

Predictive Analysis Tool for Energy Distribution Networks

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Abstract. There has been multiple research in the energy distribution sector over the last years because of the significant impact in societies. However, the use of aerial high voltage power lines involves some risks that may be avoided with periodic reviews. The objective of this work is to reduce the number of these reviews to reduce the maintenance cost of power lines. So the work is focused on the periodic review of transmission towers (TT). A virtual organization of agents in conjunction with different artificial intelligence methods and algorithms are proposed in order to reduce the number of TT to be reviewed. The proposed system is able to provide a sample of TT from a set of them, a whole line for example, to be reviewed and to ensure that the set will have similar values without needing to review all the TT. The result is a web application to manage all the review processes and all the TT of a country (Spain in this case). This allows the review companies to use the application either when they initiate a new review process for a whole line or area of TT, or when they want to place an entirely new set of TT, in which case the system would recommend the best place and the best type of structure to use.

1 Introduction

High voltage power lines maintenance is a problem that has generated a variety of research lines [3, 4, 9]. TT supporting that high voltage power lines have to be reviewed on a regular basis depending on their characteristics, specially if they are in urban places. In the reviews it is necessary to measure the ground resistance, the resistance of the TT, and also the step and touch potentials. These reviews are really expensive. However, many of the reviews could be predicted, as most of the TT share the same features and are located on terrain with similar characteristics. Therefore, the possibility of reducing the costs associated to this kind of maintenance is not only attractive, but quite reasonable.

As technology has continued to advance, there have been different approaches that attempt to apply innovations both in the review and the maintenance processes, resulting in a common need to reduce costs. Indeed, this is precisely the reason for having created the proposed predictive maintenance system.

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