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The new Data Analytics study programme is designed to help applicants who want to be successful in the field of data analysis. It is a hybrid programme, built on "learning by doing" closely connected with practice in the commercial sector. Why study Data Analytics at MUNI? What will cooperation bring to our industrial partners? We asked Professor Jan Slovák, the guarantor of the programme.

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prof. RNDr. Jan Slovák, DrSc.

[Prof. Jan Slovák](#) obtained his PhD at Charles University in Prague in 1990. He held senior positions in Vienna, Adelaide, and stayed shortly at dozens of other places all over the world. His main scientific achievements are reflected in two very influential monographs *Natural Operations in Differential Geometry*, Springer 1993 (with I. Kolář and P.W. Michor), and *Parabolic Geometries I: Background and General Theory*, AMS Publishing House, 2009 (with A. Cap).

Jan Slovák, guarantor of the Data Analytics study programme, in his office, which is equipped with original furniture from the 1920s. Photo: Helena Brunnerová

His commitments to strategic development projects resulted in participation in numerous further managerial activities at academic, regional and national levels (e.g. Dean of the Faculty of Science, Vice-Rector for Strategy and Development at the Masaryk University, head of the Physical Sciences Division of the Czech Grant Agency, member of the panel launching the Technology Agency of the Czech Republic etc.). In the years 2015 through 2023, he served as the director of The Mathematics and Statistics department at SCI MUNI.

Since 2008, he has been serving as the Editor-in-Chief of the Elsevier's prestigious journal *Differential Geometry and its Applications*.

Before we start, please explain what data analysis is?

Data analysis is a field of activities and techniques for processing and using a variety of data with the aim of revealing useful information, and thereby facilitating decision-making. Its importance continues to grow with the digitalisation and automation of today's world. It includes aspects of preparation, inspection, cleaning, transformation, modelling, description, visualisation and machine learning. People in this area who can think mathematically and work with data in a sophisticated manner have a strong competitive advantage. Such skills can be obtained by studying the new Data Analytics study programme at MUNI, which is supervised by the Department of Mathematics and Statistics at the MUNI Faculty of Science (SCI MUNI) and the MUNI Faculty of Informatics. Presentations explaining the programme are available in these [short videos](#).

How did the opportunity to build a new, hybrid study programme arise?

The opportunity arose primarily due to one of the MUNI MASH ([MUNI Award in Science and Humanities](#)) projects being won by a very prominent person, [Stanislav Sobolevsky DrSc., Ph.D.](#), who also works in data analysis at New York University. At the same time, MUNI supported the plan through its selection for funding from the NPO_MUNI_MSMT-16606/2022 project, which finances the preparation of new study programmes at universities. The administration of the project is very demanding, so we are very grateful to our colleagues in the Dean's and Rector's offices, who helped us tremendously.

Who is the programme intended for? Who are your study applicants?

Our motivation is to reach a special target group that, until recently, did not exist around the world. It is a group of young people, digital nomads, who, during their high school studies or right after, successfully immerse themselves in programming or other work related to computer science. They are successful in their field, have their own companies and/or work for large companies, and are used to earning much more than their parents ever dreamed of. If they feel that they lack a formal university education, entering a normal degree programme would be unacceptable because they are no longer beginners and do not want to be in school all day. They probably want to spend most of their time working and enjoying life, and then study in addition, not the other way around. Moreover, our standard programmes would be detached from practice and so probably boring for them.

We want to attract people who have noticed that, right now, at the advent of generative artificial intelligence, the demand for ingenious and fast coders will decline. Indeed, it seems that qualified people with great insight can work up to eighty times faster when creating complex software systems with the artificial intelligence support, then without it.
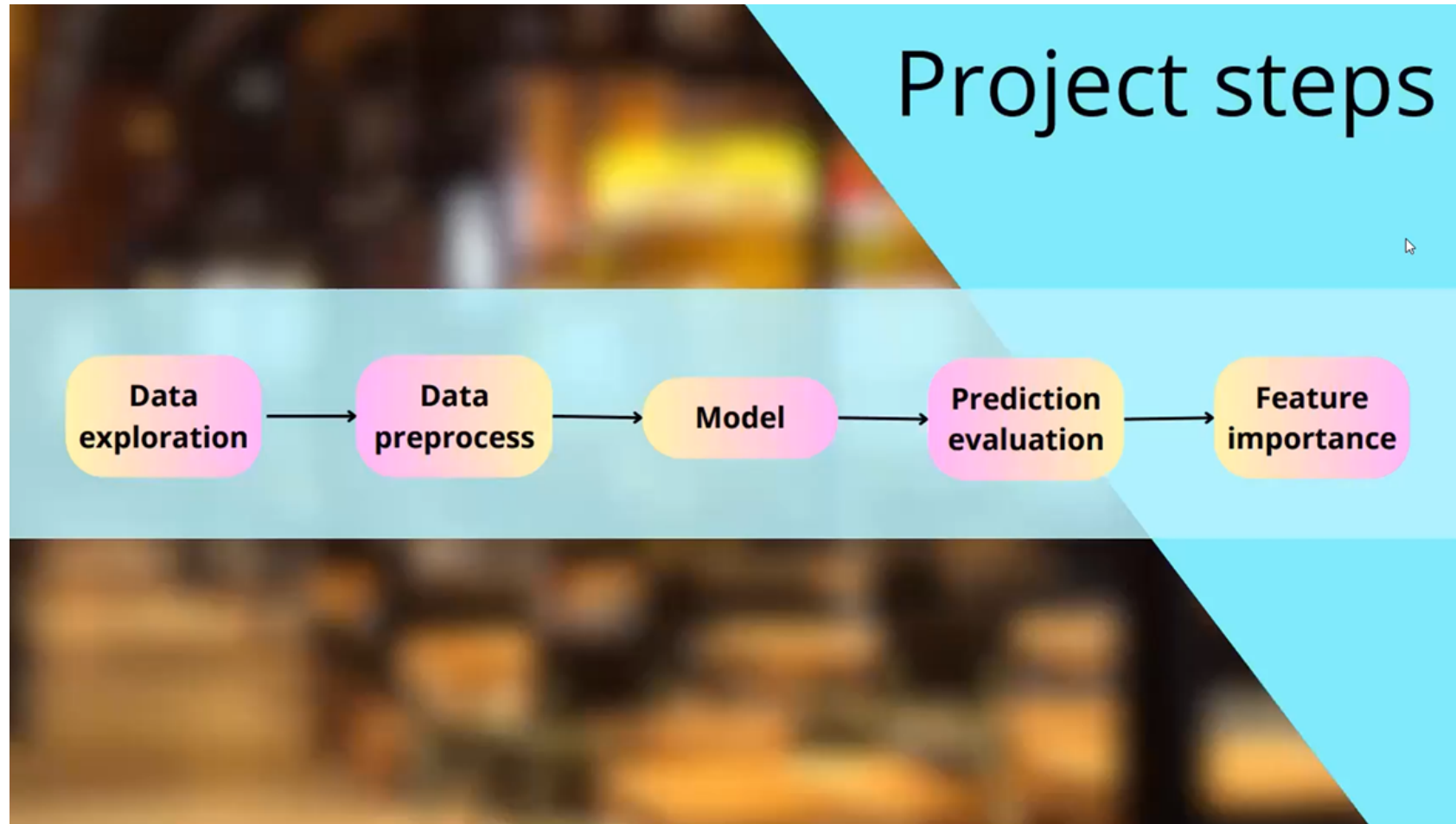

A sample from a presentation given by one of the participants in the 'hackathon', which forms part of an online Boot Camp within the upcoming project, showing the individual steps of data analysis.

What can future students of the Data Analysis Bachelor's programme look forward to; and wouldn't your intended course be better suited to an MBA programme?

We are offering a chance to people who want to extend their qualification. We want to help them acquire a 'data driven mathematical mindset' through their studies, i.e. the habit of thinking mathematically about real data and working with data in a sophisticated manner. This formalised, mathematical style of thinking is something that, with some exceptions, is not usually innate in a person. In our classical programmes, this practical connection of mathematics and computer science is difficult to obtain. We differ from other study programmes in the field of data analysis in that the architecture of our programme is very similar to that of a quality MBA programme. Unlike these, however, we do not target people who are already involved in top management and who want to advance personally and professionally. Instead, we are offering a similar approach and goals to very skilled programmers at the level of a Bachelor's degree. In this experiment, we see a huge opportunity within the current era of technological development and regional and European labour market needs; and last but not least, a way out of the bleak outlook in the Czech Republic for financing education through public resources. We want to meet this opportunity and create a platform through which the right people from all over the world can start moving to Brno, to meet the needs of current technologies and the labour market, the needs of regional development, of MUNI, SCI MUNI and its Department of Mathematics and Statistics.

Is there a growing need for such people in the data analysis job market?

Yes, we already have a huge shortage of such people. Virtually everyone will soon need to master some form of data analysis or to master generative artificial intelligence tools; and there are not many people who will be prepared for this, either professionally or through their approach to work. Brno is increasingly seen as a global computer science hub, especially in cybersecurity and the like, so it needs people with the type of education we are offering. We will feel successful if we manage to attract 20 to 25 really good students each year who are already settled in Central Europe, or who are currently working elsewhere in the world (India, China, Morocco, Algeria, Colombia, etc.). Realistically, though, I think that if 200 people came to Brno each year, that's roughly what companies here would need.
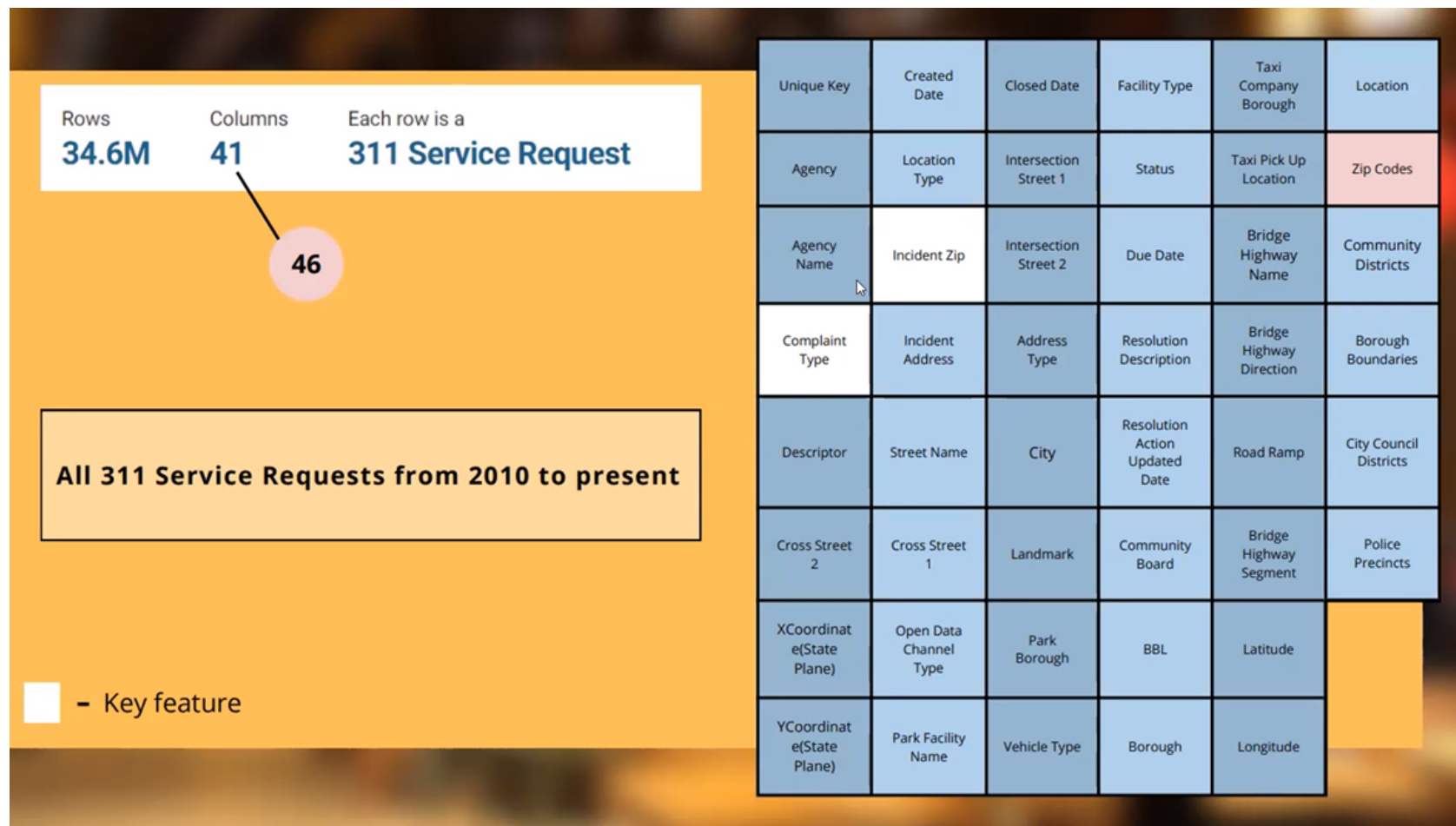
Another sample from the presentation of one of the participants of the online Boot Camp within the upcoming project.

Cooperation with the commercial sector is another pillar of the programme. You offer companies several forms of partnership, as presented in detail in the programme's website. What will such partnerships bring to both parties?

We will be successful when we manage to convince a reasonable number of commercial partners to help the students, and us, by financing the programme. Of course, all partners will be able to enjoy student internships and other common forms of cooperation to fulfil their personnel policy. An unusual element of our offer is the possibility of processing initial consultations for the needs and possible projects of companies in the field of data analysis and their pilot implementation through students,

under the full guidance and mentoring of our employees.

So, do you think there will be a demand for cooperation between the commercial sector and Masaryk University in the field of data analysis?

A growing number of companies are finding that, while they have their pool of data analytics people, their needs are growing faster than that pool. What is more, there will be an increasing number of smaller, start-up companies, or even medium to large companies, that need data analysis of customer needs, market development or other contexts, but don't have their own experts, and one day of a competent consultant can cost around €1,500. So, from that point of view, the €7,000 we want from students per semester for their studies is actually not that much, especially when we can offer cooperating companies qualified work for individual projects within the framework of a partnership with us for the first few days. On the other hand, I don't know whether such a concept has worked anywhere else yet, which means gaining the trust of companies will be difficult in the beginning. For this reason, I think growth initially will be relatively slow. However, I am sure that there are enough people in the world who will be happy to do real work for real money and that we can get them to Brno.

Jan Slovák also plays the piano. Photo: Helena Brunnerová

Even the admission to the programme is unconventional; it is an online Boot Camp in the form of a hackathon, where study applicants work intensively on an assigned software project. Could you give a specific example of such an assignment?

Last summer, we did some experiments and tested what we would expect from applicants. Twenty-nine participants chose from several types of assignment, and then tried to complete them. The successful participants made it to the next round, where they were required to solve more complex projects with the support of a mentor.

As an example, one project used complex data from the New York area that included, among other things, data on the movement of cyclists. The task was to extract from the data the extent to which the establishment of a cycle path across one of the bridges changed the behaviour of cyclists. Of course, they managed to process the problem using the data, but they also had a very elegant and convincing presentation, and I have to say that I have rarely seen better results, even when presenting diploma theses. This convinced me that there are plenty of skilled people in the world who are interested in similar activities.

Another nice example was a group tasked with training a well-chosen neural system to draw connections between the sentiments within a cinema review, the reviewer's place of residence, and his or her social status. The participants first downloaded a huge data package from our website that contained a large amount of information that was completely irrelevant to the question asked. So, they first had to extract from the data those parts that were relevant, and then they had to remove the irrelevant data before they could start training. This was a very complex project, yet many of the students handled it extremely well. Our mentoring in the advanced rounds of the hackathon helped the participants develop skills in qualified deduction, inference, making connections, revealing cause and effect and to what extent a certain conclusion is plausible. These are skills and habits that are valued in the current labour market, which gives us the right to assume that cooperating companies will be interested in our students from the first day of their studies.

Thank you for the interview and I hope your programme attracts many talented students.
Zuzana Jayasundera

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