

How Humans Succeed While Failing to Communicate

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Abstract

Human communication is full of errors, but this does not prevent us from achieving common goals. Most of the constant flow of misunderstanding is not even noticed. We think we understand each other – until the moment when something stops making sense. If the common goal is important enough to us, we will ask for explanation: “What do you mean with that?” After receiving more information, we backtrack and correct the reconstruction of meaning in the conversation. Humans are fault-tolerant communicators because nothing is ever fixed: meanings are always temporary constructions and can be changed at any time, when they appear to be outdated or misconstrued. We can “change our minds” about something and we do not need to have perfect knowledge to survive. Those humans who strive for certainty in their lives are often called control freaks, i.e. unnatural exceptions.

Computers live on the other side of the certainty spectrum: a 1 is a 1 and a 0 will always be a 0. Even if the programmer tells the computer – via string of 1s and 0s – to do something really stupid, the computer will simply do it. No room for error, as every decision is precisely defined. Of course, layers of automated translations between our modern programming languages and the processor’s basic instructions may introduce errors, but those are never called “misunderstandings”. Instead, they are called bugs and they can be found and corrected, after which everything will be in full control again.

The task of making a computer understand human communication therefore seems to be the hardest thing to do. It requires mechanisms of uncertainty, backtracking and feedback loops, each of which need to take into account that no meaning is ever fixed. In the end, the goal of understanding human communication remains subordinate to the goal of putting the communication partners in a position where they can achieve common goals. Whether the communication partners are both human, both computer or a mix of the two does not really change that. Communication of any type is always a means, never a goal.

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1 Introduction

Although I earn my living by programming in the business domain of technical communication, I am not an expert in computer technologies around language. Most of you will know much more about various methods that are being used and developed in this field. Still, when Ricardo Queirós asked me to deliver a keynote for the SLATE conference, I did not hesitate. As a philosopher, I feel I can offer some reflections on human language that may be useful for anyone who is working in this interesting and complex field. The philosopher’s role is not to declare what is true but to question anything that is implied. At the end of the day, it is you who decides what is true and false in your own view of the world.

From 1979 to 1986, I studied Psychology and Philosophy at two universities in Netherlands. Both my studies revolved around language, in all its various aspects. After graduating and failing to find work in academia, I entered the high-tech computer industry where I



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have written tons of technical articles and manuals. I presented technical topics on many conferences and delivered training in many companies and universities around the globe. When I got bored with writing manuals I taught myself programming to create smart software for the efficient production and handling of technical information.

I have learned a lot about language by studying different ways in which language was being used in the distant past, in distant cultures, in literature, in poetry, in music, and in the business domain of technical information. There is so much more to language than meets the ear (or eye, if you are reading). In this keynote, I will try to give an overview of my insights in how language works and I will try to indicate which concepts and mechanisms ought to be incorporated when trying to make computers work with human language. Possibly, a lot of these are already handled – even in that case, by confirming the importance of what you are already working on, my keynote should be of some value to you.

2 Our common misunderstanding

When studying Philosophy at the University of Amsterdam, I had the pleasure of attending talks by professor Hubert Dethier. He was a talented speaker and chose topics he was passionate about. One of his phrases has stuck with me ever since: “we communicate by means of misunderstanding”. In the decades that have passed since then, I have not come across a better description of that strange phenomenon we call human communication. Rather than having common access to a shared idea (which the word “communication” hints at), we are constantly stabbing in the dark, but nevertheless feel like everything is bright as daylight.

Humans are remarkably fault-tolerant language processing machines: they might – and usually will – have completely different ideas about the world, but this does not mean they cannot work towards a common goal. Our feeling of mutual understanding is only harmed when unexpected things happen. Someone laughs where no joke was intended. Someone starts frowning where you were expecting everything to be crystal clear. Someone is hurt and walks away when you thought you were complimenting them. Those signals are indicators that we may assign different meanings to the same words. They invite us to elaborate and make our assumptions explicit. More often than not, elaborating on assumed shared knowledge clears the air and allows resuming the joint actions that we were involved in.

When we speak, we are constructing a vision of the world in our minds and our words refer to that internal construction. The same process happens when listening to someone else. But there is no guarantee that the reconstruction in the mind of the listener is in any way similar – let alone identical – to the one that is in the mind of the speaker. As long as the internal reconstruction still works, there is no reason to assume that you have misunderstood the speaker. And even when some details are obscure, they may not be deemed important enough to ask for an elaboration. As long as the common goal is met (a course of actions that can be taken based on the communication), we assume we have understood each other well enough. Of course, the perception of that common goal may differ between us as well.

To give an impression of the vastly different roles that language has played in European history, I have chosen to follow Michel Foucault’s magnificent work “*Les Mots et les Choses*” – which was published in English as “*The Order of Things*”. Even this simple translation of a book title shows the difficulty in expressing the same complex of meanings in two different languages. The English title, although it mentions the subject of the book, fails to convey the importance of language in that order of things. The original French title merely mentions

words and things without going into the type of relationship between them – if there is such a relationship at all. Two very different phrases describing the same subject. Such uncertainty in meanings, as we shall soon see, was not always possible.

3 Language as ordering mechanism

In the Middle Ages, there were two very different languages: one was for speaking in everyday life (with every region having its own local language) and one was for science, law and religion. Because of the strong influence of the Catholic Church, the formal language was Latin. This was deemed to be the divine language, created by God. In some minds the language even is the essence of God, as we can read in John 1:1,

In the beginning was the Word, and the Word was with God, and the Word was God.

The link between this divine Latin language and the world was unquestionable. In fact, the language defined and ordered (or even created) the world. After all, God created both, and they were “of the same”. If you knew the Latin word for an animal, e.g. a poisonous snake, and pronounced it in the right way and at the right moment, you had power over that animal. The word for an object was truly a handle to that object – all of the object. Obviously, the divine language (Latin) could not evolve – as God is all-knowing and eternal, his divine language cannot be other than all-encompassing and eternal. Moreover, as everything was a creation of God, everything was an expression of God, i.e. everything was essentially “of the same”.

In natural science, which was the only science outside of studying the Bible, language was the ordering principle of the world. This, again, was a given by the fact that God created the world according to, and even via uttering, the Word. Botanists knew which species of flowers existed even if they had not yet found all of them: If there was a three-leaf and four-leaf clover, there also had to be a five-leaf clover, etc. Also, since God’s word is eternal, there was no History – in the sense that nothing ever really changed. Of course people were born, had children and died and sometimes there were events like the plague, a volcano erupting or an earthquake, but essentially nothing really changed.

4 Language as representation

When, over a long period spanning the Renaissance, educated people started discussing new ideas (like the sun being the center of the universe with the earth as a globe circling around it), History started happening. No longer was everything expressed in the dead Latin language. Still, even though languages like Italian, French and English were alive and allowed new words and expressions to be added, words were taken to be simply representations of things in the world. New words were invented but they did not create new meanings: they were simply shortcuts for a longer phrase that describes the object you are talking about: an “employee” is nothing more or less than “a person who works for me on a regular basis in exchange for a fixed amount of money”.

In a way, this made language invisible, as the medium did not change anything to whatever it was representing. There was no way to think about language differently, as there was no concept of an individual mind yet. Everyone had access to the same common – and thereby universal – knowledge. It is like the glasses you might be using to look at the world: you never see the glasses themselves unless you take them off. Basically, nobody ever took the glasses off for several centuries – until logicians started formalising natural language just before the turn of the 20th century. The sentence that was discussed for decades is this:

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The Phoenicians did not know that the Morning Star was the Evening Star

This seems clear enough to most people, but for logicians there was a huge problem. The laws of logic state that a word representing an object has a one-to-one relationship with the object it represents: it can be replaced with the object without changing the logical value of the statement. By consequence, if two words A and B represent the same object, you can replace the word A for the word B without changing the logical value of the statement. According to the laws of logic, you can replace the above sentence with this one:

The Phoenicians did not know that Venus was Venus

Obviously, this sentence is not logically the same as the previous one. Still, laws of logic allowed this as a valid substitution. But if a valid substitution changed the logical value of the statement, all of logic was in danger. Which is why logicians have been debating this simple sentence for decades, coming up with all kinds of fancy solutions – none of which really stuck. For some logicians, natural language was the real problem, as people did not really know what they were talking about. You can only speak of things that can be true or false. Everything else is completely senseless. To quote Austrian philosopher Wittgenstein:

Whereof one cannot speak, thereof one must be silent.

Obviously, not everyone was satisfied with this position. In fact, Wittgenstein, after moving to Cambridge, completely turned around in his later days, defining the meaning of words from their usage instead. This is why in Philosophy there is mention of Wittgenstein 1 and 2, both of whom have inspired an entire philosophical language school.

5 Language as a package delivery service

The logician's fierce debate led to closer inspection of the glasses everyone was using to represent the world. With this, the science of language was born and one of the main names in the early years of this new science was Swiss linguist and philosopher Ferdinand de Saussure. He formalised the way language represents the world: the sign is a combination of the signifier (a word, an image, a sound) and the signified (the meaning). The sign became a kind of package delivery service: you wrap a meaning in it by using the right signifier and send it to the receiver, who unwraps the sign and finds the meaning. It may well be that multiple signifiers point to the same signified, but that just means there are different signs for the same thing.

This did not solve all problems, though, as there were many real-world examples where meanings were lost or misconstrued. They could not all be explained by incompetence of the person using the language. The same sign seemed to acquire different meanings depending on the person who used it, the circumstances in which they were used, the context in which it appeared. It seems that language is not the fully transparent medium that allows our minds to share the same universal meanings. The signified might not be “out in the world” but exist only in our private minds. The closest we may get to objective universal truth is the feeling that we understand more or less the same thing at the end of our conversation.

This failure to get common access to objective truth is normally not the fault of the package delivery service: they truthfully transport the signs from sender to receiver. But instead of simply unwrapping the package we seem to be doing something entirely different with it. We seem to be reconstructing the signified instead – and this is where all of the uncertainty gets into the picture. How can we be sure that we are reconstructing the same world that the sender has before their mind's eye when they sent the word packages to us?

6 Learning to (re-)construct the world

Words allow us to construct an imagined reality. In the development of a young child, the first phase is simply identifying objects by single words. Once the child moves on to uttering short sentences, it is expressing relationships between objects. That is where the observer becomes a builder, creating representations of the world. And once the child starts playing with the relationships in its mind, just like it is moving objects around in the physical world, the child becomes a creator of new meanings.

Uncertainty is introduced in each of these stages: how can we know the child is pointing to a car when pronouncing the word for it? It may be pointing to a bird that sits on top of it. As long as we do not recognise the mismatch between the focus of our attention and the object the child is pointing to, we will not figure out that there is a misunderstanding. Imagine we do see the mismatch but never correct the child: it would simply learn to refer to a bird with the word “car” and get into serious trouble in primary school when stating it saw a car fly.

This simple example shows that feedback loops are essential in creating even the most primitive level of communication. Making mistakes is when we learn to make connections between what we see and what we hear. And making mistakes requires getting feedback: I cannot do anything wrong when there is nobody pointing it out to me.

7 There is not one single truth

When we move beyond very practical meanings like “car” and “bird”, things quickly get much more complex, as the meanings we are trying to communicate are no longer physical objects that we can point at to identify them. This also happens to be the level where most of human communication takes place. We express relationships between physical objects, which may not be measurable and therefore remain uncertain.

This is also the domain where most of our common misunderstanding happens, and often these remain unnoticed. Two people may agree completely in words, only to find out much later that their impression of what was agreed turned out to be very different. The reverse can also happen: two people arguing about something eventually discover they are just using different words for – supposedly – the same concept.

When there is no single truth, no single meaning to a phrase, reconstructing a world view out of the words that are communicated to me becomes a hazardous task. It resembles building a house out of playing cards, which are carefully balanced on top of each other. When a new meaning does not fit into its designated space, the entire building may be in danger of collapsing.

But then, getting a complete and correct reconstruction in our minds is never really a goal (unless you are a philosopher and make it your goal to know exactly what someone else had in mind). Communication is a tool that allows us to pursue a common goal. It is possible, and even quite common, that people have very different goals when engaging in communication. Someone may have the goal to look smart – in which case he might purposely add some incompatible words into his construction, so that the listeners cannot understand him at all. There may be an intention to spread gossip about someone just to make them look bad. On the listener’s side there are many possible goals as well: learn something new, find proof that the speaker’s views are dumb or dangerous, get quotes from the speaker that can be used for propaganda – or in court cases against them, etc.

8 Speaking is acting

To add just one more thing to the possibly confusing language puzzle there are speech positions at work in every conversation (and in any type of media). This aspect is studied in the speech act theory that was initiated by the English philosopher J.L. Austin in his book “How to do things with words”. Every utterance is not just a statement but also an act. Some acts really change something in the world, but the effects depend on the context.

Answering “yes” to a direct question may get you a drink, get you married or cause a punch in your face. And if a Japanese answers “yes” it may not mean anything at all – as answering “no” is found to be the most horrible offending thing you can do in the Japanese culture. When I say you are guilty, nothing much happens except possibly you feeling a little embarrassed or offended. When a judge says exactly the same words, you may get sent to prison. Of course, the judge must also be in the right context (in a court room) and should not start the session with this statement but wait until all arguments are heard and everyone has the impression that careful consideration is made.

In any conversation, an exchange of speech acts takes place, in which speakers and listeners take turns in uttering words. All participants in the conversation have their own ideas about themselves, about the others and about the subject that is being discussed. Speakers often tap into collective memory by referencing historic figures or events, whereby only a certain implicit aspect of those referenced object classes comes into play. As a speaker, you have no control over the associations in the minds of your listeners, although the best speakers can really captivate and almost hypnotise their audiences.

9 Natural Logic

My thesis in Psychology revolved around argumentation. Classical argumentation theory uses classical logic. When you state A is B and later on state something that logically leads to A is not B, you have lost the argument. As you can imagine, this was not exactly my style of reasoning, as I believe that normative theories have little to do with the real world.

I was much more interested in what really happens in everyday-life situations: how does an argument between people work? How can a simple exchange of words evolve into a fierce fight, or rather how can a fierce discussion be resolved by moving the line of argumentation into a different direction?

This is where a barely known theory of a barely known Swiss professor comes in. Jean-Blaise Grize was logics professor at the linguistics faculty of the University of Neuchâtel and his “Natural Logic” was only ever published in French. It is a descriptive theory that allows formalising real-life arguments between groups of people. The theory includes the alternating positions of speaker and listener as well as the context in which a conversation takes place. An important aspect is the changeability of everything that is being exchanged between the people who engage in a conversation: nothing is ever eternally fixed and there is no reference to universals at any time.

Probably the most important aspect of Natural Logic is the way an object is defined: instead of referring to a specific object (which would be the signified of de Saussure’s sign and caused all kinds of problems for logicians), Grize is using an “object class”. This is not to be taken in the sense of traditional classifications: it is basically a focus of attention in our mind, which allows us to group all kinds of characteristics together. When I state that I need to take care of my “body” this does not necessarily imply I am thinking about all of my body all the time. I may be planning to go to the gym and work on my muscles, going to the supermarket to buy food, getting a beauty treatment or even filling out a form to

become an organ donor after I die. The meaning of “body” hints at an object class that may have a wide variety of possible members: your muscles, your skin, your organs, or indeed all of the above taken together.

The context becomes much more important in this type of logic, as it helps the listener determine which of the possible meanings is probably in the focus of attention of the speaker. Context in turn is an object class as well, and speaker and listener may have different ideas about what it really is that they are talking about. Taking turns in a conversation, allowing the listener to become speaker and reflect what they think you were talking about is an important aspect of human conversation. It may even be the key to getting any level of understanding at all, as there cannot be any level of certainty without some kind of feedback.

10 Concluding remarks

So how does all of this translate to the digital world of computers? It seems to me that efforts to create a universe of fixed meanings is doomed to fail when it comes to handling real-life conversations. Humans do not refer to fixed meanings but to bundles of associations that are normally referenced with the same token over time. It looks like the object classes of Jean-Blaise Grize would be good candidates to map to computer software, together with the other concepts of his Natural Logic. Unfortunately, none of his writings were ever translated and even the ones in the original French language may be hard to find. But even without having direct access to texts on Natural Logic there are aspects that can be incorporated into software that deals with human communication. I will try to list those aspects that come to my mind and leave it to the audience to figure out what they would relate to in their work.

1. Everyone has their own inner representation of the world
Just imagine what the world looks like for a young, old, blind, deaf, color blind, tall, short, etc. person. Imagine someone who has never seen an airplane and sees one passing high overhead.
2. Words may have multiple meanings, and may change over time
Cool used to mean rather cold, but it has acquired a new meaning in social media and marketing. Being social used to mean doing good things for your neighbours – today it seems to mean bragging about yourself as much as you can.
3. Associations may come into play at any given time
The mention of a word triggers thoughts of other words in my mind: ball leads to soccer, but also to round, which leads to square, etc. Associations work via sound resemblance, word resemblance, shape resemblance, memories, among others.
4. Context is important and consists of various factors
The location (restaurant, theater, police station, home, university), the history (common or separate), the participants in the conversation, the medium in which it takes place (newspaper, television, letters, social media).
5. Understanding requires active solicitation of feedback
I cannot be sure that you have understood my message unless I check what you have understood. Asking to explain to me what you think I told you is one of the main instruments in education.
6. We cannot know whether someone else has really understood us
Most domestic disputes may be caused by the failure to give explicit feedback – you assume you know what your partner means when they say something, instead of checking this when the differences in understanding were not yet too complex to overcome.

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7. Speech positions may determine what words can achieve
When I state “this means war” to another academic, I show I am prepared to get into a serious discussion and we might both get out of it in better shape. When the president says it, a lot of physical damage might follow.
8. Speaking is hardly ever a goal, but a means to achieve something
Nobody reads a manual to kill their time: they are looking for a solution to a real problem. When speaking, there is something you want to achieve with it (looking cool, getting someone to do something for you, etc.). It might be a goal in itself for little kids who are learning to speak, but after that it quickly becomes a means to an end.
9. Various goals may be met within the same conversation
Not all participants need to have the same goal with the conversation, and often you may never find out the differences until much later. Someone was just saying “yes” to your ideas just to make you look stupid after the plan broke down. There are many other examples that can easily be imagined.
10. Human language is a fascinating subject to study
I guess you all can agree on that without me giving you more examples than I already have today.