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Dynamic voice spammers detection using hidden markov model for voice over internet protocol network

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ABSTRACT

Voice over Internet Protocol (VoIP) provides flexible and cost effective services. These services are used by voice spammers to generate unsolicited voice calls. Earlier research declared that the VoIP services are misused for making prank calls, product promotion calls and credit card services. This results in customer dissatisfaction and the financial losses in the bank and telecommunication sectors. Thus, detection of spammers is an essential task to enhance the quality of services in VoIP network. Spammers occur in the form of either human spammer or computer spammer and mimic as the legitimate caller. Voice spammer's states in successive time period are dynamic and dependent, particularly the human voice spammer exhibit high degree of dynamism. This poses challenge for traditional spam detection algorithms. In this paper, a Dynamic Voice Spammer Detection Model (DVSDM) based on the Hidden Markov Model (HMM) is proposed. This model estimates voice spammer's states by using various behaviour variables and detects the voice spammers before reaching the victim. The performance of this detection model is experimentally evaluated with two scenarios (mild and heavy distribution of voice spam calls). The proposed model achieves a False Positive Rate (FPR) of less than 2% and 5 % for heavy and mild distribution of voice spam calls respectively. Moreover, the DVSDM model achieves a True Positive Rate (TPR) of 95% for heavy and 92% for mild distribution of voice spam calls.

Keywords: HMM, VoIP, Voice spammer, Computer spammer, Telemarketer.

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