Artificial intelligence ecosystem in Bulgaria

2019
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Vangavis is an international innovation company focusing on the key industries that will shape the future of our society and economy. Together with our experts and partners we gather innovation intelligence and develop collaborative projects in order to support, connect and promote Europe’s ecosystems, startups, corporates and governmental organisations.

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Introduction

Artificial intelligence (AI) technologies are expected to address many societal challenges and improve the quality of life on a global scale. What’s more, they will greatly boost competitiveness across all sectors of the economy.

The growing implementation of AI technologies will lead to transformations in the labour market, especially in activities where there is high repeatability of actions. The expanding application of AI solutions will open up more intellectually-challenging, knowledge-intensive and analytical job opportunities for highly-educated professionals. On the other hand, the trend will have a negative effect on the labour market for low-qualified staff.

Bulgaria, with its strong IT sector has the potential to become a prolific AI market.

At their core, AI-powered solutions offer simpler and more convenient products. They also enable better personalisation by processing and streamlining comprehensive datasets and tasks.

According to the European Commission, Europe has a leading edge in AI and robotics, as acknowledged by the excellent scientific standing of European researchers. The strong expertise, along with Europe’s vibrant startup landscape, is attracting substantial investments in the high-tech field, including AI, from world leading companies. The European AI market is estimated to be worth more than EUR 500 mln and is forecasted to flourish by a compound annual growth rate (CAGR) of more than 40% in the period 2018-2026.

AI development needs a suitable ecosystem to flourish. It demands strong
knowledge and skills in mathematics and programming, as well as support from governmental and non-governmental bodies. It also demands an adequate educational system and a favourable business environment.

Bulgaria, with its strong IT sector has the potential to become a key AI market. To add to that, the growing popularity of AI technologies is creating a startup wave in the country.

Bulgaria’s potential in the AI field will benefit greatly from the development of an ecosystem, which is usually formed around scientific communities, innovative entrepreneurs, investors, large corporates and governmental organisations. This type of ecosystem represents collaboration among scientists that carry out both fundamental and practical research. It promotes the development of intensive business environments, supporting technological startups. It also attracts large international corporations and companies that invest in and work with these scientists and start-ups. This, in turn, leads to the creation of a large number of new, high-tech jobs and creates a natural link between science and business.

Bulgaria is a reserve of tech talent and has a breathing startup environment. The development of the local AI ecosystem looks promising, spurred by foreign investors, a booming outsourcing sector and the growing awareness of the benefits of using AI technologies.

The aim of this report is to put Bulgaria on the global map for AI solutions and technologies, and to highlight the value that the country and its talent can bring to the sector.
More and more companies in Bulgaria tend to prefer and introduce AI technologies. We identified a total of 47 companies developing or using AI in Bulgaria. National or international corporates numbered 15, and we counted 32 startups or scaleups.

There is a growing AI startup ecosystem in Bulgaria. Almost 30% of the companies researched for the report were established in the period 2016-2018.

There are several AI related events, meetups and scientific communities, that aim to unite, support and promote the companies and experts in the AI field. The general AI community in Bulgaria is estimated at about 3,000 people. The continuing development of the local startup ecosystem will bring out more and more success stories, including in AI.

Regarding the industry focus, the main solutions in Bulgaria are designed for the retail, finance and media industry.

Healthcare is one of the sectors in Bulgaria in which the AI technologies will be of great use. We researched a rising number of AI companies with solutions in Life-Science, BioTech and Healthcare. The number of companies in this sector is expected to grow even further as the healthcare ecosystem is developing.

The AI specialists in Bulgaria are about 500 people. In terms of job offers - about 3% of the total developer job market is for AI related jobs.

Companies in Bulgaria are rather optimistic about the use of AI solutions. However, they prefer to see examples of already implemented AI technologies before implementing them.

Bulgaria is strong in Neuro-linguistic programming (NLP), according to market experts.
Poor access to public big data is still hindering the AI field in Bulgaria and the EU when it comes to training people and systems.

Large international companies are reluctant to outsource AI development, fearing they will lose a competitive edge by spreading their knowledge.

Among the companies that can benefit greatly from the implementation of AI technologies are Business Process Outsourcing (BPO) providers. This includes voiced-based BPO (VBPO), financial and accounting outsourcing (FAO), human resource outsourcing (HRO), as well as financial and accounting companies. Automating various processes will lead to considerable cost savings and an increase in efficiency.

There is a growing interest on the part of universities and state research institutes towards the development of the Bulgarian IT field. According to market experts, the current number of university graduates suitable for the AI field is between 200 and 250 per year in Bulgaria. In the past years, the state has made substantial investments in high-tech infrastructure.

Companies developing AI technologies are strengthening their collaboration with universities to find the specialists they need. However, larger companies still rely, to a large extent, on their internship programmes or in-house training to recruit or develop staff.

The use of AI-related technologies in Bulgaria will continue to grow in the daily activities of both companies and households. Companies of all sizes and individual consumers will become more aware of the benefits that AI solutions provide thus improving the business environment for technology startups. Furthermore, the growing presence of knowledge process outsourcing (KPO) companies on the local market will further boost the need for AI solutions.
Companies

Our research identified a total of 47 Bulgarian companies developing AI technologies. We have classified them by AI technology focus and by product type – for use within the company’s group or for external clients. In terms of AI technology focus, the fields are:

- Big Data
- Predictive Analytics
- Data Science
- Chatbots
- Other/Mix of two or more

Sofia, Bulgaria’s capital, is the country’s AI centre with 43 of the companies being headquartered in the city. There are AI developers also in Burgas, Plovdiv and Petrich.

In terms of the number of companies by industry focus, the leading sectors are retail, finance and media. More than 30 companies develop AI solutions for these industries. Other major industries are telecommunications, healthcare and the government sector.

The number of startups, established in the 2016-2018 period, or companies that have received startup funding make up for more than 60% of all AI developers in Bulgaria.
Distribution of companies by year established

**1996 - 2013**
- A Data Pro
- Adastra
- Credissimo
- Coca-Cola Sofia IT Services
- Commetric
- Danlex
- Digimark
- Experian
- Gemseek
- Imagga
- Kaufland IT Services
- Kontrax
- Mozajka
- Neural Brothers
- Novanor
- Ontotext, Sirma AI
- Perpetto
- Progress
- VMware

**2014**
- Analytics.bg
- Hyperscience
- Maj.io
- Metrilo
- ReceiptBank
- Transmetrics
- Trigonon
- 11235

**2015**
- A4E
- Identrics
- MammothDB
- Prof.ai
- ShopUp
- Speedflow
- WorldQuand

**2016**
- Helecloud
- Linbots
- Yatrus Analytics

**2017**
- Alcatraz AI
- Connecto.ai
- Humans in the Loop
- Metabolize
- Ocado Technology
- Telelink
- UmniBot

**2018**
- Centroida
- Damocles Analytics
- Smule

Structure by company type

**Total Corporates** 15

**Total Startups** 32

- Established before 2016 18
- Established in 2016-2018 14
Number of Companies by Industry Focus

- **12** Retail
- **11** Finance
- **10** Media
- **7** Pure data
- **7** Telecommunications
- **6** Government
- **4** Logistic
- **4** Health
- **1** HR
- **20** Other

**Note:**
- **Market Research** includes Market Intelligence, Business Intelligence
- **Logistics** includes Transportation, Drones, Public Traffic
- **Health** includes LifeScience, BioTech
- **Government** includes political and public topics
- **Media** includes WMarketing, Publishing, Social Media, News
- **Finance** includes Fintech, Banking, Investment, Insurance
- **Retail** includes Wholesale, E-commerce
- **Pure Data** includes Big Data Analytics, Data Mining, Data Base
- **Other** includes Sports, pets, and visual recognition
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The bulk, or 80% of all companies are engaged in two or more of the AI development segments:

- 80% of the AI companies develop products for external clients
- 20% of the firms develop AI solutions for use within their company group

Other/Mix of two or more
- 38
- Chatbots
- 3
- Data Science
- 3
- Big Data
- 2
- Predictive Analytics
- 1
Financial performance

We have used the official overall non-consolidated company records of all 47 companies. The AI development is part of the activities of almost all companies, especially the larger ones and it is practically impossible to defer the financial results for the AI operations alone. That means these results do not represent the volume of the AI ecosystem, but only the performance of the market players.

The operating revenues of the AI developers were sharply growing in the 2014-2017 period. For calculations we used revenue data from companies’ annual reports, and generated not only from AI activities. The number of employees followed the trend, although at a slower pace and exceeded 3,000 people in 2017. The uptrend in revenues was not enough to lead to a net profit until 2017, when the combined net result of the companies amounted to the positive EUR 17.2 mln.

As the AI segment in Bulgaria is at an early development stage, it is highly concentrated in terms of operating revenue. In 2017, only three of the companies, mainly subsidiaries of large foreign corporations, accounted for nearly 60% of the segment’s total operating revenue.

<table>
<thead>
<tr>
<th>Year</th>
<th>Operating revenue (EUR mln)</th>
<th>Average annual number of employees</th>
<th>Net profit (EUR mln)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>104.3</td>
<td>2,050</td>
<td>-5.670</td>
</tr>
<tr>
<td>2015</td>
<td>135.2</td>
<td>2,291</td>
<td>-6.703</td>
</tr>
<tr>
<td>2016</td>
<td>156.4</td>
<td>2,732</td>
<td>-3.107</td>
</tr>
<tr>
<td>2017</td>
<td>206.9</td>
<td>3,111</td>
<td>17.233</td>
</tr>
</tbody>
</table>
Total salary costs of the AI developers (EUR mln):

- 2014: 53.257
- 2015: 71.027
- 2016: 84.414
- 2017: 100.456

The AI companies are constantly rising their salary costs. In 2017, their total value was double the sum three years ago. The average annual growth of the total salary costs in 2014-2017 was 24%.

AI companies’ total tax contributions (EUR mln):

- 2014: 1.826
- 2015: 0.758
- 2016: 1.594
- 2017: 2.286

The AI developers are becoming important tax contributors. In 2017, they contributed 40% more in taxes than a year earlier.
Corporates vs startups

Data is for 2017

Operating revenue (EUR mln)

- Corporates: 196.576
- Startups: 10.351

Net profit (EUR mln)

- Corporates: 18.445
- Startups: -1.213

Average annual number of employees

- Corporates: 2,919
- Startups: 192

Total salary costs of the AI developers (EUR mln)

- Corporates: 95.091
- Startups: 5.365

Statistics confirm that the AI startups have a long way to go to get close to their corporate adversaries in terms of financial performance and employment.
The contribution of a single employee to the total operating revenue of the corporates stood at 0.03%, while in the startups it was much higher – 0.52%. That may reflect a higher effectiveness of the startup tech talents and the companies’ more intensive development than traditional corporates.
In Bulgaria there are about 500 AI specialists, according to Sloth.Works, an automated hiring platform connecting IT companies and tech talent. AI-related jobs account for 3% of the total developer job market in Bulgaria and about 11% of all the 3,000 developer profiles (CVs) on the Sloth.Works platform are related to AI technology, excluding Elastic and Solr.

The majority, or 80% of the developers registered on the platform, are Senior Experts, IT Architects or C-level executives.

AI related jobs account for 3% of the total developer job market in Bulgaria, according to a research by Sloth.Works.

In terms of education, in 2017, there were more than 7,600 Information and Communication Technologies, and Engineering university graduates in Bulgaria. Between 200 and 250 of these graduates are estimated to be joining the AI field annually, according to the Data Science Society.

The estimates for the number of AI developers are as follows:

100-300 are experts
500-600 are middle level
1,000 – 2,000 are juniors or are entering the AI ecosystem
AI Tech Presence by Developers

- **40%** Python
- **30%** Java
- **10%** C++
- **20%** Non-developers (Business Intelligence, Data Scientists)

Most wanted skills in job offers on the platform:

- **Hadoop** including Cloudera, Hortonworks, HDFS, Yarn, HBase
- **Big data** including Spark
- **Data science** including Data mining, Keras, Neural network, Deep learning
- **Machine learning** including Sklearn, Pandas, Matplotlib, NumPy, PyTorch, Jupyter; TensorFlow; NLP; Weka

The most common tools found in CV’s on the Sloth.Works platform are:

- **Olap**
- **Scikit-learn**
- **Tensorflow**
- **Natural language processing (NLP)**
SWOT Analysis

Strengths
- Skilled IT workforce
- Diverse AI industry sectors and expertise
- Strong outsourcing sector
- Local startup accelerators
- State and VC investments in infrastructure for high-tech developments
- Existing AI societies and communities
- IT academies, courses and trainings
- NLP expertise
- Goog mix of mature international corporates and young startups

Opportunities
- Growing number of graduates in the IT field
- Growing as an ecosystem
- Growing number of VCs focusing on AI
- Attracting IT specialists from other countries in Southeastern Europe, such as Macedonia and Moldova
- Unsaturated market for AI solutions
- Stronger cooperation between IT companies and education institutions

Weaknesses
- Slow implementation of AI solutions by local companies
- Inconsistent state policy in supporting the development of the local IT sector
- Still limited number of AI development specialists
- Lagging development of a scientific ecosystem, weak level of research and development

Threats
- Competition from neighbouring countries, mainly Serbia and Romania, in attracting IT specialists
- Non-utilised high-tech facilities, equipment and infrastructure due to lack of appropriate scientists
- Concerns about job losses because of implementation of AI technologies
Ontotext is globally recognized as a leading vendor of semantic technology. We are the developer of GraphDB™ – the best semantic graph database engine and top-10 across all varieties of graph databases.

We help enterprises get better insights by interlinking diverse databases and unstructured information from proprietary and external sources.

We are the only graph database vendor who also has text analysis technology and offers a complete platform for KG development, consumption and maintenance.

Companies from which sectors form the bulk of Ontotext’s current client list, in which sectors do you see most potential for growing?

Ontotext’s technology and solutions got proven across multiple sectors: Market Intelligence, Life Sciences and Healthcare, Publishing and Media, Government. Ontotext’s semantic graph database engine GraphDB™ is used by the BBC, the Financial Times, Standard and Poor’s, the UK Parliament, the Ministry of Interior of Spain, Kadaster.NL, the National Gallery of the United States, Elsevier, John Wiley & Sons, Oxford University Press, Getty Trust and many others. Recently, we have seen a growing demand in new sectors – we got the first deals with the biggest banks in the USA as well as some outstanding manufacturers, e.g. automotive and aerospace.

Where do you see Ontotext in 5 years?

I see a unicorn setting the trends in knowledge management and analytics. A company with a broad ecosystem of partners who implement their solutions using Ontotext’s technology. We already partner with 4 of the top 10 IT Services vendors: InfoSys, Atos Origin, Fujitsu and NTT Data.

To get there, we need to invest further in marketing, product development, business development and delivery. We must get more international and, in particular, increase our presence in the USA.

Which are the main drivers of AI development in Bulgaria?

It is a combination of factors. Most fundamental is the good education in mathematics – both in high schools and universities. As well as the good traditions in Informatics and, generally speaking, IT – the entire ecosystem of universities, private academies and software companies. Bulgaria hosted the first International Olympiad in Informatics back in 1989. The baseline is that we have a great mass of people with a very good mix of skills: knowing math and advanced algorithms, and having the engineering skills to implement complex systems.

The next important factor is the AI research carried in the Bulgarian Academy of Sciences and few other universities in 80s and the 90s. Back in 1993, when I was doing my M.Sc. at
Sofia University, our lectors were world-class scientists in neural networks, reasoning and natural language processing. After 1998, Bulgarian participants were allowed to engage in research projects in EC’s Framework programs (FP5, FP6, FP7, H2020). This fostered networking with the best AI groups in Europe.

There are three factors that have been boosting the AI developments in Bulgaria in the last ten years:

The immense growth of the software industry. It has increased more than 5 times since 2007 – both in terms of revenues and employees. Many of the global IT leaders opened R&D offices in Sofia: HP, VMWare, SAP, Experian are just a few examples. This created a lot of engineers working on complex IT projects, including advanced analytics over big data. This is a huge difference compared to other countries where the software industry is dominated by cheap outsourcing services.

Access to venture funding – all the way from incubators such as Eleven and LuanchHub to funds such as NEVEQ, which finance early state companies. In 2019, there are already several funds targeting later stage companies.

The growing data science community. The Data Science Society, head-quartered in Sofia, runs the most popular global datathons. Several times per year hundreds of participants from all over the world team up and spend a couple of days competing on use cases provided by Bulgarian companies.

Which are the main challenges to the development of the AI sector in Bulgaria and how could they be addressed?
What comes first is natural language processing (NLP, also known as text analysis). Having Ontotext here makes Bulgaria a leader in semantic databases and knowledge graphs. There are companies doing outstanding image analysis and computer vision technology, e.g. Imagga and Sirma. There are also lots of companies developing predictive analytics systems, for instance, for risk analysis in the financial industry for cross selling in retail.

What about the Corporate-Startup Collaboration in the AI sector in Bulgaria in general?
Historically, there were not many transactions in this space between Bulgarian companies. Most of the companies found their M&A opportunities abroad. I expect some consolidation to start soon – both mergers between more developed companies and acquisitions of younger startups. Yes, Sirma, part of which is Ontotext, is searching for strategic partnerships or acquisition opportunities.

Could the application of AI solutions be the key to improving the country’s competitiveness on the global market?
Most definitely! We have already proven that an AI company in Bulgaria can generate 100 thousand euro per engineer annually. This is twice higher than the average revenue/person of the typical Bulgarian IT services company. If more companies in the IT industry go this way, it will have impact on the whole country because IT is a big part of the GDP.

Speaking of the broader industry, most of the companies in Bulgaria lack the scale and IT comprehension to invest in AI solutions and reap the benefits. There is a generation of companies across different sectors, which have recently matured good businesses with international standing and will soon be in a position to improve their competitiveness via AI.

Your opinion on the role of SEE and Europe on the global AI market
It’s far from fascinating at present. But the knowledge and engineering skills are here. As business models evolve and economy gets more and more global and interconnected, there will be more companies like Ontotext in the future – serving global companies, while having most of their R&D in Sofia. When your client is a global company, having its IT operations spread across 5 time zones, it doesn’t make much difference whether they buy technology from a company in Sofia, London or Austin, TX. Global companies do research and choose the best technology for them, wherever it is.

Current capital flows in AI in Bulgaria, SEE, Europe - are there any patterns?
As I already said, there are lots of early stage investments in AI companies in Bulgaria. Most of the time – financial investors getting minority shares. Recently, we have seen a number of interesting acquisitions of Bulgarian software companies: Telerik and Finanalytica are just a couple of good examples. I expect more M&A involving AI companies in the region in the next few years.

How far can AI go and what does it mean for humanity?
I don’t plan to train my kids how to counter fight robots overtaking the Earth any time soon. I like Yuval Harari’s view of the history of humankind, but I don’t share his fears about AI. AI will keep improving our efficiency in all sorts of activities. It bears massive potential to do more of this! Particularly, to allow people and organizations better manage and exploit their knowledge, combine it with external data and make smarter decisions.

Knowledge can make a huge difference! Social and industrial knowledge is what allowed Germany, which was physically and morally destroyed after WW2, to become a leading global economy again within a couple of decades! Knowledge is the most important difference between poor and rich countries, between driving businesses and winners.
Communities

Sofia AI
Sofia AI is a community of startups, corporates and academics in the AI sphere focusing on understanding the current state of these technologies, its value add for businesses, and what is in store for the near future.

Web: city.ai/cities/sofia

Data Science Society
Data Science Society (a volunteer organization) develops a friendly environment where data enthusiasts are able to learn, share and experiment with real data cases within our global family.

We organize online Datathons, monthly challenges, digital meetups, webinars, workshops, summer schools and many others events. At the Data.Platform there are more than 2,000 registered data scientists from 50 plus countries.

Since its establishment in 2014 it has organized a multiple of events: 3 Datathons, the The First Online Global Datathon (Worldwide Data Science Hackathon with 140+ participants from 20+ countries); 35+ Data Science meetups and conferences.

Activities in the AI spectrum:
Organising Datathon in different areas – NLP, Predictive maintenance, Object and entity detection, Chatbots, etc.

Best practices/ success cases / customers:
https://www.datasciencesociety.net/datathon/
Top research problem – Identifying propaganda;
Unique methodology and data set;
Top Researchers at NLP sector are involved from QCRI, Max Plank, Sheffield, California, Michigan, Texas and others.
Events

AI events, meetups and communities:

1. **18th International Conference on Artificial Intelligence**
   - URL: [http://www.aimsaconference.org](http://www.aimsaconference.org)

2. **Sofia AI and Machine Learning Meetup**

3. **Global Tech Summit; AI & Smart Tech Software Development Conference**
   - URL: [https://globalsummit.tech/](https://globalsummit.tech/); [https://aismart.tech/](https://aismart.tech/)

4. **International Data Science Hackathon**
   - URL: [https://www.datasciencesociety.net/datathon](https://www.datasciencesociety.net/datathon)

5. **Recent Advances in Natural Language Processing (RANLP)**

6. **Part of RANLP: Summer School on Deep Learning in NLP; International Conference Biographical Data in a Digital World 2019**
The AI industry in Bulgaria will continue growing, according to ScyNet. More and more markets will be impacted by AI-enhanced products. Throughout the coming decade, a lot of current professions will become obsolete, especially in fields with repetitive and easy-to-predict decision process. Meanwhile, more talent will be employed in the further development of Deep Learning technologies.

AI will not lead to unemployment, according to A Data Pro and Identrics. Instead, it will create many new functions for humans, and companies will be looking for Chief Automation Officers in the near future, as well as many new lower level HITL positions. Businesses must prepare their employees so that they can work with the technology when it arrives.

According to Data Science Society, more resource centers start focusing efforts in Bulgaria and there will be a growth in terms of complexity of given tasks and knowledge.

By 2021 there will be at least 10 internationally recognizable Bulgarian companies, using AI technology, according to Ontotext. Put together, these companies will hire more than 500 people and will have a total annual turnover of more than EUR 50 mln. This does not include people working on AI projects for international companies having offices in Bulgaria (e.g. SAP, VMWare, Progress). Within five years at least two of the major Bulgarian AI companies will attract funding or get acquired, generating investment flow of more than EUR 50 mln.
Company Profiles
A Data Pro specialises in content, data, and business intelligence services, including tailor-made risk and compliance, media monitoring and analysis, and automation solutions. The company has a dedicated AI research and development hub.

Activities in the AI spectrum:
A Data Pro has year-long expertise with automation and AI-enabled solutions, which supports both internal processes and the services it provides. The company's AI-powered capabilities include data collection, transformation, enrichment and management, as well as machine learning and natural language processing (NLP).

Activities in other related spectrums:
A Data Pro's solutions are big data-oriented and collect, systematise and enrich content according to specific, pre-defined criteria. The company also develops in-house algorithms and systems through its R&D hub.
A4E is helping business better utilize their existing data by automating their processes in areas of decision making, demand & sales forecasting, risk management, product portfolio mix, market basket and geo targeting.

Activities in the AI spectrum:
A4E is developing its own platform for delivering AI as a Service to its clients. The analytical applications, which are run over the platform are completely automated, so all ML and optimization workflows, like model development, optimal decision making, and also the service delivery, are performed without human intervention.

Activities in other related spectrums:
The business solutions delivered to A4E’s clients are primarily into the sphere of Analytics. A4E has its own R&D team and collects proprietary developments covering ML, numerical optimization, NLP, and other algorithms.
Credissimo is a European FinTech Group that utilizes innovative proprietary technology to provide online consumer financing services and is focused on the development and implementation of financial solutions and related technologies since 2007.

Credissimo is present in five countries worldwide, four of which in Europe, and claims to be among the market leaders in the online consumer lending segment in two of them.

**Activities in the AI spectrum:**
Credissimo uses AI-based hybrid quant credit risk models and decision engines to efficiently manage its lending process. The company successfully automated its entire underwriting process, including all clients background checks and evaluation. More than 70% of decisions are now non-human based.

**Activities in other related spectrums:**
Credissimo has launched a chatbot service for granting online consumer loans via Facebook Messenger. The chatbot was designed and developed entirely by the Group’s own team.

**Locations:**
Poland, Spain, Colombia, Bulgaria, Malta, Macedonia

**Established:**
2007

**Employees:**
140

**Website:**
credissimo.com
Identrics is the R&D hub of A Data Pro, which develops in-house AI and automation solutions for both internal optimisation of organisational processes.

**Activities in the AI spectrum:**
Identrics' expertise ranges from entity extraction, content categorization and sentiment analysis, to machine learning, natural language processing and named-entity recognition, among others.

**Activities in other related spectrums:**
Identrics' team of data scientists and analysts has expertise in big data management, including content extraction, categorisation, automated recommendations and sentiment analysis.
Maj.io is a Sofia-based tech company. One of its main projects is Sloth.Works, a candidate-centric anonymous and a fully automated hiring platform connecting tech talent to companies. The platform operates in Bulgaria with plans to open four other CEE markets in 2019 through strategic partnerships with staffing firms across the region.

Activities in the AI spectrum:
Maj.io builds AI solutions for talent acquisition. The company has a team of recruiters, computational linguists and data scientists.

Activities in other related spectrums:
Maj.io’s technology stack is built with both heuristics and ML. The company has developed its own resume and job parsing technology and have trained its engine on millions of profiles and jobs in the US and Europe. The parsing is contextual, utilizing NLP and proprietary taxonomies which update automatically for new skills, technologies or job titles.
Ontotext offers technology and services for the development of big Knowledge Graphs, interlinking multiple structured datasets. The company's main product is GraphDB™ – semantic graph database engine.

**Activities in the AI spectrum:**
Natural Language Processing (NLP, text analysis, Information extraction); Knowledge graphs (Semantic data modelling and integration); Logical reasoning (semantic graph database engine); Knowledge representation (ontologies); Machine learning (neural networks and other methods) Computer vision (facial recognition)

**Activities in other related spectrums:**
NoSQL database engine developer; Big data analytics and data science; Social media analysis

**Locations:**
Sofia, London, New York

**Founders:**
Sirma Group Holding JSC

**Established:**
2008

**Employees:**
60+

**Industries:**
Media and Publishing, Market Intelligence, Financial Services, Healthcare and Life Sciences, Government and Public Sector

**Website:**
tonotext.com
ScyNet is a decentralised platform for creating and training of AI agents. It utilizes a technology, similar to AutoML that enables the AI agents to self-improve autonomously. The platform is open-source and its applications include trading algorithms and medical imaging.

**Activities in the AI spectrum:**
Developing algorithmic trading AI.

**Locations:**
Sofia, Bulgaria

**Founders:**
Todor Kolev, Zvezdin Besarabov

**Established:**
2017

**Employees:**
12+

**Industries:**
Algorithmic trading
AI for the financial blockchain sector

**Website:**
scynet.ai
About Bulgaria

Area
111,002 sq km

Currency
Bulgarian lev (BGN), pegged to the euro at BGN 1.95583

Membership
EU, NATO, WTO

Form of government
Parliamentary Republic

Population
7,000,039

Taxes
Corporate tax-10%; Income tax-10%; VAT-20%

Macroeconomic indicators as of 2018

- **GDP Real Annual Growth Rate**: 3.1%
- **Exports**: EUR 28.2 bln
- **Imports**: EUR 32.2 bln
- **Labour Force**: 3.326 million people
- **Unemployment**: 5.2%
- **Average Monthly Wage**: EUR 574
- **Gross External Debt**: EUR 33.3 bln
- **Current Account Surplus**: EUR 2.548 bln
- **FDI**: EUR 1.744 mln
- **Number of foreign tourists**: 5.805 million
List of companies, which have been researched for the purpose of this report

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<thead>
<tr>
<th>Company Name</th>
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<tbody>
<tr>
<td>11235 OOD</td>
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<td>A Data Pro</td>
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<td>Coca-Cola Hellenic IT Services EOOD</td>
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<td>Connecto AD</td>
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<td>GemSeek Consulting EOOD</td>
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<td>HeleCloud Bulgaria EOOD</td>
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<td>HITL EOOD (Humans in the Loop)</td>
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<td>Rainbe EOOD (Alcatraz AI)</td>
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<td>RB Sofia EOD</td>
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<td>ScyNet (AI blockchain solution)</td>
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<td>LLC - Sofia Branch</td>
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