

ENERGY CONSUMPTION PATTERN BASED ELECTRICITY FRAUDULENT DETECTION USING FUZZY ALGORITHM

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ABSTRACT:

We have introduced a novel Consumption Pattern Based Energy Theft (CPBET) Detection System algorithm which leverages the predictability property of customer's normal and malicious consumption patterns. This approach focus on both practical reduction as well as machine learning reduction. In practical reduction with the help of distribution transformer meters, areas with a high probability of energy theft are shortlisted, and by monitoring abnormalities in consumption patterns, fraudulent customers are identified. In machine learning reduction focus on two parts. In the first part of the paper k-means based fuzzy clustering was performed to group customers with similar profiles. In the second part of the paper K Nearest Neighbor (KNN) fuzzy classification was then performed and Euclidean distances to the cluster centers were measured. Customers with large distances to the cluster centers were considered potential fraudsters.

I. INTRODUCTION

Energy theft has been a major concern in traditional power system worldwide. The Generation, Transmission and Distribution (T&D) of electricity involve huge operational losses. The

Magnitude of these losses is rising at an alarming rate in several countries. In order to identify illegal consumers of electricity in the view of enhancing the economy of utilities, efficiency and security of the grid, a new method of analyzing electricity consumption patterns of customers and Identifying illegal consumers is proposed and realized. Losses that occur during generation can be technically defined, but T&D losses cannot be quantified completely from the sending-end information. Distribution losses in several countries have been reported to be over 30%. Substantial quantity of losses proves the involvement of Non-Technical Losses (NTL) in distribution. Total losses during T&D can be evaluated from the information like total load and the total energy billed, using established standards and formulae. India incurs losses around \$9 billion every year in the form of electricity theft. In the United States (U.S.) alone energy theft was reported to cost the utility companies around \$6 Billion per year. In Canada, BC Hydro reports that the electricity theft costs \$100 million every year In Taiwan the most frequent low voltage customers are coastal farmers, gardeners, and flower growers, with total annual electricity revenue lost through illegal power usage estimated at over NT\$1 billion.