Exercises PT3 (Defeasible Arguments)

With Solutions

Issue 1: *Starter*

Answer the following questions:

(a) What is the difference between defeasible and deductive reasoning?

(b) In which contexts do you think that defeasible arguments have the upper hand over deductive arguments?

(c) What could be a reason that we nevertheless aim at deductively valid arguments in this lecture instead of any other form of arguments?

Sketch of a Solution 1:

(a) The core difference is that successful deductive reasoning is truth-preserving, while defeasible reasoning is not, i.e. whenever all the premises of an argument are true, the conclusion *must* be true, too, if it is a deductive argument, while it can be the case that the conclusion is false if it is a defeasible argument. Defeasible arguments can have defeaters that can make the conclusion false, even if all premises are true. This cannot happen with deductive arguments.

(b) Oftentimes, a certain connection only holds most of the time, but not always. This is the case, e.g., for everything that involves generics, for pro tanto reasons, for situations where you can only use statistical correlations for inferring (like it is the case with medical diagnostics systems), and for many more. In this case, defeasible arguments are much more natural and *seem* to be easier to handle.

(c) Nevertheless, defeasible arguments are a lot harder to handle than deductive arguments when push comes to shove. If you want to know whether a defeasible argument holds, you have to check whether

- all premises are true,
- the inference works, meaning that there actually is a high enough conditional probability that the conclusion holds given the premises, and
- that there is no defeater.

All of these things are hard to check and often need thorough empirical evaluation. Also, "defeasible forceful" is vague, which means that sometimes you will not be able to judge whether the argument is defeasibly forceful or not. So, even though defeasible arguments look easier and more intuitive on first glance, they actually are harder to handle than deductive arguments in many respects.

The only thing that usually is really hard when checking the soundness of a deductive argument is checking the truth of the premises. Deductive validity is usually a lot clearer and a lot easier to check than defeasible forcefulness. So, with defeasible arguments we only have one 'messy' aspect, and that's the truth of the premises. We often can check one premise at a time and work our way down the list instead of juggling many balls at once as it is the case with defeasible arguments.

If we manage to convert a defeasible into a deductive argument, we might get rid of some unclarities, and even if we do not, we still have an argument in the end that is (i) a lot easier to handle in many respects, that (ii) makes the unclearness that surrounds it a lot more transparent, and (iii) that bundles all unclear aspects at one point, namely in the premises and not in the structure of the argument. All those three points are very important reasons why one should prefer deductive over defeasible arguments in almost all instances.

Issue 2: ***Conversion from Defeasible to Deductive Arguments***

You can always transform a non-deductive into a deductive argument. For this, you will often need to modify the conclusion, change the structure and add premises. Think of ways to convert

(a) inductive into deductive arguments.

(b) abductive into deductive arguments.

(c) analogies into deductive arguments.

(d) general deductive arguments into deductive arguments.

Hint: It might be helpful to write down a general form of each of the forms of arguments first.

Sketch of a Solution 2:

(a) The general form of an inductive argument is:

Argument: General form of inductive arguments

P1:	All instances of X known to us so far have property P.
P2:	We have seen many instances of X.
C:	Probably, all instances of X have property P.

This can be translated to:

Argument: 'Deductivized' form of inductive arguments

P1:	All instances of X known to us so far have property P.
P2:	We have seen many instances of X.
P3:	If all instances of X known to us so far have property P and we have seen many instances of X, then it is probable that all instances of X have property P.
C:	Therefore, it is probable that all instances of X have property P.

(b) abductive into deductive arguments.

Argument: General form of abductive arguments

P1:	We made observation O_1
P2:	We made observation O_2
	$\vdots$
Pn:	We made observation O_n.
C:	The best explanation is e.

This can be translated to:

Argument: 'Deductivized' form of abductive arguments

P1:	We made observation O_1
P2:	We made observation O_2
	$\vdots$
Pn:	We made observation O_n.
P(n+1):	If we made observations $O_1, O_2, \ldots, O_n$, then the best explanation for our observations is e.
C:	Therefore, the best explanation for our observations is e.

(c) abductive into deductive arguments.

Argument: General form of analogies

P1:	X has property P.
P2:	X and Y are similar in relevant aspects.
P3:	P and R are similar in relevant aspects.
C:	Y has property R.

This can be translated to:

Argument: 'Deductivized' form of analogies

P1:	X has property P.
P2:	X and Y are similar in relevant aspects.
P3:	P and R are similar in relevant aspects.
P4:	If X has property P, and X and Y are similar in relevant aspects, and P and R are similar in relevant aspects, then Y (probably) has property R.
C:	Therefore, Y (probably) has property R.

(The "probably" is set in brackets here, because sometimes people do not intend analogies to convey a probable relation, but a certain relation. Nevertheless, the default is to count analogies as defeasible argument.)

(d) abductive into deductive arguments.

Argument: General form of general defeasible arguments

P1:	p_1
P2:	p_2
	$\vdots$
Pn:	p_n
C:	c

This can be translated to:

Argument: 'Deductivized' form of general defeasible arguments

P1:	p_1
P2:	p_2
	$\vdots$
Pn:	p_n
P(n+1):	If $p_1, p_2, \ldots, p_n$, then probably c.
C:	Therefore, probably c.

Issue 3: *Analogies*

In video you saw the following analogies from a newspaper article by Patrick Lin[1]

> "...robots aren't merely replacing human drivers, just as human drivers in the first automobiles weren't simply replacing horses: The impact of automating transportation will change society in radical ways, and ethics can help guide it."

What is flawed with this analogy?

Sketch of a Solution 3:

Human drivers never replaced horses. It is more like engines replaced horses. Also, in the time of horses, humans were in charge of steering the carriage, and so are human drivers in cars. This would change with autonomous cars. Also (though this is not a very charitable reading of the analogy), it can be objected that there will not be a robot driver who replaces human drivers, but the autonomous car just takes care of the driving.

Issue 4: *Reconstruction*

(This issue is a modification of an exercise in Bowell/Kemp (2015).)

Reconstruct the following commentary from a sports report once as three separate arguments and once as one argument. Explain which way is more forceful and why.

> The athlete is probably not going to win another Olympic medal in the long distance. He is now older than any previous winner of a medal. He hasn't got any racing experience this year, and his training has been inadequate lately because of a knee injury.

[1] "The Ethics of Autononmous Cars", 2013, The Atlantic, `http://www.theatlantic.com/technology/archive/2013/10/the-ethics-of-autonomous-cars/280360/`

Sketch of a Solution 4:

Three different arguments:

Argument: Seperate Argument 1

P1:	The athelete is older than any previous winner of an Olympic medal.
C:	Probably, the athelete is not going to win another Olympic medal in the long distance.

Argument: Seperate Argument 2

P1':	The athelete hasn't got any racing experience this year.
C:	Probably, the athelete is not going to win another Olympic medal in the long distance.

Argument: Seperate Argument 3

P1":	The athelete's training has been inadequate lately because of a knee injury.
C:	Probably, the athelete is not going to win another Olympic medal in the long distance.

One argument:

Argument: Combined Argument

P1:	The athelete is older than any previous winner of an Olympic medal.
P2:	The athelete hasn't got any racing experience this year.
P3:	The athelete's training has been inadequate lately because of a knee injury.
C:	Probably, the athelete is not going to win another Olympic medal in the long distance.

The variant as one argument is more defeasibly forceful, as the probability for the conclusion increases given all three premises together rather than just any one of the premises alone.

Issue 5: *The Mercedes*

In the video you saw the following argument unfolding:

Argument: The Mercedes

P1:	My neighbour told me that he just bought a new Mercedes.
P2:	There is a brand-new Mercedes in front of his house.
P3:	His sister, who is usually a very reliable source of information, says that he just brags about it everywhere, but that he did not actually buy a new car and that he could not afford it.
P4:	His wife, who has no incentive of lying, says that his sister is always jealous and often tells lies about the family.
C:	The Mercedes in front of my neighbour's house is his.

(a) Add a premise P5 that defeats the conclusion and instead leads to the conclusion that the Mercedes it not my neighbour's.

(b) Add a premise P6 that defeats the lat conclusion and instead leads to the conclusion that the Mercedes it indeed my neighbour's.

(c) Add a premise P7 that defeats the last conclusion yet again and instead leads to the conclusion that the Mercedes it not my neighbour's.

Make sure that, in each step, none of the previous premises is contradicted!

Sketch of a Solution 5:

(a) P5: The car has a small, but very visible sticker on the back with the logo of a popular car rental.

(b) P6: Everybody in the neighbourhood has an apology letter in their mailbox from the parents of a mischievous child, who put stickers with the logo of a popular car rental on every car in the neighbourhood for fun.

(c) P7: The neighbour's best friend tells, that my neighbour does not actually own the Mercedes, but that he just likes to mess with his wife and his sister and breed discord between the two.

Issue 6: ***More deductive arguments***

Write more valid arguments! If you did not yet finish the exercise sheet on deductive arguments, complete this. Then try to come up with at least three arguments you believe to be sound and informative. You can argue for or against anything from our list of inspiration or suitable conditionalizations thereof or you can think of a conclusion yourself. Post at least one of your arguments in the forum and check at least one argument from your fellow students for validity.

List of inspirations:

(a) We should all wear masks during the Covid-19 pandemic.

(b) The fragmentation of the streaming market is bad for the consumer.

(c) Children should learn a musical instrument when they are young.

(d) Pens with blue ink are better than pens with black ink.

(e) Vim is better than Emacs.

(f) Both Emacs and Vim are highly impractical.

(g) Most Apple products are overpriced.

(h) It is morally wrong to eat meat from intensive farming.

(i) Esports is sports.

(j) It is rational to maintain a regular sleep cycle.

(k) Arriving at informative and sound arguments is hard.

Issue 7: ***Bonus: Even more deductive arguments***

Think of something that you very firmly believe in and try to come up with a sound argument that argues for that. Depending on what you pick, it sometimes can be very hard to come up with a sound and informative argument for that.