Chapter 13
Real-Time Multimedia Policy Analysis of Using Video and Audio Recognition from Radio, TV, and User-Generated Content

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ABSTRACT
Real-Time Multimedia Content Analysis opens up exciting possibilities for accessing opinion-oriented arguments about regulations and dynamic policy changes. In this chapter, the authors present common methodologies and core technologies to analyse multimedia content from a practitioner’s viewpoint, highlighting their primary impact, best practices, current limitations, and future trends. They illustrate the impact of multimedia content analysis within a governance-oriented applied context based on two use cases: one use case addresses the task regarding the improvement of certain KPIs (Key Performance Indicators) for the quality of living in a city by performing real-time analytics of TV news in order to assess public opinion and how it changes over time with respect to certain events or incidents; the second use case addresses search and data exploration within multimedia data to reveal certain correlations across space and time in order to retrieve meaningful information from unstructured sources of data, information which can effectively contribute to meeting the concrete needs of citizens.

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INTRODUCTION
Multimedia and user-generated content are powerful means of conveying information between different stakeholders in a society. From a governance and policy modeling perspective, analysing information between government organizations and the civil society can provide novel ways to promote the democratic role of media, to gauge public perceptions and influences; to provide more effective citizen-centric services and policies; and to close the loop from policy proposal over implementation to assessment of the impact. Real-time Multimedia Content Analysis as a part of Information and Communication Technologies opens up exciting possibilities for accessing opinion-oriented arguments about regulations and dynamic policy changes, and allows a quick reaction to citizen opinions. However, there are several challenges. Multimedia content encompasses vast amounts of data, which are typically unorganized or only weakly structured in terms of space, time and topics. Information needs to be extracted from different sources and formats (text, video, images, sound) and a meaningful interpretation of the content must be accomplished resulting in extracted concepts, entities, relations and emotions. The analysis process and the extracted data – as the technology layer within the communication process between citizen and government – must be presented in a transparent and easy to understand manner for all participants and actors, and must meet legal and ethical requirements. In this chapter we first present common methodologies, core technologies to analyse multimedia content from a practitioner’s viewpoint, highlighting their primary impact, best practices, current limitations and future trends. Given the heterogeneity of information sources from traditional (TV, radio) and new media forms (social media, blogs), the information extraction process involves multiple, often interdisciplinary technology components. We will describe these components (audio segmentation, speaker segmentation, speech-to-text, key-frame and shot cut detection, coverage, text detection, face recognition and identification, video transcoding, semantic processing, video search and visualization) and their relations within an information processing system in a transparent way. In order to emphasize the relevance of multimedia content analysis within a governance-oriented applied context, we will illustrate this on two use cases.

BACKGROUND
Real-time multimedia content analysis, video and audio recognition for radio, TV and user-generated content for governance and policy applications have very important multidisciplinary implications in terms of technological and governmental aspects. In order to develop successful applications, we have to take into consideration the requirements, limitations, current developments and trends from both fields. Due to different viewpoints, research initiatives may not match stakeholders’ interests in every case. On the one side it is a political question, and on the other side mature applications or ideas are missing as to how people/governance can process large amounts of data (multimedia and user content). The question is how to integrate technology and governmental requirements. According to Mohanty & Nayak (2008), Information and Communication Technologies are necessary to improve the efficiency of government organisations; and there is a clear and evolving need for monitoring and analysis for policy life-cycle. Information Technology and governmental processes have a bi-directional influence on each other. On the one hand, technology is capable of shaping electoral mechanisms or political situations: “The Internet and social media in Kenya, which played a central role in this year’s elections by allowing Kenyans to question candidates, took on a new function” (Abshir, 2013). On the other hand, as (Kim, 2011) showed in a Korean use case, policies and regulations have