Chapter 1

Introduction

The history of Statistics in criminology goes is over two centuries old going to back in 1778.

In the second chapter of this thesis a short review of statistical applications in criminology is presented, giving an emphasis in some recent ones. The work of Kent Borowick (1998) has shown that reported crimes to the police follow some kind of Poisson mixture distribution.

In Chapter 3 we present some semiparametric methods of revealing the clusters in such heterogeneous populations, as the crime counts are, based on maximum likelihood estimation.

In Chapter 4 the available Greek crime data are presented and some preliminary methods are applied to them to give a synopsis of crime activity over Greece.

In Chapter 5 a discussion on using official crime statistics is presented. In the sequence, a non parametric maximum likelihood estimation algorithm (NPMLE) is applied to reveal the hidden clusters for annual data per available offense, using also the populations of Greek counties. The NPMLE algorithm is written by Karlis (2001). The populations of Greek counties used for the years 1987-1988 and 1990-1997 are estimated populations by Virras (2001).

In Chapter 6, in order to give a catholic picture of crime activity in Greece, the hierarchical clustering method of Complete Linkage is applied to the estimated partial classifications obtained from the application of the NPMLE algorithm. For the application of Complete Linkage the Euclidean distances are used. Moreover, we apply Mojena's (1977) stopping rule in combination to its correction by Milligan and Cooper (1985), in order to select the number of clusters.

The clustering results are mapped using a different color for each cluster for a better representation of them.

Finally, in Chapter 7 some conclusions are given.