

Applying Markov Logics for Controlling Abox Abduction

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Abstract

Manually annotating the multimedia documents is a time-consuming and cost-intensive task. In this work, we define a media interpretation agent for automatically generating annotations for multimedia documents. Observations of the agent are given as surface-level information extracted by state-of-the-art media analysis tools. Based on background knowledge the agent interprets observations by computing high-level explanations. Observations and their explanations constitute the annotations of a media document. For this purpose, we investigate an abduction algorithm which computes explanations using a logic-based knowledge representation formalism. Multiple explanations might be possible for certain media content. Since the agent's resources for computing explanations are limited, we need to control the abduction procedure in terms of branching of the computation process and "depth" of computed results, while still producing acceptable annotations. To control the abduction procedure, we employ a first-order probabilistic formalism.

Kurzfassung

Die manuelle Erstellung von Anmerkungen zu Multimedia-Dokumenten ist eine zeit- und kostenintensive Aufgabe. In dieser Arbeit definieren wir einen Agenten zur Medieninterpretation, der automatisch Anmerkungen zu Multimedia-Dokumenten generiert. Die Beobachtungen des Agenten werden durch oberflächliche Informationen gegeben, die mit Hilfe von modernen Medien-Analyse-Werkzeugen extrahiert wurden. Auf der Basis von Hintergrundwissen interpretiert der Agent diese Beobachtungen durch die Herleitung von Erklärungen auf einer höheren Ebene. Beobachtungen und ihre Erklärungen bilden die Anmerkungen zu einem Multimedia-Dokument. Zu diesem Zweck untersuchen wir einen Abduktionsalgorithmus, der Erklärungen durch die Verwendung eines logikbasierten Wissensrepräsentationsformalismus bestimmt. Für bestimmte Medieninhalte können auch mehrere Erklärungen möglich sein. Da dem Agenten zur Bestimmung der Erklärungen nur begrenzte Ressourcen zur Verfügung stehen, müssen wir die Abduktionsprozedur in Bezug auf die Verzweigung des Rechenverfahrens und Tiefe der berechneten Ergebnisse beschränken, wobei immer noch akzeptable Anmerkungen generiert werden sollen. Um die Abduktionsprozedur zu beschränken, benutzen wir einen probabilistischen Formalismus erster Ordnung.



To my dear parents

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