REMOTE METER READING OVER POWER DISTRIBUTION LINES.

THESIS PRESENTED

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DECLARATION

The work submitted in this thesis is the result of my own investigations, except where otherwise stated.

It has not already been accepted in substance for any degree, and also is not being concurrently submitted for any other degrees.

Signed
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Delicated to

my loving mother, elder brother

and

teachers

who encouraged me

for my education

ABSTRACT

The thesis presents the development of a simple technique for remote reading of utility meters using the low voltage power distribution network.

Remotely reading electricity, gas and water meters have distinct advantages over traditional metering methods. Several communication technologies have been designed and implemented for this purpose using wireless techniques, telephone lines, power transmission and distribution lines. In this study, the last one has been selected as the basis for the development of a remote meter reading system applicable to Sri Lanka.

Power line communication over low voltage distribution lines is a cost effective method for data transmission. But it is complex due to large number of branches, tapings, transformers, different line configurations etc., that are present in the distribution network. The main task of this research is to develop suitable techniques for transfer of data over this network.

The basic concept of data transmission in this application is the change of voltage and current wave at the supply end and the load end respectively of the power system. A series of current pulses are generated representing the data to be transmitted from the consumer end. Similarly, a series of voltage pulses are generated at the supply end to represent the commands to be sent to the consumer. These current and voltage pulses are superimposed with the line current and the line voltage at the load end and the supply end respectively on the power line signal.

The prototype system presented in this thesis shows simulation as well as experimental results relating to the data transmitter, and the software design for the communication subsystem interfacing the meter to the distribution lines. A series of measurements are also carried out to find a suitable time of the day for the data transmission. Associated problems such as harmonics generated due to the insertion of data and the effects of load changes in the distribution network are also discussed.

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