ABSTRACT

Relevance. With the development of information technology and artificial intelligence, there has been widespread use of robots in various fields of human activity, ranging from robots in factories and ending with works that are exploring other planets. Because of the rapid development of artificial intelligence, such works are gaining in popularity, because they can save lives and do things that people can not do. For example, minefields robots. Or the well-known "Curiosity" robotic research worker for Mars that is a part of NASA's Martian Scientific Laboratory. Such works are capable of making decisions about where to go and what to do, thanks to artificial intelligence. But there are cases when the system fails and robot contol goes to the person. In this case, to know where to move, you need a local relief map. To construct this map, you can use the measured elevation data using robot sensors or use existing data from the SRTM mission. Shuttle Radar Topography Mission is a radar topographic research of most of the globe in 2000 year. This data are publicly accessible and are binary files with elevation data and are perfectly suited for solving spatial interpolation problems for building a local relief map. Also, an important task is to evaluate the accuracy of the map of the relief. In this regard, research and improvement of the methods of constructing relief maps and interpolation methods are relevant, which will reduce the cost of computing resources in the development and use of robots or land vehicles.

Connection with academic papers, plans, themes. The work was done at the branch of the department of automated data processing systems and management at the V.M. Glushkov Institute of Cybernetics NAS of Ukraine within the research topic " Development of algorithms for modeling and optimizing dynamic systems for defense, medicine and ecology" (topic code: 16БФ015-03).

Purpose of study – improvement of the algorithm for constructing spatial interpolation by the method of inverse distance weighting. To achieve the purpose, the following **tasks** must be accomplished::

- modify the existing algorithm;
- propose the criteria for map suitability;
- define interpolation criteria (complete interpolation error);

- compare different algorithms for building a map and interpolation.

Object of study – process of building a local relief map.

Subject of study – algorithms for mapping and interpolation.

The scientific novelty of the obtained results is to optimize the existing algorithm of inverse distance weighting for constructing a local relief map that is closest to the real one. And also an quality estimation for interpolated relief map.

SPATIAL INTERPOLATION, Kriging, SRTM, INVERSE DISTANCE WEIGHTING, SPATIAL MODEL