The thesis is divided into five chapters. In the first two chapters I give the overview of clustering data analysis, I present definitions of terms used in the work and describe the k-means algorithm. Third chapter focuses on the filtering algorithm that uses heuristics when algorithm pass throught the MRKD-tree. The fourth chapter describes the x-means algorithm that uses all of the above-mentioned findings. In the fifth chapter I test all algorithms both on artificial and real data from physics. In some cases I refer to the WEKA program where the x-means algorithm is implemented. Algoritms that are discussed in this thesis are intended only for objects described by quantitative variables. They are also suitable for large datasets. In the attached CD I present the implementation of algorithms in Matlab language.