

In modern agriculture the productiveness is becoming more and more important therefore it is necessary to keep record of field work. Because of this the usage of GPS based applications has become elementary in precision farming.

The topic of this thesis is the usage of geographical information systems in agriculture. The main purpose is to determine the quality of field work based on GPS data that was collected during the movement of agricultural vehicles. Specifically, the aim of this thesis is to determine the beginning and the end of field work and the sowing distance, furthermore to calculate the area of cropped fields and skipped areas. Different geoinformatical algorithms are introduced and compared in order to find the most efficient for the extraction of the required data.

The thesis summarizes the potentials and limits of GPS technology, and presents different methods for precision improvement. Furthermore it gives an overview on the basics of cartography and presents some map projection types that are necessary before executing the mathematical operations.

Various options are presented for the extraction of the required information. For these the basics of image processing, especially mathematical morphology is described.

Besides analyzing the possible methods, this thesis contains the implementation of the necessary algorithms in C++ language and the evaluation of precision and effectiveness.