

From text to scheme: Problems in identifying arguments from expert opinion

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Abstract

We show how to solve common problems in identifying arguments from expert opinion, illustrated by five examples selected from *The Economist*. Our method started by intuitively identifying many appeals to alleged experts in *The Economist* and comparing them to the argumentation scheme for argument from expert opinion. This approach led us to (i) extending the existing list of possible faults committed when arguments from expert opinion are performed and (ii) proposing the extension of the list of linguistic cues that would allow analysts to identify arguments from expert opinion. Our ultimate aim is to help argument identification by argument mining connect better with techniques of argument analysis and evaluation.

Keywords

argumentation – argumentation schemes – argument mining – defining expertise – expert systems

1 Introduction

We have to rely on arguments from expert opinions in many different settings and situations for different purposes. We can't always evaluate them in exactly the same way, but there is a common thread running through how we need to evaluate such arguments. One type of situation is where we are reading a written text of discourse such as document on the Internet in which an argument from expert opinion is used to support a claim. In this type of case, the only data we have is the text of the argumentation in which the claim was made. The name of some person may be given as the expert who said something used in the argument supporting the claim, but in such cases, it is not normally possible to communicate directly with the expert and ask them questions, such as what they meant by certain terms or what their qualifications are. A first step that is vitally helpful in trying to evaluate such an argument is to identify it as a commonly used type of argument, such as an argument from expert opinion. Identification of types of arguments is in turn vitally important for argument mining, using software, often assisted by human coders, to search through a text of natural language discourse containing argumentation to identify occurrences of individual arguments. Argument mining is a field of corpus-based discourse analysis that has the goals of automatically identifying argumentation structures in discourse (Peldszus & Stede, 2013; Budzyska et al, 2014; Lippi & Toroni, 2016; Lawrence & Reed, 2016;

Duthie, Lawrence et al., 2016). The aim is to use argumentation schemes to identify types of arguments in a text and identify them as arguments by specifying the premises, the conclusion, and the inference link joining the premises to the conclusion. Argument mining tools have been applied to natural language texts such as legal documents, on-line debates, transcripts of political debates, citizen dialogues, mediation, product reviews, academic literature, newspaper articles, and court cases. Recently, a crucial goal of argument mining is not only to explore inferential structures that are typically associated with argumentation schemes, but also to automatically extract these structures as they appear in their broader natural communication setting, namely in dialogue. One of the key questions is how dialogues create arguments, i.e. how argumentative (inferential) structures are generated from dialogical moves (Reed & Budzynska, 2011; Budzynska et al 2014).

Pragmatics covers language in use, and therefore argumentation may be seen as a subfield within it. As this paper will show, identifying and analysing appeal to expert opinion as a type of argument that needs to take into account the context in which a given argument was supposedly used (Walton, 2006). The proposed method of identifying arguments from expert opinion is in line with some works in pragmatics that link the discussion of some specific types of language dependent on a given domain such as media and interpersonal communication in particular countries (e.g. Shi-Xu & Kienpointner, 2001; Santibáñez & Hample, 2015). The main similarity between these approaches and our account is the bottom-up direction of inquiry: studying pragmatic features of particular types of discourse allows analysts to formulate models applicable in further analyses. Each of the analysed problematic examples of arguments from expert opinion analysed in this paper allows us to make a progress in developing our method. Moreover, proposing a future development of the link between this research and some recent developments in argument mining by proposing to elaborate a method of identifying arguments from expert opinion by means of linguistic markers (see section 5) helps to emphasize this bottom-up approach to everyday arguments which is the core of argument mining techniques.

The primary argumentation tools used to identify and evaluate arguments, such as arguments from expert opinion, are the argumentation schemes showing the inferential structure of this type of argument along with the set of critical questions matching the scheme, and the method of argument diagramming (Reed, Walton & Macagno, 2007; Freeman, 2011). In order to properly qualify a piece of a text as an argument from expert opinion, the real example of an argument is confronted with must meet certain requirements of the scheme. Otherwise it does not fit the scheme, and cannot properly be classified as an argument from expert opinion. Thus, there is a range of different kinds of cases that need to be dealt with when evaluating arguments from expert opinion. Some examples are short sequences of text, such as a part of an article in a magazine, newspaper, or posted on a social media site, that makes a quick appeal to expert opinion to support a claim that the article is advancing as a thesis. Because there is not much data to take into account as evidence, the evaluation of the argument here often needs to be brief and hypothetical in nature, depending on how the claim and the argument supporting it are interpreted, and how these two things are related to each other. Here the argumentation scheme is the main tool for the evaluation, used in conjunction with tools for extracting the meaning of the claim or argument put forward in everyday natural language discourse.

As teachers of logic courses are aware, judging whether an argument in a given natural language text fits an argumentation scheme is a sophisticated task that students and instructors in informal logic courses have problems with (Walton, 2011). In this paper our aim will be to build a method that can be used to help identify arguments from expert opinion in problematic cases.

We use five examples found in articles in *The Economist* that we use to illustrate how (1) the scheme needs to be applied to real examples, (2) the critical questions for it need to be taken into account, and (3) problems that arise from trying to apply the scheme to such examples. We begin in part two by introducing two argumentation schemes that are directly or indirectly related to expert opinion: the argumentation scheme for argument from expert opinion and the argumentation scheme for argument from position to know. In part three we analyse four problem cases where indications are given in the text that the argument is meant to be an argument from expert opinion. In part four we proceed to a more in-depth analysis of a fifth example to show in more detail how the method developed in the remaining parts of the paper needs to work. Our ultimate aims in the paper are to build resources useful for solving problems illustrated by the examples and thereby to show how to move ahead with building a better method for fitting schemes to real examples of natural language arguments.

2 Two argumentation schemes

The most basic version of the argumentation scheme for argument from expert opinion is given in (Walton, Reed & Macagno, 2008: 310) as follows.

Major Premise: Source *E* is an expert in subject domain *S* containing proposition *A*.

Minor Premise: *E* asserts that proposition *A* is true (false).

Conclusion: *A* is true (false).

An argument from expert opinion needs to be evaluated by the asking of the following six basic critical questions (Walton, Reed & Macagno, 2008: 310).

Expertise Question: How credible is *E* as an expert source?

Field Question: Is *E* an expert in the field *F* that *A* is in?

Opinion Question: What did *E* assert that implies *A*?

Trustworthiness Question: Is *E* personally reliable as a source?

Consistency Question: Is *A* consistent with what other experts assert?

Backup Evidence Question: Is *E*'s assertion based on evidence?

If a respondent asks any one of the six critical questions, the original argument defaults unless the question is answered adequately. Once a question has been asked and answered adequately, the burden of proof shifts back to the questioner to ask another question or accept the argument.

The argumentation scheme for argument from position to know is given in (Walton, Reed and Macagno, 2008: 310) as follows.

Major Premise: Source *a* is in position to know about things in a certain subject domain *S* containing proposition *A*.

Minor Premise: *a* asserts that *A* is true (false).

Conclusion: *A* is true (false).

There are three critical questions attached to the scheme for argument from position to know.

CQ1: Is *a* in position to know whether *A* is true (false)?

CQ2: Is *a* an honest (trustworthy, reliable) source?

CQ3: Did *a* assert that *A* is true (false)?

A problem is that it is hard to know which scheme should be applied to a given real-life example because the concept of an expert has not been defined in a precise and adequate enough way that we can tell whether given argument really is an argument from expert opinion. Argument from expert opinion is a species of argument from position to know. But not all arguments from position to know are arguments from expert opinion.

Suppose you have arrived in a city you are not familiar with in order to attend a conference and that you are near the university where the conference is to be held. Suppose you have a map, but are struggling to find where the university is in relation to your present location. You go into a nearby shop and asked the proprietor where the university is located. He takes the map and shows you the route you need to follow. The proprietor of the shop, we can reasonably assume, lives in this city, and hence is in a position to know about locations in the city and routes you need to take to get from one location to another. But he is not an expert on the subject, in the way that an urban planner might be, or a geographer specializing in cities in this country. In such a case it seems reasonable to think that following the advice given by the shopkeeper is not based on the form of argument called argument from expert opinion, but rather on a closely related type of argument called argument from position to know. But to deal with borderline cases, we need criteria that enable us to identify who is an expert, based on at least some kind of minimal definition of who or what is an expert.

3 Four problematic examples

We chose *The Economist* as a source of examples of the kind we are interested in analysing, because, by its nature this periodical is a good source for arguments from expert opinion. It very often reports on information derived from expert sources, frequently experts in economics and related disciplines, as well as experts from many scientific fields. Here we present and discuss four examples that are interesting because they appear to be problematic, or at least worthy of discussion, in relation to the topic of this paper.

The mapping device we will be using is the Online Visualisation of Arguments (OVA) tool developed by the ARG-tech Centre for Argument Technology. OVA is an open source software and is available at <http://ova.arg-tech.org/>. The OVA+ version of the software allows analysts to annotate not only inferential structures, but also transitions in a dialogue and illocutionary connections such as *Asserting*, *Agreeing*, *Disagreeing*, *Arguing*, etc. (Janier et al., 2014), however, given that our task in this paper is a basic reconstruction of premise-conclusion structures that are possibly related to using expert opinions, we will be using the basic version of the software, OVA. The reason for employing this tool is that it allows us to show four key elements of arguments that are crucially relevant for this study, namely (i) the support relation between sentences, the particular instance of which is argument from expert opinion and (ii) the conflict relation between sentences. For the reasons discussed in section 4 (devoted to the extended treatment of the Horsey Example) our last case will be mapped using the Carneades Argumentation System (CAS).

An article in *The Economist* ("Myanmar's Ethnic Conflicts: More Process than Peace", Feb, 21, 2015, 39-40) about attempts of the government in Myanmar to reach peace agreements with rebel groups contains two arguments that look like they are arguments from expert opinion.

This example poses some interesting problems about how to identify arguments from expert opinion by applying the argumentation scheme for argument from expert opinion to real examples. The article describes several obstacles for the two sides in the conflict to reach agreement and have a lasting peace, and concludes that despite the attempts of both sides to reach agreement, there are reasons to be sceptical about the prospect of achieving a lasting peace. The part of the text containing one of these examples is quoted from *The Economist* (Feb, 21, 2015, 40).

A longtime Myanmar expert, Bertil Linter, says that government and rebel armies have “fundamentally different ideas” about what kind of country theirs should be. Both sides pay lip-service to the notion of some kind of federal union. But the ethnic armies want maximal devolved power, whereas the central government wants the opposite—after all, holding on tight to the country for fear that things might fall apart was the rationale for the Burmese army’s long dictatorship. At present Myanmar’s peace process offers a whole lot of process, and not enough lasting peace.

The first sentence contains two linguistic cues that are helpful in identifying an argument from expert opinion: ‘expert’ and ‘says that...’. On the basis of the first sentence we may state that there are two explicit premises supporting an implicit conclusion. This structure is represented in Figure 1 as follows:

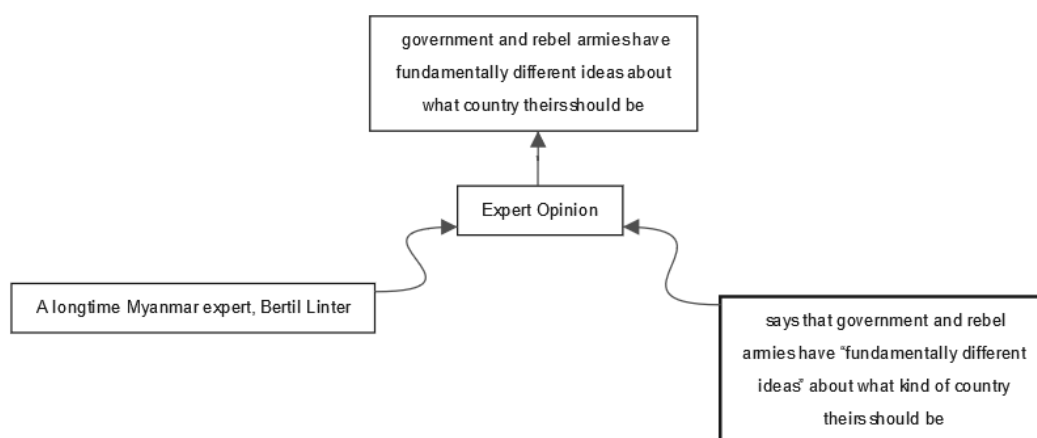


Figure 1 *Argument from expert opinion in the Linter example*

The next question is how the sentences that follow the identified argument from expert opinion are related to it. Note that the sentences “But the ethnic armies want maximal devolved power, whereas the central government wants the opposite” consists of two arguments supporting the claim that government and rebel armies have fundamentally different ideas. As these two premises jointly support the conclusion, we may reconstruct this structure as a linked sub-argument in Figure 2:

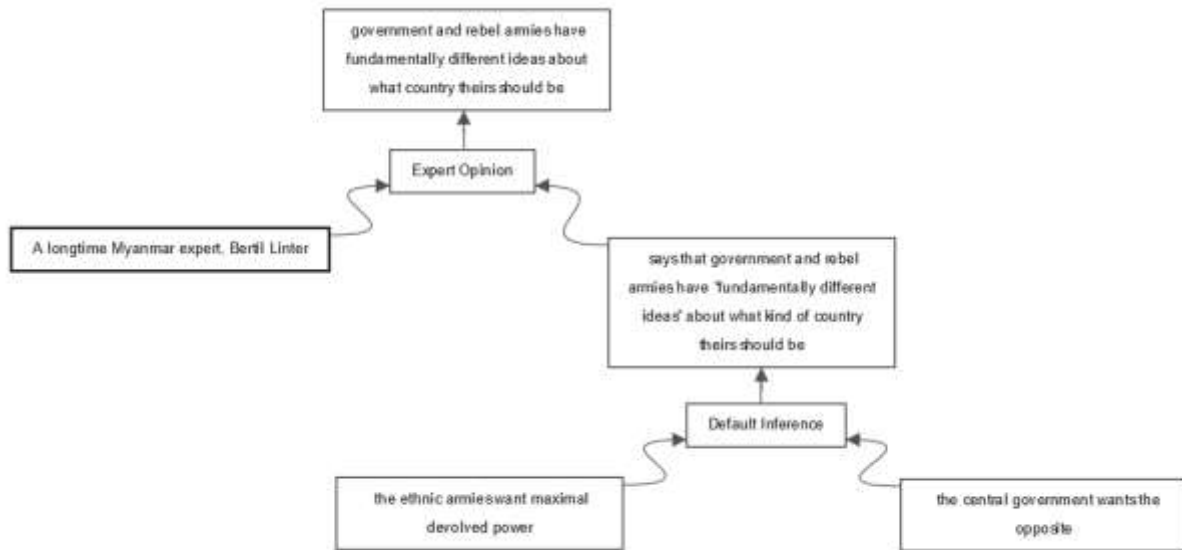


Figure 2 Adding a linked sub-argument to the Linter example

This structure shows that the procedure of identifying arguments from expert opinion is not limited only to detecting components of the ‘argument from expert opinion’ argumentation scheme.

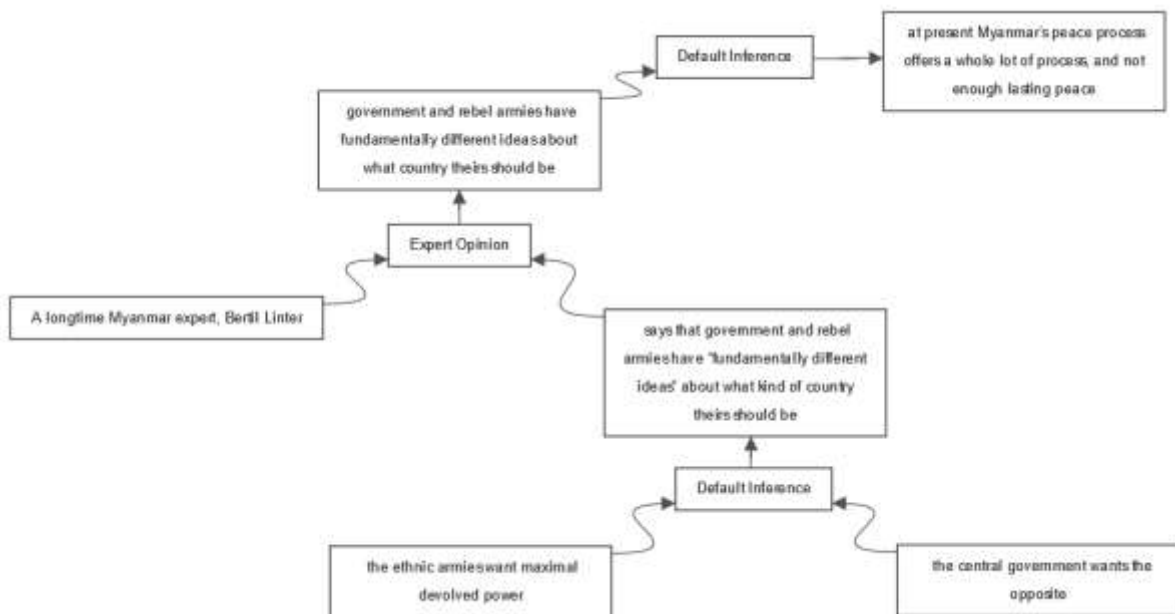


Figure 3 Adding the main conclusion to the Linter example

Having identified the linked sub-argument we may further ask the question of whether there are some other elements of the argument that have not been mapped yet. The last sentence of the analysed excerpt (“at present Myanmar’s peace process offers a whole lot of process, and not enough lasting peace”) may be interpreted as a main conclusion of the whole argument.

According to this interpretation, the fundamentally different ideas held by each side of the Myanmar conflict are the reason why the peace process is unsuccessful. This means that the main conclusion can be added to the argument structure in Figure 3: Once the reconstruction of the whole argument has been done, the next step is to evaluate the argument by noticing that Mr. Linter is called an expert, suggesting that an argument from expert opinion is being put forward, but no indication is given of his field of expertise. We are given no idea whether he is called an expert because he has some practical expertise based on his familiarity with the situation or because he has some qualifications as an expert who has specialized knowledge about Myanmar. All we are told is that he is a longtime Myanmar expert. We are not told, one way or the other, whether he has some specific credentials or qualifications showing that he has expert knowledge of the current political situation in Myanmar or whether he has practical familiarity with the situation because he is a longtime resident of the country.

In this case, the term ‘expert’ is used to support the line of argumentation in the article citing obstacles to lasting peace in Myanmar, but there is insufficient evidence given in the text to support the assumption that Mr. Linter can properly be qualified as an expert by giving some indication of the kind of knowledge he is supposed to possess about the current political situation in Myanmar. In order to apply the argumentation scheme for argument from expert opinion, the domain of expertise of the individual claimed to be an expert must be specified. So we are left hanging on whether this particular argument fits the scheme or not. One of the critical questions attached to this scheme is what field the expert has expertise in. So the argument from expert opinion in this case is a very weak one until this question can be answered. Indeed, it is questionable whether it is even an argument from expert opinion in the sense defined by the scheme for this type of argument.

In the second example, an article in *The Economist* (Lost in the Splinternet, November 5, 2016, 51), quoted some persons taken to be experts on the Internet. The article argued that the growing maze of barriers on the Internet is having negative consequences, not only on economies but also on freedom of speech. In two instances, the article attributes opinions to think-tanks. One is Internet & Jurisdiction, a think-tank based in Paris. The other is the European Center for International Political Economy. In one part of the article, quoted below, it attributes opinions to so-called Internet experts, but does not name any of them specifically.

Internet experts distinguish between governance “of” the internet (all of the underlying technical rules that make it tick) and regulation “on” the internet (how it is used and by whom). The former has produced a collection of “multi-stakeholder” organisations, the best-known of which are ICANN, which oversees the internet’s address system, and the Internet Engineering Task Force, which comes up with technical standards.

In this instance, the quoted text attributes a subtle distinction to Internet experts, but it does not give the names of individual experts, nor does it say what fields these experts have expertise in. This is a problem for trying to analyse the text quoted above by fitting it to the argumentation scheme for argument from expert opinion. Even though the term ‘expert’ is used in a way that suggests an argument from expert opinion is being put forward, unless more of the appropriate details are given, the analyst is not in a good position to evaluate the text using the scheme. On the other hand, the text does link the claim made about the distinction to two organizations that are likely composed of individuals with claims to expertise. Also, it is not entirely clear that the quoted text is putting forward an argument. It could be held that the text is an attempt to give an

explanation of how certain terms are used by those who are engaged in discussions about technical issues relating to Internet governance.

If there is a case of which the analyst is not sure where exactly the alleged fault is located in the argument structure, the possible solution might be to make a working assumption that the problematic example contains an argument from expert opinion and aim at representing its structure using a diagramming method. For the internet experts example such an attempt is shown in Figure 4:

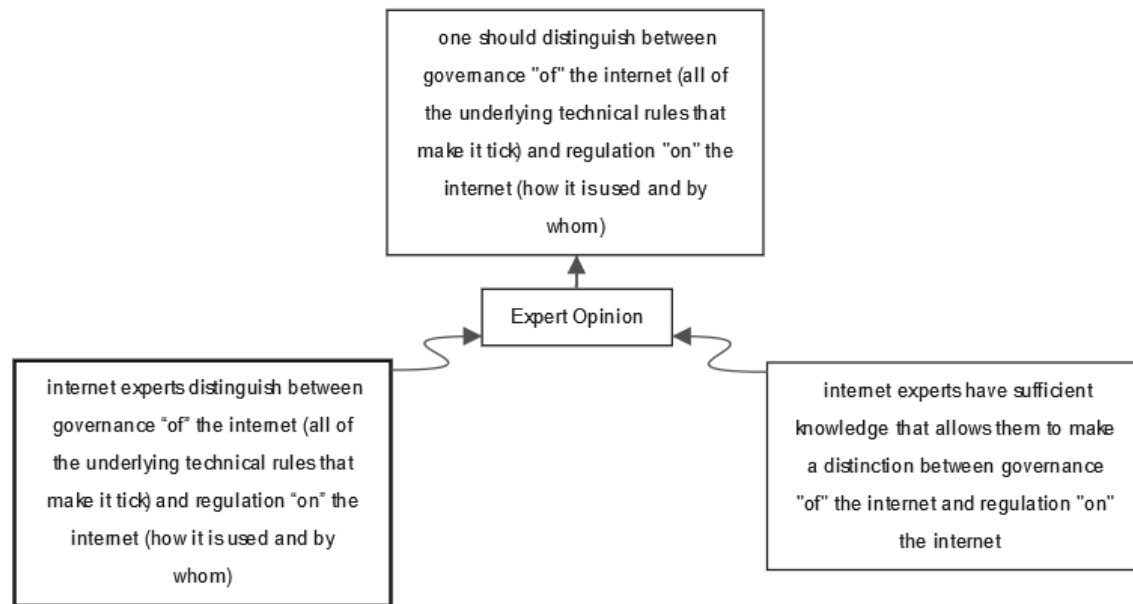


Figure 4 *Representing the internet experts example as an argument from expert opinion*

As the reference to the internet experts is enigmatic, the fault made in this example is clear. However, for the sake of showing the method of identifying it as a particular element of an argument structure, let us focus on its key feature, namely on the fact that this type of arguments from expert opinion is a linked argument. This means that premises do not support the conclusion independently, but jointly. This means that it is sufficient to rebut one of its premises to reject the whole argument. In this case, as it has been discussed above, the criticism is directed towards the phrase ‘independent experts’. Even if the analyst accepts the first premise that some internet experts distinguish between governance *of* the internet and regulation *on* the internet, we do not know who those experts are and what their experience and exact field of expertise is. Hence, we are not entitled to accept the second (unexpressed) premise saying that internet experts have sufficient knowledge about issues being discussed. Hence we may identify the problem with interpreting this argument as argument from expert opinion. In other words, the structure of this argument is designed as if it was a legitimate argument from expert opinion, but it is not due to the character of the second premise. This is basically how the argument diagramming method works together with the knowledge of the scheme ‘argument from expert opinion’ in identifying the problem.

In order to discuss the above problem in greater detail, let us refer to the method of criticizing arguments from expert opinion as proposed by Walton (2008: 218-219). There is a list

of five detailed questions that may help the analyst to establish whether one can be reasonably called an expert in a particular field. These questions are:

1. What degrees, professional qualifications, or certifications by licensing agencies does this person hold?
2. Can testimony and evaluations of colleagues or other experts be given to support his status?
3. Does the expert cited have a record of experience in the field or particular technique being discussed?
4. What is this individual's previous record of predictions or successful accomplishments in this field of expertise?
5. Can evidence be given of publications or other projects that have been evaluated, refereed or reviewed by other authorities?

When applying these questions to the internet experts example the analyst may treat them as steps of a more detailed criticism concerning the unexpressed premise of this argument. If none of these questions can be answered – as it is in the case of internet experts – the argument cannot be classified as a legitimate argument from expert opinion. Hence, this method of identifying a problem with identifying arguments from expert opinion consists of two steps. First, the analyst should define which of the components of the argument is the weakest. If the premise about expertise is such a weak point, the second step consists of asking these five detailed questions that point to conditions a genuine expert would have to fulfil. So it might be inappropriate to say that the argument in this case commits the *ad verecundiam* fallacy because no experts are named to back up the appeal to expert opinion. Making a claim about a distinction said to be accepted by so-called Internet experts does pose problems with trying to apply the argumentation scheme for argument from expert opinion. No expert is named, for one thing. For another, it is far from clear who should be included in this category.

In the third example, an article about states that have passed laws requiring prospective voters to show state-issued identification at the polls (*The Economist*, November 19, 2016, 23), cited the opinion of an individual claimed to be an expert on voting rights.

Liz Kennedy, a voting-rights expert at the Centre for American Progress, a think-tank, says Oregon's law has the potential to be "absolutely transformative". She advocates expanding the programme, perhaps by automatically registering voters when they use social services. Such citizens tend to vote less often than wealthier ones. "We want people to feel invited into our democratic system of government," Ms. Kennedy says.

This example, as quoted above, presents a problem for properly identifying an appeal to expert opinion. Figure 5 allows the analyst to point to the particular element of this argument's structure which is subjected to this critique. There are two elements of this structure are the subject-matter of criticizing the alleged argument from expert opinion: the explicit premise "Liz Kennedy (is a) voting-rights expert at the Centre for American Progress, a think-tank", and the unexpressed premise "voting-rights is a field of expertise". The content of these two premises may be criticized by saying that there is no scientific or academic single field of expertise on voting rights. So when we try to apply the scheme for argument from expert opinion to the text of this example, there is no way to fill in the information on what field Liz Kennedy is supposed to be an expert in. Given the fact that an appeal to the genuine expertize is lacking in this example, a

reference to a think-tank may be interpreted as a fallacious replacement of an argument from expert opinion. According to this interpretation, the author is using the fact that the ‘expert’ is employed by a think-tank as a reason why that person should be considered an expert.

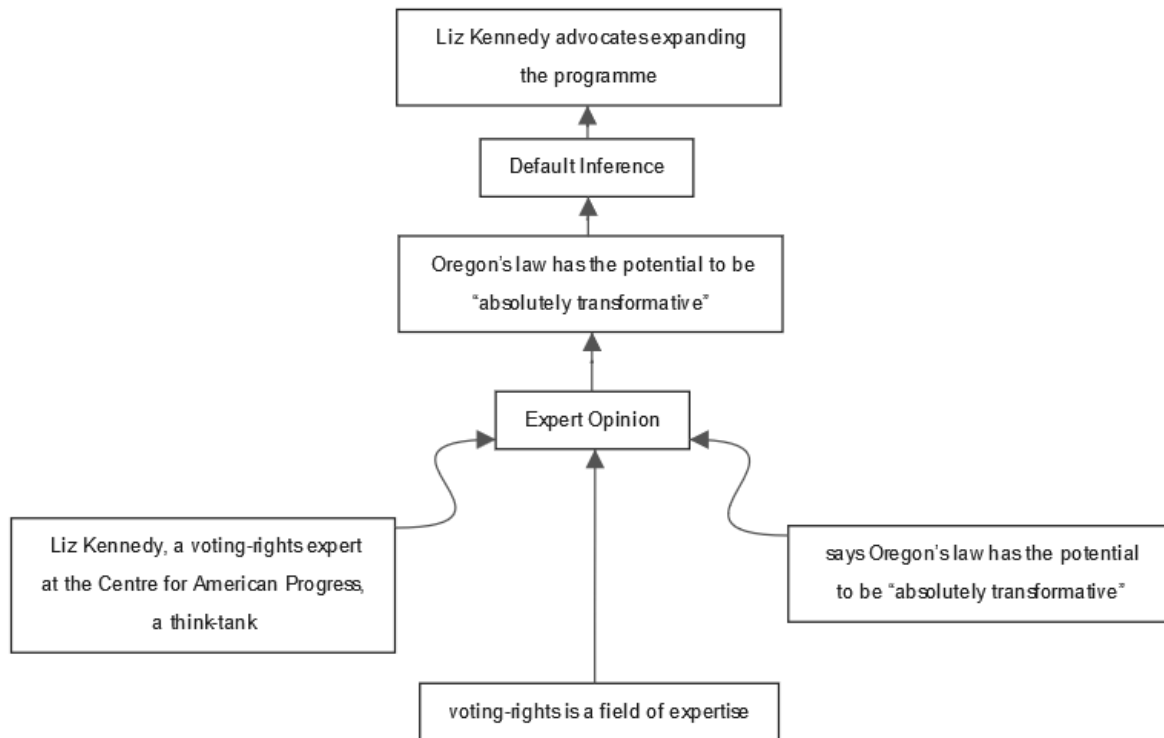


Figure 5 Representing the voting-rights example as an argument from expert opinion

A reference to a think-tank is also made in the fourth example (*The Economist*, Hamilton’s Heirs: Deporting Undocumented Migrants, December 10, 2016, 31) is about illegal immigrants.

Since winning the election, Mr. Trump has said he will focus on illegal immigrants with criminal records—not unlike President Obama, whose administration has deported more people than any other president’s. He has also made some sympathetic noises about those who arrived in the country as children. In an interview on “60 Minutes”, a television programme, Mr. Trump estimated the number of criminal immigrants to be between 2m and 3m. The Migration Policy Institute, a think-tank, says it is closer to 820,000.

In this example, the economist attributed a claim about the number of criminal immigrants to Mr. Trump, and then attributed a very different figure to a named think-tank. Here the text as an example of pitting one source against another. One source is Mr. Trump while the conflicting claim on the other side is that of a think-tank. The interesting question here is whether belonging to a think-tank means that the member is an expert of some sort, or can be taken to be an expert source. As will be shown in what follows, there are some difficulties with interpreting the reference to the Migration Policy Institute as an argument from expert opinion. However, the problem of identifying arguments from expert opinion in natural language texts requires at least

making an attempt at reconstructing such problematic examples in terms of an argument from expert opinion. Figure 6 represents such an attempt.

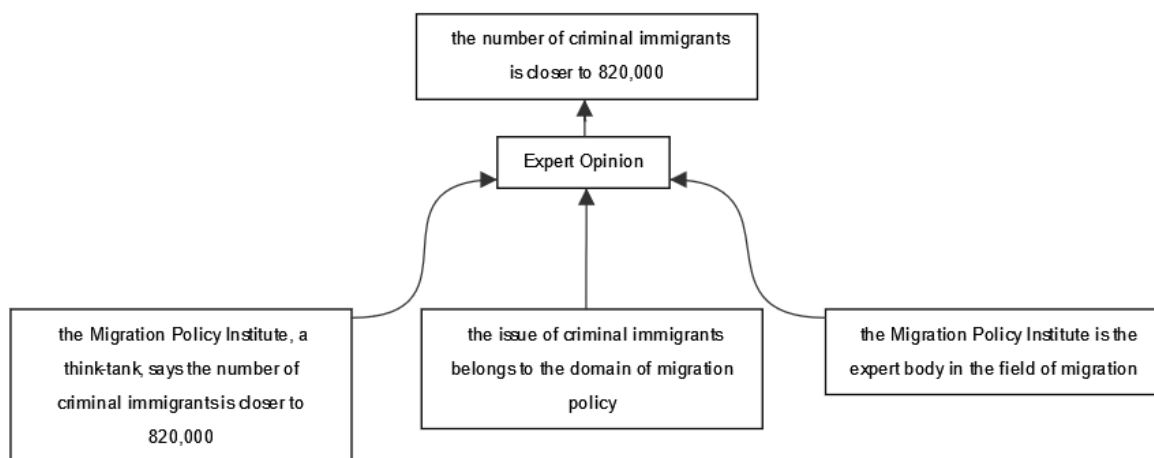


Figure 6 Referring to the Migration Policy Institute as an argument from expert opinion

As the diagram shows, the full reconstruction of this argument requires making plain three unexpressed elements: one conclusion and two premises. The unexpressed conclusion is “the number of criminal immigrants is closer to 820,000”. It is supported by *The Economist*’s claim about the Migration Policy Institute together with two unexpressed premises, the first of which holds that the discussed issue is in the field of migration policy; and the second – that the Migration Policy Institute serves as an expert body in this particular field.

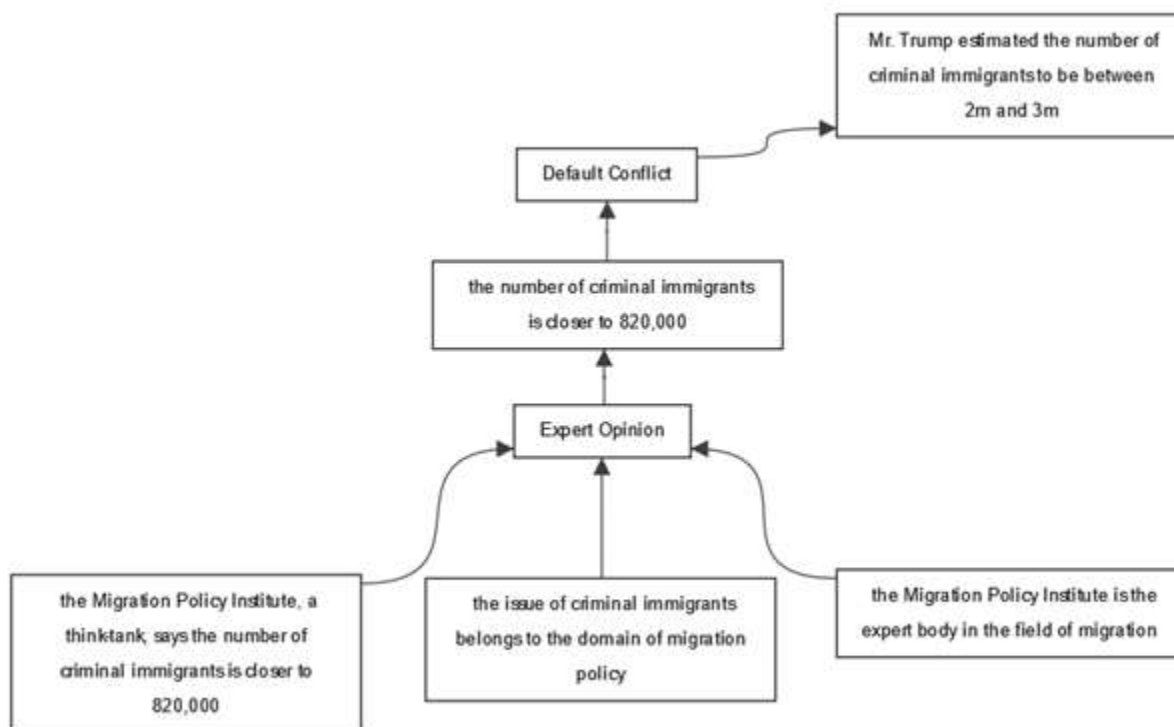


Figure 7 *Argument from expert opinion as an attack on the opponent*

Having answered the question of how the reference to the migration institute can be represented in terms of an argument from expert opinion, the next issue concerns the relation between the claim that the number of criminal immigrants is closer to 820,000 and Trump's claim that this number is between two and three million. The conflict between these two claims allows us to show, in Figure 7, that the whole argument from expert opinion (as represented above in Figure 6) is employed to attack Trump's statement. Figure 7 shows how the conflict relation allows us to show the broader context of using arguments from expert opinion.

Note that in this case there is no name given for an individual in the think-tank who made the claim the number of criminal immigrants is closer to 820,000. But, in contrast to the reference to the think-tank in the third example above, because an exact number is given, the claim sounds fairly authoritative. So, there are really two problems here. First, we have what looks like an argument based on an appeal to expert opinion, but no name of a specific expert making the claim is given. The second problem is how arguments based on claims coming from a think-tank should be taken into account and evaluated as arguments from expert opinion. A think-tank is presumably composed of individuals at least some of whom are experts, but we still don't know whether the individual who was the source of the claim was an expert or not. At least the think-tank was named, so the possibility is there of searching for it on the Internet. Cases like this one pose a special problem. A think-tank is a research or policy institute that carries out both research and advocacy on a broad array of topics that can include topics such as social policy, economics and political strategy. Think-tanks are funded by governments or advocacy groups, or even by private businesses. They sometimes have a political agenda and so it could be unwise to take it for granted that they are always impartial.

Figure 7 *Argument from expert opinion as an attack on the opponent*

4 Extended treatment of a fifth example

The fifth example (*The Economist*, Myanmar's Ethnic Conflicts: More Process than Peace, Feb, 21, 2015, 40), which appears in the same article as the first one, is even more difficult to pin down with sufficient precision to tell whether the text fits the scheme. In describing the current situation in Myanmar, the article claims that any agreement between the government and rebels would involve large redistributions from wealthy to poor regions, which would prove politically unpopular, and that this would be a problem for reaching some peace agreement in the future. At this point the article cites an opinion attributed to an expert who claims that the particulars of the situation makes this the best time for the ethnic armies to seek a deal (text quoted below).

Quite whether the looming election helps or harms the pursuit of peace is unclear. Some think that it gives the government and the ethnic armies more incentive to strike a deal. Any agreement should involve a hefty redistribution from relatively wealthy areas to poorer regions. That would prove politically unpopular in the country's majority-Burman heartland. It is unlikely that the next government will have the clout of this military-dominated one overcome such resistance. That, says Richard Horsey, a Myanmar analyst, makes this the best time for the ethnic armies to seek a deal.

In this example, the key word 'expert' is not used, but Mr. Horsey is described as a Myanmar analyst, suggesting that he has some sort of experience or skill in analysing the political situation

in Myanmar. Thus in this case, it is even more open to speculation what kind of qualifications or practical experience Mr. Horsey might have, and hence here it is also questionable whether the argument should be properly classified as an argument from expert opinion. If it is taken as an argument from expert opinion, then we have to add the implicit premise that if Mr. Horsey is a Myanmar analyst then he is an expert on the current political situation in Myanmar. But this assumption is dubious, because there is no evidence given to support it in the text. The fact that Mr. Horsey is described as a Myanmar analyst, suggests that he has been put forward as some sort of expert, but no information is given about his field of expertise or any academic or professional credentials. Since he is described as an analyst, presumably he has had some knowledge about Myanmar. But whether any of these presumptions are applicable cannot be definitively inferred from what is stated in the text.

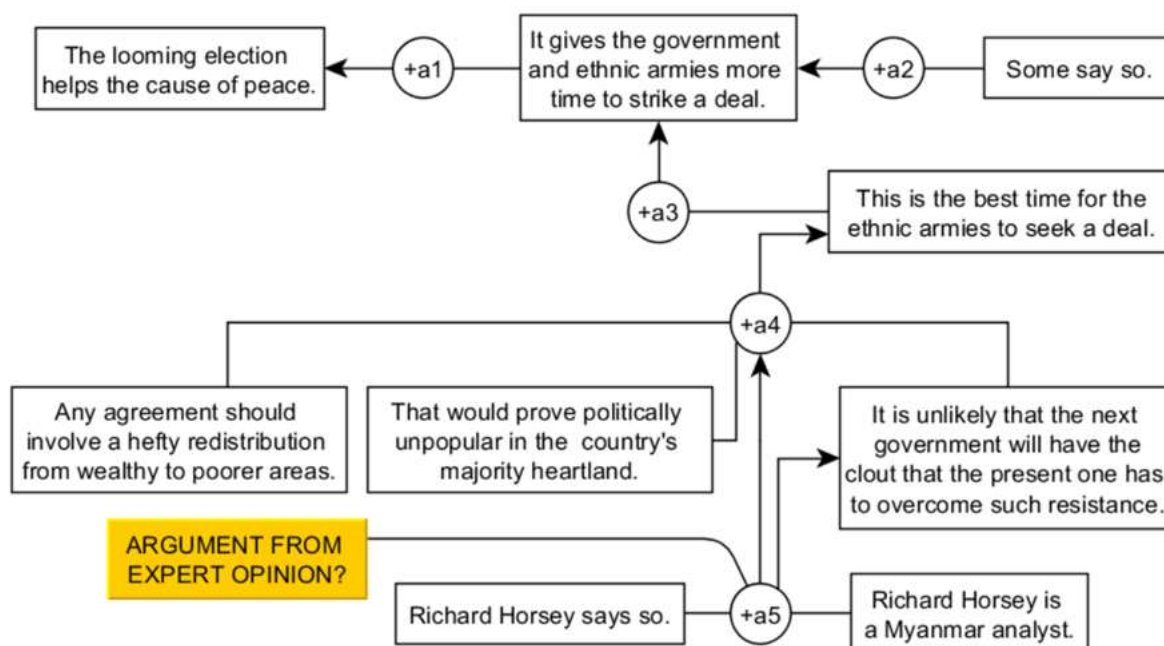


Figure 8 *An argument map of the Horsey example*

The problem can be expressed more perspicuously by building an argument map showing how the key argument in question fits in with the argumentation surrounding it in the text of the case. This argument map, as shown in Figure 8, illustrates the difficulties involved in not only identifying a particular argument in a real text as an instance of the scheme for argument from expert opinion, but also the problems of trying to figure out how such an argument is connected with other arguments it is supposed to support according to the text of discourse.

The ultimate conclusion of this part of the text is taken to be the proposition at the top left stating that the looming election helps the cause of peace. There are five pro arguments given to support this proposition labelled as a1,...,a5 in the argument nodes. The round nodes represent arguments and the rectangular nodes represent propositions that are premises or conclusions in the sequence of argumentation. Argument a2 is very weak, and there is no indication that it is meant to be taken as an argument from expert opinion, so we made no further comment on it. Argument a4 is a linked argument containing three premises that go together to support the conclusion that this is

the best time for the ethnic armies to seek a deal. Argument a5 is the one that poses the problem of whether it should be classified as an instance of argument from expert opinion or not.

The first problem with a5 is similar to the problem with the previous example. It may be expressed with the question: should this argument be properly classified as being an argument from expert opinion or not? This question is legitimate because of the fact that no field of expertise for Mr. Horsey is specified. In this case however, the word expert is not explicitly used in the text, so there is even less of a basis for classifying it as an argument from expert opinion. However, since one of the premises is that Richard Horsey is a Myanmar analyst, the suggestion is being made that is being an analyst of the country offers some sort of basis for saying that there are grounds for qualifying him as an expert. A solution to the problem is to refrain from classifying the argument as an argument from expert opinion, and instead classify it as an instance of argument from position to know. This would mean that the argument needs to be treated differently. When the argument comes to be tested, instead of having to answer the critical questions for the expert opinion scheme, the proponent only has to answer the less stringent critical questions for the argument from position to know. In that case it does not have to be asked what his field of expertise is or what his qualifications are. However, the danger remains that an uncritical reader may presume that the argument is an argument from expert opinion.

The second problem with interpreting the argument arises from uncertainty about what the word 'that' refers to in the last sentence: "That, says Richard Horsey, a Myanmar analyst, makes this the best time for the ethnic armies to seek a deal". Does it refer to the proposition beginning "It is unlikely that the last government...", or the whole argument a3, including all three of its premises? Using the normal argument diagram of the kind familiar to most readers, single arguments, linked arguments or convergent arguments representing separate lines of support are used as arrows to join some propositions to others. But in some variants, it is possible for one argument to support another argument. The notion of entanglement is central to the ArguMed argument diagramming technology based on the DefLog system (Verheij, 2003), a formal argumentation system for artificial intelligence applications. Other systems, such as the Carneades Argumentation System (Gordon, 2010) also have this capability. Hence, the reason why Carneades has been used to analyse this example is not only to illustrate how another argument diagramming system might apply to the problem in the Richard Horsey example, but also to illustrate this idea of one argument supporting or attacking the inferential link in another argument, as opposed to attacking the conclusion of the argument or attacking one of the premises.

In this instance, there is some uncertainty in interpreting the text to tell whether argument a5 is to support a proposition or another argument. It could be taken to support the proposition that it is unlikely that the next government will have the clout that the present one has to overcome such resistance. Hence in the diagram there is an arrow going from a5 to the rectangle containing this proposition. But there is also another interpretation that is possible, shown on the diagram where argument a5 is taken as supporting argument a4. A system that does have entanglement must find some other way of mapping the argument. One way would be to simply delete the arrow from a5 to a4. Another way would be to retain the arrow from node a5 to the rightmost premise of a4 but add another from a5 to the middle premise, and still another one from a5 to the leftmost premise. These problems of how to represent the structure of argumentation containing an argument using an argument diagram are typical of the task of argument analysis as applied to arguments used in natural language texts.

In these two instances, arguments from expert opinion are put forward in which the expert is named. That is very important, especially given the possibility of doing a search on the Internet to find out more about the background and qualifications of the person cited as an expert. But just giving a name, in the absence of other information, is not enough to see whether or how the argumentation scheme for argument from expert opinion fits the real example, if other information is missing.

5 Possible perspectives for argument mining

Argument mining is an automatic processing of large natural language datasets to recover inferential structures. As one of the research strands in argument mining is to combine automatic extraction of arguments with the knowledge of particular argumentation schemes, we suggest that our analyses of problematic cases of arguments from expert opinion might be employed in proposing a future inquiry into developing methods for mining arguments from expert opinion. In what follows, we emphasise those current strands of developing argument mining techniques that might be useful for making this proposal.

Lawrence and Reed (2015) have implemented a supervised machine learning approach to argument mining based on the argumentation schemes identified in (Walton, Reed & Macagno, 2008). This approach works by identifying the premises and conclusions of an argument and by determining how these components work together. Their procedure works by identifying the individual components of the scheme, and uses these components to identify the scheme from a list of the propositions contained within a text. Lawrence and Reed also propose a new line of inquiry aimed at combining the argumentation scheme technique for argument mining with two other argument mining techniques, namely the discourse indicators technique and the topical similarity technique. The mutual relation between these three methods within the proposed argument mining system is set up in the following way: firstly, if discourse indicators are present, then they are assumed to be a correct indication of a connection; next, scheme instances are being identified the component parts of the argument are being connected in accordance with the particular scheme structure; finally, topic similarity is being used to connect any propositions that have previously been left out of the already identified structure (Lawrence & Reed, 2015: 133). The classification was performed with a naïve Bayes classifier using the *scikit-learn* Python module for machine learning enabling the identification of such features as each word, a proposition, each pair of successive words, and the parts of speech contained in the proposition (Lawrence & Reed, 2015: 131). In the case of the scheme for argument from expert opinion, the three features identified were the field of expertise, the statement of knowledge assertion by the expert, and the so-called knowledge proposition, representing the claim made in the conclusion. The key words for field expertise were ‘expert’, ‘experienced’ and ‘skilled’. The key word for knowledge assertion was ‘said’. The key words for the knowledge position were ‘to be’. By identifying these components, they were able to identify the presence of a particular scheme from a list of the proposition contained within the text with a high rate of success comparable to previous argument mining work.

In the spirit of combining the argumentation scheme approach with computational linguistic methods (Koszowy & Budzynska, 2017) have proposed a similar method of identifying arguments from expert opinion based on linguistic cues. This method takes as its basis the method for studying ethotic structures i.e. those dialogue moves that either support or attack speaker’s credibility. This method consists of two stages. At the first stage, data

repositories have been searched the using basic, most intuitive keywords for a given ethotic support or attack. The repository being searched for that purpose consisted of Hansard transcripts¹ of British parliamentary debates. For the purpose of the discussed research, the intuitive keywords related to accusations of inconsistency (such as ‘inconsistent’, ‘inconsistency’, ‘not consistent’) have been employed at the first stage (Koszowy & Budzyńska, 2016: 41). At the second stage context-dependent keywords related to the specific style of British Parliamentary speeches (such as the word ‘backbencher’) have been used (see pages 41-45).

There are at least six possible tasks for the future inquiry aimed at combining current tools for identifying arguments from expert opinion with most recent research strands in argument mining. The first task is to employ methods of mining *ethos* from political debates (Duthie et al., 2016; Koszowy & Budzyńska, 2016) as a starting point for identifying arguments from authority from data repositories such as Hansard and the US Presidential Elections. As in the case of using linguistic cues in mining ethotic structures (Koszowy & Budzyńska, 2016), two stages may be proposed for this new line of inquiry. First, a set of the most intuitive keywords for identifying arguments from expert opinion may be employed. Among those keywords there are ‘authority’, ‘expert’, and ‘expertise’. Next, this list could be extended by adding linguistic cues that have been proposed by Lawrence and Reed (2015), namely ‘experienced’ and ‘skilled’. The second stage would consist in employing non-intuitive context-dependent markers characteristic for a particular debate, by means of which speakers refer to experts, but without using direct cues such as ‘expert’ or ‘expertise’. For instance, the last name of the expert frequently cited in the debate could function as such a linguistic cue. The Horsey example suggests that for the certain types of texts, the word ‘analyst’ could also be a useful keyword.

Once such a general method for mining arguments from expert opinion is established, the second task would be splitting the list of linguistic cues into major sub-lists. This task could be helpful for mining particular types of arguments from expert opinion and authority. For instance, the distinction between arguments from epistemic authority based on the knowledge of the facts and arguments from deontic or administrative authority about what should be done (see, e.g. Walton & Koszowy, 2017) could be applied for determining two subset of linguistic cues: those for epistemic and those for deontic components of arguments from expert opinion.

The third related task would be to make an inquiry into the specific types of discourse or debates in order to build a list of non-intuitive, subject-related keywords. This task could lead to finding characteristics of various types of discourse and showing how the list of subject-related cues changes depending on the type of data repository the analyst is taking into account.

The fourth, more general task would consist in showing how some particular problems with identifying arguments from expert opinion – as discussed in this paper – could be helpful in extending or modifying the above three tasks.

The fifth line of future inquiry is related to the most recent version of the OVA software, namely OVA+. It allows the analyst to express dialogical and inferential structures described by the Inference Anchoring Theory (IAT, see Budzyńska & Reed, 2011). The OVA+ argument mapping software allows the analyst to link locutions constituting sequences of moves in the dialogue with propositional contents of the locutions by means of illocutionary forces (such as *Asserting*, *Arguing*, *Agreeing*, *Disagreeing*, etc.) taken from the speech act theory (e.g. Austin, 1962; Searle, 1969). Hence IAT allows an OVA+ map to express three types of structures:

1

The Hansard transcripts are available at <http://hansard.millbanksystems.com/>.

dialogical moves (locutions), inferential structures (described in terms of argumentation schemes) and illocutionary forces that link the two previously described structures. In order to extend the repertoire of devices that could be helpful in exploring the complex communication phenomena related to arguments from expert opinion, the possible line of future inquiry could be to represent our examples using OVA+ maps. For instance, this argument mapping software can be helpful in indicating particular dialogue moves that generate a conflict between two competing expert opinions or enriching the analyses such as those presented in figure 7 by showing how a conflict between the conclusion of an argument from expert opinion and the other party's claim is anchored in a particular dialogue transition.

6 Practical experience is included

An expert is an agent that is a source of knowledge in a particular field or domain of knowledge that can rightly be taken to make claims or offer advice that have more evidential weight behind them than the same claim or advice that would be offered by an agent that is not an expert. Such a non-expert may be taken to only have only the average level of knowledge in this domain of an agent with no special training or experience. It should also be noted that there are kinds of expertise where the skill is more practical than theoretical, often described knowing how to do something, as opposed to knowing that a proposition is true or not in an academic domain. But the two are frequently combined, as in the expertise of a surgeon. In the U.S., under the Federal Rule of Evidence 702, an expert witness must be qualified on the topic of testimony. In determining whether someone is qualified, the Rule requires that the person must have specialized education, training, or practical experience in the subject matter relating to the case.

This brings us back to the Horsey example, where Mr. Horsey was said to be a Myanmar analyst. Could it be claimed or assumed that Mr. Horsey is an expert on the basis that as a Myanmar analyst he would have practical experience on the current political situation in Myanmar whether he has some sort of academic credentials entitling him to be an expert or not? This is a possibility, but note that the scheme for argument from expert opinion being an expert in some subject domain, and in some versions of the scheme the word 'field' is used in place of the word 'domain'. Indeed in the version of the scheme for argument from expert opinion and matching critical questions quoted in section 2 from Walton, Reed & Macagno (2008: 310), the term 'domain' used in the scheme switched to 'field' in the so-called field question. This observation points to an unsettled issue that needs to be clarified before it can successfully be applied to examples like the one at issue.

7 Expert systems

There is one special field of expertise that we can draw on in trying to define the concept of expertise that would be useful in solving our problems of how to identify legitimate arguments from expert opinion. This is the field of artificial intelligence, which includes the technology of expert systems, an area that can give us insight into how to define what an expert is. In artificial intelligence an *expert system* is a computer program that emulates the expertise of a human expert in a specific domain of knowledge. Expert systems constitute a relatively old technology dating from the 1970's but one that influenced many subsequent forms of AI software. An expert system is built from two basic components: (1) a set of propositions usually called 'facts' in a domain, (2) an inference engine that can be applied to the facts to derive conclusions from them

as new facts. Rule-based expert systems use rules that take the form of conditional propositions linked to single (atomic) propositions in *modus ponens* steps so the two kinds of components can be put together in a chaining and branching sequence. The resulting graph of the sequence of reasoning is typically displayed as an argument diagram of the kind used in informal logic. The distinction between forward and backward chaining is important for expert systems. A forward chain of reasoning forming an argument moves from facts and rules to an ultimate conclusion. A backward chain of reasoning forming an argument moves from the ultimate conclusion to exhibit the facts and rules it was based on.

Expert systems were the first knowledge-based systems. In an expert system, the knowledge base is simply the set of facts in the system. Expert systems were used for specific tasks, such as assisting the physician to arrive at a medical diagnosis, and this kind of system only needed to furnish a specific answer. However, as artificial intelligence evolved, it required more sophisticated kind of knowledge bases in which the knowledge had to be analysed and reused by multiple users, and had to contain information about procedures, reusable designs, and other kinds of data that are made up of more than merely a set of facts. But even a relatively simple expert system must have more than just a knowledge base containing the facts (or other data) and the inference engine. In order to answer questions, and present explanations when asked for them, an expert system needs to have a *user interface*, a dialogue structure enabling the system and the user to ask and answer questions. The interface must have the capability of enabling keeping track of what has transpired in the dialogue up to a given point. At any given point, even the fact that some particular proposition has been asked about by the user can be added to the system's knowledge base as a fact.

But we would extend this notion of an expert even further. In addition to having the capability to carry out reasoning from some propositions already contained in its knowledge base so that it can add other propositions to its knowledge base, an expert must also be able to communicate its reasoning to another agent who asks it a question. This capability requires that when asked for an explanation of something by a questioner who is not an expert, or even by another expert, the original expert must have the capability to offer an explanation. Another capability that the expert must have is to be able to explain the evidential reasoning that is used to support its opinion, when its opinion is questioned. This capability to retrieve evidence from within its field of knowledge to support an opinion it has put forward is a fundamental requirement for something to be an expert.

8 Conclusions

We have shown how cases of employing expert opinions in specialised periodical articles can be interpreted as instances of arguments from expert opinion, and how our proposed method may be a starting point for mining this type of arguments from dialogue. This method requires an expert to not only have a knowledge base, as an expert system does, but also communicate with non-experts asking critical questions. We could sum up all these requirements of what it takes to be an expert by breaking them down into two main categories. The first one is that to be an expert, an agent or system must have a knowledge base containing a set of propositions, sometimes called the facts, and the capability of drawing inferences from those facts, called the inference engine in artificial intelligence. The second category is that the expert must be able to communicate both with non-experts in its domain of knowledge and also with other experts in that domain. This requires not only an expert system but also a dialogue interface with two kinds of users,

experts and non-experts. This category is dialectical. Any attempt to define who or what is an expert needs to recognize that both categories need to be taken into account.

The main problem related to the future task of mining arguments from expert opinion is that there are borderline cases of several kinds. One kind of case is one where the textual evidence is not decisive to indicate whether the given argument is an instance of argument from expert opinion or is an instance of some other related but recognize type of argument, such as argument from position to know, or argument from witness testimony.

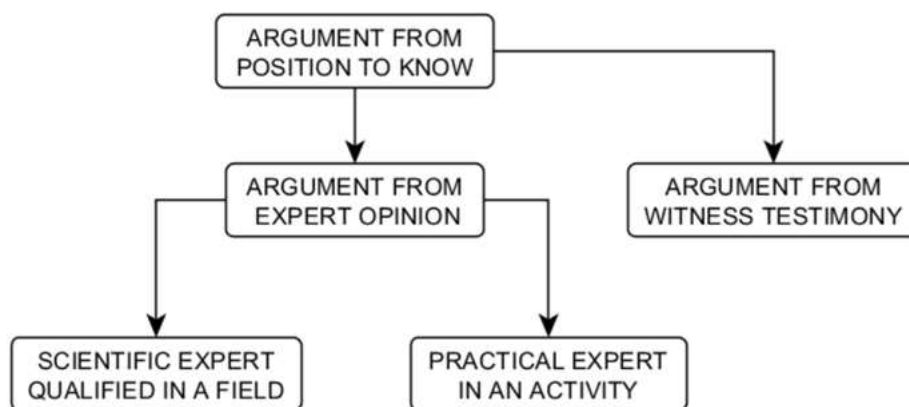


Figure 9 *Closely related cluster of arguments*

As Figure 9 indicates, argument from expert opinion is classified as a species of argument from position to know, and has two main subtypes, one where the expert is a scientific expert qualified in some academic or scientific field. The other subtype is that of the practical expert in a domain requiring skill, but that does not have recognition as an academic or scientific field. Of course, it is to be expected that some scientific experts have related practical skills, while practical experts without academic qualifications can possess a lot of scientific knowledge about their domain of activity. But what is especially important to notice that there can be other kinds of arguments closely related to arguments from expert opinion, but that cannot be classified as a species of arguments from expert opinion.

If certain requirements are missing, or have not been correctly stated, the argument cannot qualify as a genuine argument from expert opinion until these gaps are filled. But even once the argument has been interpreted or reformulated as one that fits the requirements, it still may not be a strong argument unless its premises are supported by evidence, and unless it can stand up to some criticism. It is the critical questions that point the entryway into the kinds of criticisms that generally need to be considered at the most elementary level. Asking a critical question shifts a burden of proof onto the proponent of the argument from expert opinion to give a relevant response to the criticism. But once the given critical question has been answered appropriately by the proponent of the argument from expert opinion, the burden of proof shifts back to the respondent, the party who asked the critical question, to either accept the argument from expert opinion or go on to ask other questions or pose relevant counterarguments. In this way the dialogue can be continued between the two parties, so that there is a sequence of arguments and counterarguments going back and forth from the one side to the other. In such a case, the argument from expert opinion needs to be evaluated by weighing the pro arguments against the con arguments using a standard of proof. But before we can switch to the evaluation

stage, we must first confirm that the argument does indeed match the known scheme for argument from expert opinion. Identifying the critical questions can also be helpful for carrying out this task.

Another kind of case is one where the textual evidence is not decisive to indicate whether the given argument is an argument from expert opinion or whether it is simply an unknown type of argument that does not match any other known argumentation scheme. An approach to these problems is to instruct the coders to label types of arguments using a tripartite system of categories: (1) the argument fits the scheme, (2) the argument fits some other scheme, perhaps a closely related one, or (3) the argument fits no known scheme. As examples discussed in this paper indicate, the instances taken from *The Economist*, due to their problematic character, may fall under category (2) or (3) as they are not clear instances of arguments from expert opinion. But the additional difficulty with analysing these quite typical uses of expert opinions is that they may be fairly interpreted as no arguments at all. For instance, referring to Bertil Linter (see figures 1-3 in section 3) may be just interpreted as mentioning what an expert has said in order to inform the audience about the Myanmar conflict with no intention of making an argument. As in the paper we have shown how such instances may be interpreted as arguments, we are aware of the fact that this alternative interpretation might be taken into account.

Moreover, there is a particular problem that is visible in the scheme for argument from expert opinion and the set of matching critical questions as formulated in (Reed, Walton & Macagno, 2008) that needs to be solved. The major premise in the scheme refers to subject domain *S* containing proposition *A*, but the field question asks whether *E* is an expert in the field *F* that *A* is in. This is an inconsistency. Is an expert an expert in a particular field, or merely in what is called a subject domain? For example, language is a subject domain whereas linguistics is a particular field. It would be much easier to tell whether someone is an expert in linguistics as opposed to trying to figure out whether they are an expert on language. The latter class is much wider. For example, a language teacher or a person who speaks many languages could be called a person who is an expert on language, but such a person might not be qualified to be an expert in the field of linguistics. To fit the latter category a person would need to have some academic qualifications.

The Horsey example combines these problems. It is typical case where we are not given enough information to tell whether (1) Mr. Horsey is an expert in some scientific or academic discipline, (2) whether he is somebody who has practical knowledge about the situation in Myanmar because he must have had some kind of training as an analyst, or (3) whether he is merely in a position to know about current politics in Myanmar. This is a borderline case where there is not enough information to definitively pin down an identification of the argument as fitting the scheme for argument from expert opinion. The term 'expert' is not used, suggesting that on a balance of interpretation might be better to qualify the argument as one fitting the scheme for argument from position to know, but not fitting the more specific scheme for argument from expert opinion. There are two methods that can be combined to deal with this problem. One is to seek for further evidence by examining the context, that is, the rest of the text in the case in which a single argument was embedded. For example, if a critic has asked critical questions, these critical questions might match the critical questions attached to a particular argumentation scheme. This kind of evidence can be very useful for making a decision on a borderline case. The second method is to look for evidence external to the given text. If the expert has been named in the example text, it might easily be possible to look up that name on the Internet including some term indicating the field of expertise. For example, we could look on

the Internet to try to find information about Mr. Horsey that might tell us more about whether he should be qualified as an expert or not. This could provide an answer to the appropriate critical questions of whether he is an expert, his field of expertise, his qualifications and so forth. But on the data available in the text of the example as given, all we need to do is to treat this example as an interesting borderline case.

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