



## Listen.UP- The Podcast of the University of Potsdam

<b>Title:</b>	<b>Dr. Julian Risch: The Concept Behind The Words</b>
<b>Episode:</b>	<b>01</b>

*Music, above original sound as opener*

**Dr Julian Risch:** For me, transfer means that scientific research results also find their way into practice, and that works particularly well when we as scientists make contact with users in practice during the research projects.

**Speaker Announcement (under music):** Listen.UP-The podcast of the University of Potsdam.

**Announcer:** Today: The concept behind the words, with Dr Julian Risch.

**Speaker:** Dr. Risch studied IT Systems Engineering at the Hasso Plattner Institute at the University of Potsdam and is involved in developing and managing complex IT projects.

**Speaker:** A special feature of this institute, which is financed entirely from private funds, is its excellent connections to other research institutions and commercial enterprises. Students benefit from this in the form of practical project work or internships abroad.

**Dr Julian Risch:** I was in California for six months, in Silicon Valley, in Palo Alto, in Mountain View and in San Francisco. And I worked there at SAP, one of the largest, if not the largest software company in Germany, which also has a location there in the US. I worked there in a small team on a research prototype. Of course, that was a lot of fun for me, this overlapping of industry and science as industry-related research.

**Speaker:** The practice-oriented degree programmes were also the decisive reason for the Berliner to choose Potsdam as a place to study.

**Dr Julian Risch:** I was attracted by the fact that the Bachelor's and Master's programmes already include practical projects, projects with industry, partners, projects where you can get a taste of how software projects are carried out in practice. And the fact that this already took place during my studies really excited me. That means I was already able to gather preliminary knowledge during my studies and then also whilst writing my Master's thesis, just before I started my doctoral studies. But I only found the topic itself later.

**Speaker:** Dr Julian Risch began working on his doctorate directly after completing his Master's degree. The question he dealt with during this time had crossed his path almost by chance.

**Dr Julian Risch:** The topic revolves around comments in online discussions, and I came across it when we were working with a newspaper, an online newspaper, which was faced with the problem that online comments had to be moderated because there were hate comments, insults, threats or comments that simply disrupted the discussion. In other words, disruptive comments that have no interest in respectfully conducting the discussion on the topic. And the problem of this challenge, which is so strong, is that there are people sitting there 24/7 around the clock who have to moderate.

That means they read every comment and then decide whether it complies with the rules of the discussion platform or not. And if it doesn't, it is shortened or even deleted completely. In case of doubt, the authors are blocked for a short period of time or permanently. And to read all the comments that are posted there every day, that would be tens of thousands of comments every day. That simply cannot be done by hand. Hence the consideration: How can we support this with computers?

**Speaker:** Some news platforms had already had to close the comment function. In order to guarantee the exchange of opinions among users, the task was to develop a system that is able to classify linguistic expressions.

**Dr Julian Risch:** Then there was a first project where we looked at small amounts of data: What can we actually do? Do we understand the problem? Do we have an idea that could be pursued to solve the problem? In this case, this entry into the project worked perfectly. However, it turned out that the problem is much bigger than what we can achieve in 4 or 5 months with students in a project. As a result, it became my doctoral topic. Again and again with very close exchange, which means I met with editorial staff every few months. I showed them what the current status is, what we can already do, what we can't do yet. But even further away from the actual evaluation at a particular newspaper, I dealt with the same problems in other languages, for example.

**Speaker:** The scientist was grateful for the opportunity to work with real data - i.e. with reader comments that had been classified as irregular by the moderator team of the online platform in the past. They were the training data of the system to be developed.

**Dr Julian Risch:** And in there, our machine learning process can then recognise patterns, which groups of words or which spellings are indicators that comments are against the rules. This means that it is not immediately classified as 'against the rules' or 'not against the rules', but rather a collection of indicators that work very well in most cases. In very concrete terms, you can imagine, groups of words like "Thank you Merkel" are perhaps innocuous. Nevertheless, this is certainly a comment in most cases where a moderation team should look at it. Another example would be comments written entirely in capital letters, perhaps with ten exclamation marks at the very end. That's certainly something to look at as well. Or a long list of keywords that we don't specify ourselves, but which have been learned automatically from past years and past comments. This system is trained to recognise which words are used in the same context in our language. That is, it can estimate similarities of words based on how we use words in our everyday language. This means that I don't have to specify by hand which words are crucial, but rather it detects concepts that can describe our language with many different words.

**Speaker:** However, Dr Julian Risch admits that this is precisely one of the system's weaknesses. Because it can only learn from past data, i.e. from those decisions that the moderation team has already made. Especially in the case of news, however, the topics change very quickly.

**Dr Julian Risch:** New words are constantly being added that are suddenly topical. Maybe the meaning of certain words also changes. These are things that we can only include in this system if we also keep getting new training data and these training data can then be fed into this system anew.

## Music

**Speaker:** So far, there has been talk of "toxic comments", i.e. those that poison an exchange and cause interested users to leave the discussion.

**Dr Julian Risch:** And in contrast to that, I thought about whether there should be another class of comments, which I called stimulating comments, with the aim of identifying which comments lead to people enjoying participating in a discussion. And to do that, I could look at which comments have had particularly many responses in the past, or where the discussion might also have been particularly long, with particularly many different participants. And the idea now is to have a machine process that can already assess, based on the text, whether the comment will probably lead to many interactions. And if so, I would like to present this comment particularly succinctly on the discussion page, so that many people can see this comment and enter the discussion there.

I could think of an example, an article describing how people are currently doing with working from home. It's a very topical issue: how do you set yourself up at home? What advantages does that perhaps have? What disadvantages? How do our work processes change? How does communication change? And there might be someone in the comments who describes how they feel about it from their own point of view. And such comments provoke a lot of interaction. On the one hand, because there are people who say 'Oh yes, I feel the same way and I feel represented there'. I then feel for the person, and they can express that on the one hand by commenting or by giving a thumbs-up. On the other hand, there may also be people who say: 'I don't feel that way at all. I feel quite differently', and they are also encouraged to join in the discussion.

Conversely, this also means that comments that will probably cause little interaction, where no one interacts with this comment at all, will get less visibility, that's quite clear.

**Speaker:** Doesn't that also create the possibility of manipulating the system?

**Dr Julian Risch:** To a certain extent, unfortunately, yes. And that is because the decisions of this system are based on the decisions we have made in the past as a moderation team. That means that if there were any prejudices, for example, in the moderation team in the past, which are completely unconsciously or consciously reflected there in the decisions, then the system will probably also implement these same prejudices if we train it to do so. This also shows that the decision as to which comments comply with the rules and which do not always remains a subjective decision. That's also why I want the moderation team to make the decision in the end, not a machine. Another topic that comes to mind is that I have also dealt with how these machine learning processes can justify their own decisions to a certain extent. Creating transparency helps both the moderation team and the community, the community that discusses there.

## Music

**Speaker:** Dr. Julian Risch was concerned with finding a solution to the concrete problem of this particular online platform, but not with creating a marketable product in the sense of a service. During the four years of his doctoral studies, he therefore maintained a regular exchange with the staff of the online editorial office on the one hand, but also with other academics on the other. He experimented with different languages and made contact with other potential users.

After all, the classification of comments is only one aspect of the complex system Dr Julian Risch has been working on.

**Dr Julian Risch:** That means that the research is already detached from the very concrete problem and the concrete data set. But the research results that emerge are then always put into practice as far as possible.

**Speaker:** That is precisely why Dr Julian Risch was awarded the Better World Award for his work this autumn, which the Universitätsgesellschaft Potsdam e.V., together with the Land Brandenburg Lotto GmbH, gives annually to a project that makes the world a little better. Because it promotes freedom of expression and a culture of conversation on the internet, the jury chose the work of Dr. Julian Risch this year.

#### *Better World Award Laudatory Speech and Award Ceremony:*

**Speaker:** Dr. Julian Risch may have come across the topic of his dissertation by chance. It is no coincidence that he now works for the up-and-coming Berlin start-up deep set, which deals with very similar questions.

**Speaker:** There, too, it's a lot about data, about document sets, document collections and the search within them. In English, this would be called neuronal search, i.e. neuronal search in text documents. An example to illustrate: we certainly often search for information in text documents, and until recently, if not still now, we search a lot with keywords. That is, we think about what words have been mentioned in the document I am looking for right now? And I then enter these words into the search engine and try to find the documents. And in fact, with the current state of research, we can already do much more and we can formulate questions that we have or searches that we want to carry out quite naturally linguistically. That is, I can formulate words or whole sentences as a search and then find semantically similar documents because I can automatically understand the meaning of the question with the machine learning process. That means I can automatically recognise: What is the question about? What is the user's information need? And then I can see which of the documents in my large document collection is most likely to fulfil this information need. And this even goes so far that I can not only find the appropriate document for a naturally linguistically formulated question, but also already highlight it. In the document, a sentence or a sentence excerpt that contains the answer to the question.

**Speaker:** The software developer is particularly proud of the fact that the project, which the company calls Haystack - the name stands for the search for a needle in a haystack - is publicly accessible. Deepset's open-source projects are shared on the GitHub platform.

**Dr Julian Risch:** Many, many people in the world really use this. We don't even notice who is using it. That's because we don't have to be paid for it. Then, of course, there are also very interested companies that use it for themselves. Because if I have company data, perhaps technical instructions, large quantities of contracts, large quantities of expert opinions, then I can't search them with Google or any other internet search engine, because the data is not even available on the internet. And with this solution, with Haystack from deepset, we can enable users to build their own search engine, so to speak, from building blocks that we have previously developed as a framework for search engines.

**Speaker:** And this is where we come back to Dr Julian Risch's doctoral thesis. Because his current employer had developed the first German-language model for a machine learning procedure - also

freely available - which Dr Julian Risch used in his research. The classification of comments, whether positive or negative, is basically a small snippet of the larger application he is currently working on.

**Dr Julian Risch:** There are certainly other areas of research that are further away from a practice application, where the research takes place further away from a practice application. But even with my topic, with my research, there were areas that are not so close to an application. That means, for me, transfer is not that you only do research on things that have an immediate application. It means that during the research you think about what an application could look like, make contact, sound out how the transfer from the research results to practice could ultimately take place. And the sooner you try out whether the research results can also be applied in practice, the more promising it is for both sides.

*Music*

**Speaker closing announcement:** Listen.UP-The podcast of the University of Potsdam.

**Produced by speak low on behalf of the Innovative University of Potsdam project.**