A One-Class Classification decision Tree based on kernel density estimation

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Abstract: In this paper we have proposed the use of A One-Class Classification decision Tree based on kernel density estimation .

I. INTRODUCTION

OCC is of major concern in several domains where it may be expensive and/or technically difficult to collect data on a range of behaviors or phe-nomenons . For example, it may be quite affordable to gather data on the representatives of a given pathology in medicine, or positive operating scenarios of machines in the industry. The related complementary occurrences are, by contrast, scarce and/or expensive to raise]. As a matter of fact, one-class classifiers are trained on a single class sample, in the possible presence of a few counter-examples. The resulting models allow us to predict target (or positive)patterns and to reject outlier (or negative) ones. Basically, OCC is pursued for outlier (or anomaly) detection. One-Class Support Vector Machine (OCSVM) and Support Vector Data Description (SVDD) are among the most common OCC methods [4, 5]. OCSVM aims at finding the hyper-plane that separates the target instances from the origin with the wider margin, while SVDD aims at enclosing these instances within a single hyper-sphere of minimal volume. Far from being contested, the effectiveness of these methods has notably been improved with the development of variants that better fit some data structures Indeed, the instances of a single class may be enclosed within several groupings in the form of sub-concepts that it would be interesting to raise separately

II. RESULTS AND OBSERVATIONS

Noise Level	Accuracy
2%	0.98
5%	0.96
10%	0.91
15%	0.88