Mining areas), people engaged in this domain are faced with a new challenge, that is the management, maintenance, renovation and utilization of lots of mining maps. The establishment of Digital Mining Map Database (DMMDB) is put forward to solve this problem in this paper. We know that underground mining should be guided by a series of maps, among those the important and common are “the main eight mining maps”. All mining maps are drawn on papers and used by hand traditionally, and many disadvantages such as time-consuming, high-cost, shrinking of paper, change of scale, difficult maintenance and others occurred. Nowadays, with the proposal of Digital Mine, application of GIS and RS to mine, development of computer cartography and other relative scientific progress, it is necessary and feasible to establish a DMMDB and apply it to solve the problems caused by conventional patterns and methods. Mining maps are different with general maps and graphs in many aspects, and we can say that they are more complex than others. Firstly, the features of mining maps are discussed and some demands to mining map database are given. The technical flow of establish DMMDB is proposed, including multi-source data capture, data pre-processing, determination of rules and legends, computer cartography, database maintenance and renovation, spatial analysis, practical applications. The whole system should be developed by object-oriented thoughts, and make full use of all available hardware and software, data. According to the concrete demands, we give some further discussions on some important issues, including multi-source data fusion for mapping, serial cartography thoughts and methods, multi-resolution and multi-scale transformation, data and resource sharing by network. Following those, the applications of some modern techniques including 3D visualization, Virtual Reality(VR), artificial intelligence and expert systems(AI and ES), automatic cartography are analyzed. Finally, the applications of the DMMDB are discussed, and the main applications are: aiding mining engineering, realizing modernization of mining surveying, protecting and treating mine environment, treating mine disaster, setting up MGIS and DM, serving sustainable development of mining areas.