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THE SIGNIFICANCE OF THE FORENSIC PHONETICS IN THE VOICE IDENTIFICATION AS AN EFFECTIVE PROTECTION AND SAFETY MEASURE

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Abstract: Communication is a complex process between humans and other species. It involves the act of transferring informations, ideas, opinions, and other facilities through signals and signs (speech, language signs, symbols, etc.). Verbal communication includes written and oral communication. Exact methods in the study of language and text, and an interdisciplinary approach caused the development of the forensic phonetics. It is today, in practice and in research, domain that has reached a significant progress. It is extremely useful in the world in a crime investigation, and provides protection and safety. It is used in criminal investigation, counter-terrorism and surveillance. Countries such as: the United Kingdom, Germany, Holland, Belgium, and America rely much on the forensic linguistics. This paper explores the importance of the forensic phonetics when analysing the criminal investigation. In order to determine the profile of an offender it is essential to pay attention to the forensic phonetics. Unfortunately, the field of the forensic phonetics is not recognized in Bosnia and Herzegovina. That is why this subject is selected.

Keywords: Forensic phonetics, criminal investigation, speech, communication, verbal communication

Introduction: protection and security

Communication is a complex process that involves communicating between people and other living beings by transmitting information, ideas, attitudes, and other content with the help of a signal system or characters (speech, tongues, symbols, etc.). Verbal communication is a type of communication that includes speech and writing, which are crucial for the intent of the perpetrator of the crime, because they ensure a more secure criminal investigation, and thus greater protection of citizens. The primary goal for creating security is to develop security technologies and knowledge that will ensure optimum and more coherent use of technologies. Therefore, exact methods in speech research and the application of an interdisciplinary approach have led to the development of forensic phonetics which has reached significant development in the world today and in the research and research domain. 1. Principle of operability It is necessary to emphasize that legal regulations and professional literature are mostly used by the term "criminal-operative affairs", and it defines it insufficiently and unclearly, where such a term does not define the totality of taking actions and measures of officials within the framework of a continuous and long-lasting process of prevention and the suppression of criminality, which can be called content work, from where the term "criminal-operative work" is performed, or shorter "operative work". After all, this term is generally accepted in police structures and in everyday use.

In the precise definition of the term "operational work", it is necessary to determine those characteristics that are essentially composed by the team that is, that is, identify the compulsory elements that justify it. Mandatory elements of operational work are: 1) objectives (the intended operational measure or action must contain previously set objectives so as not to turn into illogical and unreasonable wandering), 2) planning (as the operational work is extremely complex activity, quality pre-planning is the basis of success , 3) the operational plan (containing the legal basis, objectives, executors, funds, targets, manner of realization, place and time of execution, control mechanisms, etc.); 4) data processing (a large number of information collected by the service is important for its functioning, 5) approvals and approvals (prior approval of the management or approval of the competent authorities for the intended operational activity is the basic prerequisite for the legality and regularity of the work, as well as the protection of officials who perform the action), 6) the legal basis (non-verification or incorrectly established the legal basis of the official work undertaken most often turns it into the incriminated behavior of the official person).

The principle of operability implies knowledge of opportunities and conditions in the domain of criminal behavior in a given area. This means that the operative worker must know well the manifestations of crime in his area, criminal records and objects, convicted persons, persons serving prison sentences, persons who are on conditional release or who have served the sentence of imprisonment, certain persons as potential perpetrators of criminal offenses , etc.

2. The notion of phonetics and branches of phonetics
2.1. The notion of phonetics

Phonetics (from the cry of the word fonetiké) is a linguistic discipline that studies the articulation and acoustical properties of speech and voices, as crucial in communication. According to Knight Rachael Anne (2012), "phonetics is a science that studies the characteristics of voices." (p.15) The subject of phonetics is articulated voices that are produced consciously and with their own will and enable the combination of an infinite number of messages.

2.2. Branches of phonetics

The three basic branches of phonetics are artistic phonetics, acoustic phonetics and perceptual phonetics. Articulation phonetics deals with the study of articulation organs, i.e. description and classification of speech organs and their production in the course of speech, while acoustic phonetics deals with the study of the transmission of sound waves and the way the inner ear receives it (Jongman & Reetz, 2009) Perceptive phonetics deals with the study of how the human brain creates experiencing voice the sounds it receives. (Bulgarian, 2003)

3. Spectrographic analysis of voice

Snapshots of words for analysis need to work in words that are converted by special hardware and software into a graphic view of a computer called a spectrometer. (Borden, Harris & Raphael, 2007) The spectrum is often called a voice tag (Kersta, 1962), which is unique and closely related to the fingerprint on which people can be detected. (Blumstein & Lieberman, 1988) On the other hand, Olsson (2004) argues that the use of the name of a voice capture for a spectrometer is not an appropriate term because "language is a property we learn, and not one we own, in which it differs from the DNA analysis and the impression finger ". (p.32) For the purpose of preparing the voice to be analyzed through the spectrum, the experts prepare a sample of voice at the Court's order, which is later compiled using the spectrum with a recorded voice previously delivered. The suspect reads the text of a universal character, and then repeats the sentences that are dictated to him. If the video is analyzed by a scream, then the respondent is asked to quit, and if it was a whisper, then the respondent will whisper. Spontaneous speech is the last characteristic on the basis of which a criminal can be discovered. The respondent in a state of as much relaxation talks about any topic.

4. Speech characteristics

Characteristics of human voice and speech are elements of speech that characterize every speaker. Speech characteristics that should be considered when identifying speakers include: voice height, intonation, accent / accent, speech speed, speech disorders, psychological state, changed voices, masking and voice quality.

4.1. Voice height

Voice height means decreasing or increasing the voice tone that depends on the fundamental frequency that is the physical parameter. The fundamental frequency is the number of vibrations that

the voices do in one second. "The value of the fundamental frequency is influenced by age, gender, body constitution, social environment, emotions, intellectual status, laryngeal pathology, mental disorders, hearing impairments, neurological and endocrine disorders and general health conditions" (Heđever, 2010, . The difference in the tone of voice is a useful feature in distinguishing between speakers and needs to be analyzed spectral and auditory.

4.2. Intonation

Voice intonation is a perceived variation in the height of the voice that is an excellent indicator of the emotional state of the speaker. When analyzing someone's intonation, it is possible to find out much about the degree of conviction or incompatibility of a particular person.

4.3. Accent / accent

Accen involves emphasizing words with the help of height and volume. If no masking is used, the speaker's accent should be similar in emphasizing the style in the word regardless of the recording. (Heider, 2009)

4.4. Speed of speech

Speech speed is a significant feature of every speaker. A part of the speaker determines a faster speech, while others have a slower pace of speech. It is important to carefully analyze whether a person deliberately tries to pronounce certain words faster for the purpose of concealing information. It is also important to professionally analyze the use of the pause

the speaker uses. It is necessary to distinguish the pause of hesitation, where the speaker considers what he is saying, from too long and too many breaks that the speaker can and intentionally take to conceal certain content. (Gibbon, Hardcastle & Laver, 2010)

4.5. Speech disorders

Irregularities in pronunciation and linguistic expression like stuttering, improper pronunciation of voices, hasty speech and others can be decisive in the discovery of speakers and should be taken into account.

4.6. Psychological condition

There are many psychological reasons that influence speech. Sometimes people are aware of them, and often they have unconsciously adopted systems of thinking. Speech can be influenced by various factors such as hunger, alcohol consumption, taking drugs, and others. Listening can usually reveal psychological effects that affect speech. Such changes are often referred to as fear, nervousness, excessive calm, excitement, and so on. The examiner should be skilled in order to properly determine the emotions they are working on.

4.7. Changes in voice

Voices change refers to the way in which the voice begins (soft and hard start) and the amount of noise in the voice. Ataka voice or hard start is the way a speaker begins speech and one of the characteristics of a particular person's speech. (Heider, 2009)

4.8. Covering (masking)

The deliberate disguise of a handset with a handkerchief or hand can pose difficulties in discovering the speaker. Also deliberate concealment of certain words are the elements on which an examiner should pay attention. It is very important to carefully analyze the characteristics of the masking in the sample and determine whether it is possible to compare with another pattern.

4.9. Voice quality

Each person has a different voice quality and by comparing the votes it is possible to discover similarities and differences between voices, considering that the quality of the voice is affected by laryngeal characteristics (height, accent and intonation), articulation movements and resonance of the oral cavity. (Kapoor & Rizvi, 2010).

A practical example of using forensic phonetics

Forensic phonetics are useful in identifying speakers in a variety of important cases, such as fake phone calls to emergency services, sexual harassment by telephone, telephone hijackers, etc. (Manojlović & Nikolić, 2009) For the first time, the perpetrators were identified in America in 1967 by passing the Standards Relating to Electronic Surveillance, first at the federal level (Shuy, 2007), so that later the local police would begin to carry out secret operations in which a covert investigator and witness associate wore hidden microphones and were involved in interviews with suspected people. (Manojlović & Nikolić-Novaković, 2009)

Since then, this method has been used in a world where many cases have been resolved based on voice analysis. Mia Šešum, a graduated defectologist for blackmail, kidnapping and threats, worked on a blackmail case. With the help of knowledge in the field of phonetics, the criminal was discovered. An incorrect pronunciation of the voice R attempted to hide it. The speaker was aware of his speech pathology he hid so well that he pointed to one skill and special ability that only a small group of people had. Knowing phonetics is very important for identity checking, but not a sufficient way of checking. Additional measures are needed that need to be considered in order to make the final decision. (Šešum, 2009)

Figure 1. Mia Šešum, a graduated defectologist in blackmail, abductions and threats

5. Intoxication and speech

The state of intoxication occurs when excessive intake of normally harmless substances or toxic poisoning. Intoxication is characterized by various effects such as uncontrollable speech, depression, nausea, and the like. During the investigation, experts always check that the suspect was under the deliberate or unintentional influence of alcohol, drugs, or other toxic or intoxicant chemicals during the commission of a particular crime. It is

necessary to pay attention to what and how people speak at those moments. For example. people who are under the influence of alcohol often have a memory deficit, are disoriented in speech, pronounce irregular and unconnected, certain words, repeating words or sentences, making breaks, and the like. They are often characterized by adding unnecessary style or voice to the word. For example. "I did not tear" instead of "I did not take", where the speaker adds an unnecessary voice to the words he took. Another example is often the rejection of unnecessary syllables and words during a break, like, but, but, uh, ah, you know, and the like. For example. the accused can say "I saw myself with (uh, ah) her." Speakers in these situations are characterized by attempts to fight on the face while trying to pronounce certain words or sentences. Their facial expression is filled with grimas, widespread pupils, lips tremors, and the like.

All five aspects of speech production (respiration, phonation, articulation, resonance, and prosody) can be disrupted by the introduction of the inoxics. People under the influence of intoxication are associated with significant changes in speech projection. Prozodija refers to those speech characteristics (words, sentences, and the like), which can not be performed or observed at the segmental level of the phoneme, but at the wider level of the word or sentence. Usually, the prozois is characterized by the following speech characteristics: tempo, rhythm, idle, and color, and they are added to the speech characteristics at suprasegmental level: intonation, volume, and length (their measurable acoustic correlates are fundamental frequency, intensity and

duration). (Bulgarian, 1996, page 89) Neurological disorders caused by injectable or toxic agents can affect these speech-motor aspects in different ways by creating a group of unique symptoms. The group of symptoms partially depends on the influence of the intoxicant on the degree of neurological organization. At certain times, when defending a suspect, lawyers should provide statements of persons if they were under the influence of certain substances. Judges can make decisions about the intensity of poisoning with narcotic substances and their consequences on speech and criminal act. Poisoning intensity is divided into three different degrees: 1) relatively low degree of anxiety, 2) higher levels of anxiety, and 3) extreme degrees of anxiety. A relatively low degree of anxiety can actually result in a speaker being more fluent and more discerning, as he or she consciously compensates for increased stress, and a person can successfully deal with anxiety. Higher degrees of anxiety have an impairing effect on fluency and speech accuracy, because a person can not knowingly eliminate the influence of anxiety on speech. Speaker's speech is not fluent and does not think clearly. An extreme degree of anxiety can cause a person to be incapable of producing comprehensible speech due to severe disruptive factors. It should be kept in mind that all people respond to anxiety differently, but the rule is that higher degrees of anxiety increase dysfunction and reduce accuracy. (Heđever, 2009, page 66)

6. Voice analysis

Heđever (2009) argues that voice analysis can result in one of the seven decisions: a secure identification (90% of comparable words of at least twenty words must be very

similar to aural and spectral), almost secure identification (80% of comparable words of at least fifteen words must (80% of comparable words of at least 10 corresponding words must be very similar to the phonetic and spectral), undefined identification (no conclusions due to different limiting factors), the possible elimination (80% of comparable words must be very similar to the phonetic and spectral) to be different in the auditory and spectral manner, on a sample of no less than words that do not match), almost safe elimination (80% of comparable words on a sample of no less than fifteen words that do not match must be very different hearing and spectral) and elimination 90% of comparable words of at least twenty words that do not match the araja must be very different hearing and spectral).

7. Second opinion

The other opinion can be requested independently of the opinion of the first examiner. The other examiner must express his or her opinion independently without obtaining any information from the first examiner's opinion. If the examiners do not agree, the final opinion is obtained on the basis of a detailed discussion between the two examiners. In case that the decisions of the examiners are not prosecuted, the decision must be an undefined identification. A third opinion may be sought, but the result may be only the lowest level of reliability or the undefined identification of all three testers. (Heđever, 2009) 8. Notes and material storage

The necessary information should include the following: a laboratory, a description of the presented evidence, a description of how to store documentation, a description

and type of tape recorder, bandwidth information, copy process information, signal processing, list of words used for comparison, co-workers in the expert judgment and final decision. (Heđever, 2009) It is necessary to keep the material for at least three years after the end of the test, unless all material has been requested to be returned.

8. Forensic Phonetics Laboratory

Figure 2, Forensic Phonetics Laboratory

The Forensic Phonetics Laboratory must have different audio and video recording, reproducing and editing devices. (Heider, 2009) All equipment must be of extremely professional quality and as advanced technology as possible. The laboratory should be located in as little noise as possible. It should be well illuminated to meet the working conditions.

9. Forensic phonetics in BiH

In the criminal theory and practice in Bosnia and Herzegovina, the area of phonetics unfortunately does not have its own place. There are no professional, academic and specialist studies that would be able to give knowledge and practice in the same field. The lack of specialists in this field presents difficulties in learning about a particular speech. At the time of developing and applying more sophisticated hidden criminal operations, technology and methods, the lack of specialists in this field presents difficulties

in learning how to describe a particular speech. This significantly affects the value of the evidence trying to prove the guilt or innocence of a particular person in criminal proceedings and to maintain security in a particular country. An attempt to build an effective legal system in Bosnia and Herzegovina should result in the desire to punish in every way the perpetrator of a criminal offense, that is, he should be prevented from avoiding criminal prosecution for a committed criminal offense. This certainly includes respect for the rights of persons who are charged with the commission of a particular criminal offense, that they can be used in all achievements of science in order to prove their innocence. Here, the area of phonetics plays a very important role and its place. When introducing modern methods in the fight against crime, it is necessary to pay attention to the field of phonetics, and to hire specialists in this field, which is certainly in the interest of protecting the basic values of the individual, society, state and the international community.

Conclusion

Phonetics is a very important and useful discipline for criminals. As the fingerprint of each person is unique, so is the language of individuals different. Learning the language of a particular person can be of great help in the investigation and interpretation of the evidence, evidence, testimony of witnesses, suspects or defendants, etc.

The speaker can be profiled with information obtained on the basis of accent, dialect, voice height, intonation, speech speed, speech disorder, psychological state, voice change, voice quality, and the like. Based on these characteristics, it is possible to establish important facts such as the origin of the speaker, the degree of security or insecurity, many of the affects and conditions, the psychological distress that man manifests through the language, etc.

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DATA SECURITY IN THE WI-Fi NETWORK IN BH COMPANIES

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Abstract: Data security in computer networks are very actual thematic. Accommodation provided by wireless network causes their spiral expansion. In the other hand easy connection to the medium for transmission of data making this networks much exposed to the attacks. Because of that it is necessary to pay much attention about data security in this networks. During the implementation of wireless networks we must decide how to define security policy and as part of this question we must decide what is equipment and data security method best for selection. In this paper as theoretical base are exposed some basic thesis in information theory. There are named often used standards for wireless networks, and standards IEEE 802. 11x. and IEEE 802.16 are detailed presented. There are discussed mechanism for data protection, and in this frame work detailed analyzed weakness and threats for data security. I elaborated the program to change the MAC address of one of the means of network security. Showing systematic measures to improve data security in wireless computer networks and described in more detail some of the technical measures.

Keywords: Data security, WLAN, Encryption, Companies