# SpeechProtector: A Speech Protection System for Preventing Reporting Bias

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**Abstract.** Freedom of expression is welcomed in democratic nations, but there is no end of cases in which recorded video is processed to report information not intended by the person in the video. For this article, we have developed a prototype system for preventing this sort of bias in reporting. The system is a smartphone application that allows users, who are the subject of news-gathering, to also record the material themselves, post it to a video sharing site, and to display a QR code containing a link to the video. The system enables a link to a video reproducing the original statements to be forcefully embedded in the report video, which should inhibit bias in the reporting as it is presented later.

**Keywords:** Reporting bias, QR code, smartphone, Youtube.

## 1 Introduction

Journalism is a type of expression that uses the media. Journalism and the right to knowledge are based on the right to freedom of expression. On the other hand, journalism must also maintain the principle of objective reporting. In spite of this, in actual reporting, the facts are very often not discussed as-is, but are reconstructed, incorporating the subjective biases of the reporting organization. For recordings of people making statements, the content is often split up or rearranged, contrary to the intentions of the speaker, and this can cause controversy.

The remedy to this is generally said to be that the receiver of the information must acquire media literacy and cultivate the ability to discern the truth of information they receive.

The goal of this research has been to reduce bias in journalistic reports that use statements made by people in presentations, speeches, press conferences or street interviews, even if the statements have been manipulated. This is done through technology that enables receivers of the information to access the speaker's statements as originally intended. This protects the credibility of the speaker in society, and can be expected to tighten global monitoring of bias in reporting.

**Fig. 1.** Being filmed while using SpeechProtector. Note that this QR code is actually readable.

As the first step in this article, we describe development of the smartphone-based SpeechProtector prototype system for preserving reported statements (Figure 1). The system applies particularly to reports involving photographs and video. The user, who is the subject of the report, also records the entire session, posts it to a video sharing site, and forcefully inserts a link in the material used for reporting by displaying a QR code with a time-stamped link to this video during the whole session. The system provides a simple interface for accomplishing this.

Then, in whatever way the gathered video data and statements are modified, the receiver can easily access the original content using a mobile terminal such as an ordinary mobile phone, as long as the QR code remains in the report. If the user is not satisfied with the report, he/she can appeal to society using this link, through Social Networking Services or other personal publishing avenues.

## 2   Related Work

This research can be considered as an application of a type of electronic water-marking. Technologies like [1] , from Mitsubishi Electric, are the latest technologies able to embed and detect copyright information in Hi-Vision video. They are mainly useful when copyright holders want to control distribution of information. In this research, however, the person being recorded does not have the right to edit the material collected, so a way to force insertion of watermark information into the report is needed.

We next describe how this additional data can be embedded visually in the real world. QR codes [2] are a 2D-barcode technology developed by Denso Inc.

(currently Denso Wave Corp.) to overcome some shortcomings of conventional barcodes, with an explicit statement that patent rights will not be exercised. Today, many mobile devices include a function able to read them, and they have spread to the extent that almost everyone with a mobile phone can read them. They are widely used, such as in paper and various urban advertising media, and on packaging to indicate product qualities. A major way in which they are used is to apply a code to physical objects or content, linking to more detailed information. The particular visual characteristics of QR codes make them easily recognizable, which is another characteristic.

## 3   Design and Implementation of SpeechProtector

### 3.1   Problem Analysis and System Design

Behind the problem that reporting can be done contrary to the intentions of the person subject to reporting are facts that it is difficult to refuse information gathering, and there is no control over how the material gathered will eventually be edited and reported. Thus, we introduce a mechanism that allows the person to force his/her intentions to be reflected in the information gathered, and allows the viewer of the report to notice and access this information. The mechanism involves designing three aspects: (1) how can the person force his/her intentions to be reflected in the report, (2) how can the viewer's attention be drawn to them, and (3) how can they be expressed to the viewer?

For (1), sudden requests for news gathering can be accommodated using a system that operates on a smartphone, which can be expected to be carried at all times. The person being photographed can force the 2D barcode to be included in the image of his/her face by holding up an image of the barcode, (Figure 1). This action falls under his/her freedom of expression, and cannot be forbidden by anyone else. As long as the resolution is high-enough, this code will still be valid even if sections of the captured video are edited. Similarly, the code should still be valid when images are posted as still photos on the Net or in paper media.

For (2), QR codes can be used for the 2D barcodes in (1). QR codes have a particular visual form and are used widely in the public, so viewers recognize them easily. They can also be read easily using any mobile device in their possession, conveying the original intentions of the person being photographed.

Finally, (3) can be implemented by configuring the destination of a link in the QR code to a video of the original content, captured by the person themselves. This is because the originally stated content is the most effective and impartial way to critique bias in reporting. Further, adding Social Networking Services and other functions that enable third parties to discuss the critique with the associated video creates a mechanism that will promote interest in reporting bias within society.
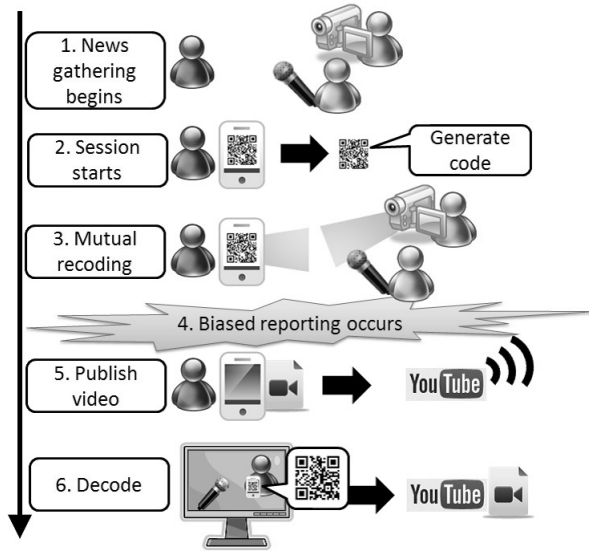
**Fig. 2.** Scenario using SpeechProtector

## 3.2  Implementation

We implemented the prototype SpeechProtector system for inhibiting bias in reporting using a client-server system. The server uses ASP.NET, and the client is implemented as a Windows Phone (smartphone) application. We used YouTube as the base for video hosting and Social Networking Service functions.

**Usage Scenario.** We outline the operation sequence with a hypothetical scenario (Figure 2) below.

(1)The user is conducting his everyday activities, carrying a smartphone, when confronted by a reporter.

(2)The user starts SpeechProtector on the smartphone, initiating a new session. This generates a QR code for the session.

(3)The reporter begins gathering material (filming). The user holds the smartphone near his/her own face while also recording video with SpeechProtector. While recording, the QR code created in (2) is displayed prominently on the smartphone, and the reporter cannot avoid photographing it when filming the user's face.

(4)Later, if the interview is reported according to the user's intentions, there is nothing to do. In such a case, a message indicating that "no corresponding video has been published" is displayed when the QR code is decoded. If not reported according to the user's intentions, he/she has the following means of opposing it.

(5)Simple operations in SpeechProtector will publish the video taken with the smartphone while the reporter was filming on YouTube. When this is done, the destination of the QR code in (2) is automatically configured to link to the video shared on YouTube. The user can then build up criticism of the biased report using comments on YouTube or other venues such as Social Networking Services or Internet bulletin boards.

(6)Later, any ordinary viewer can read the QR code embedded in the biased report using his/her mobile phone, and play the YouTube video of the recorded original statements. Thus the authenticity of the biased report is ascertained and the YouTube comment feature can be used as a starting point for criticism or participation in related discussion.

**Client-Server Communication.** When the server receives notification to start a session from the client, as in 3.2 (2), it generates a session URL, which is unique for each session. It then returns a QR code to the client indicating this URL.

The URL for the YouTube video is sent to the server after the video is published on YouTube in 3.2 (5), and it is configured as the forwarding address of the session URL.

## 4   Conclusion

In this article, we have proposed and prototyped the SpeechProtector system to control information bias in reporting, by helping the person being reported on to make his/her own recording of the news gathering, to post it on a video sharing site, and to force a link to this video into the news material being gathered, in the form of a QR code.

## References

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