Natural Language Processing and Psychology in e-Government Services: Evaluation of a Crime Reporting and Interviewing System

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ABSTRACT

Crime statistics from the US Bureau of Justice and the FBI Uniform Crime Report show a gap between reported and unreported crime. For police to effectively prevent and solve crime, they require accurate and complete information about incidents. This article describes the evaluation of a crime reporting and interviewing system that witnesses can use to report crime incidents or suspicious activities anonymously while ensuring the information received is of such quality that police can use it to begin an investigation process. The system emulates the tasks that a police investigator would perform by leveraging natural language processing technology and the interviewing techniques used in the Cognitive Interview. The system incorporates open-source code from the General Architecture for Text Engineering (GATE) program developed by researchers at the University of Sheffield, Web and database technology, and Java-based proprietary code developed by the author. Findings of this evaluation show that the system is capable of producing accurate and complete reports by enhancing witnesses’ memory recall and that its efficacy approximates the efficacy of a human conducting a cognitive interview closer than existing alternatives. The system is introduced as the first computer application of the cognitive interview and proposed as a viable alternative to face-to-face investigative interviews.

Keywords: Cognitive Interview, Computer Interview, Crime Reporting, E-Government, E-Government Services, E-Government Services Design, E-Government Services Evaluation, GATE, Information Extraction

1. INTRODUCTION

Crime statistics from the US Bureau of Justice’s National Crime Victimization Survey (NCVS) and the FBI Uniform Crime Report Program (UCR) show a steady gap between reported and unreported crime from year to year. The NCVS, which collects information from victims of crime, showed that in 2012 only 44 percent of violent victimizations and 54 percent of seri-
ous violent victimizations, including domestic violence, were reported to police (Truman, Langton, & Planty, 2013; FBI, 2012). These percentages do not change significantly from year to year and represent a considerable amount given the number of incidents that occur annually, 8.9 million violent and 19 million property crimes in 2012 alone. Research indicates that the information that witnesses provide to police is the primary determinant to solving crimes (Greenwood & Petersilia, 1975). For police to effectively work on crime prevention and to solve crimes they require accurate and complete information about each incident.

Despite the significance of witness testimonies in solving crimes, the flow of this information from witnesses to police is obstructed by people’s unwillingness to report crimes, police workload and time-constraints, and witnesses’ memory vulnerabilities. Victims and witnesses of crimes fail to inform police for various reasons. These reasons include fear of repercussion, shame or embarrassment, believing the incident is a personal issue, or believing informing police will not make a difference (Kidd & Chayet, 1984; Greenberg & Scott, 2004; Singer, 1988; Thomson & Langley, 2004).

When witnesses are willing to report, police officers rarely have enough time to effectively interview witnesses. Heavy workloads and availability of police officers to respond to incidents promptly coupled with insufficient training further impair police effectiveness (Fisher & Schreiber, 2007; Kebbell & Milne, 1998; Kebell & Wagstaff, 1997). Fisher and Schreiber ascertain that in spite of the scientific progress in the effective use of interviewing techniques in the last twenty years, in practice little change has occurred. In terms of training, little time is given to the study of memory and communication principles and to the practice of interviewing cooperative witnesses. In the field, when frontline police officers face limited resources and need to conduct their time-critical responsibilities when dealing with serious incidents, their interviewing performance is affected negatively (Gabbert, Hope & Fisher, 2008; Hope & Gabbert, 2006). When police officers respond to incidents, they conduct vital and time-critical activities such as providing aid to injured persons, securing the area, preserving evidence, and identifying and interviewing victims and witnesses (Eck 1992; McDewitt, 2005; Womack, 2007; Wroblecki & Hess, 1997). Officers need to conduct all of these activities as soon as possible within a short amount of time. Consequently, officers often resort to poor interviewing practices such as interrupting witnesses’ accounts, insufficient rapport building, one-way communication, and such weak questioning tactics as using scripted, closed questions.

The amount and quality of the information that witnesses could give to police is also affected by witnesses’ cognitive skills and memory vulnerabilities. When people witness an event, they often focus exclusively on facts that are more meaningful to them or on objects and actions that consume their attention. Rarely, witnesses make conscientious efforts to record in their memory every detail they observe. If and when witnesses successfully record event details, their recollection of those details is affected by stress, conversation with others, past experiences, and time (Gudjonsson, 1992; Loftus, 1979, 1996; Ross, Read & Toglia, 1994; Smyth, Collins, Morris & Levy, 1994; Sporer et al.1996; Toglia, Read, Ross & Lindsay, 2007; Yarmey, 1979).

The US Department of Justice through the FBI makes continuous efforts to address crime and crime reporting issues. The UCR program concentrates crime information and calculates statistics using data collected by a large number of US law-enforcement agencies, with coverage of 93 percent of the US population. These statistics serve as evidence to justify the allocation of budgets, prevention programs, and training to enhance law-enforcement administration, operation, and management as needed (FBI, 2008). Another important initiative of the FBI is the Public Leads and Tips (PLT) program. Through this program, the public can volunteer information on suspicious activities or crime incidents using the FBI’s website https://tips.fbi.gov. This website offers convenience
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