Key points of the Federal Government for

a strategy artificial intelligence

As of 18 July 2018

The federal government will until the end of November this year, a strategy Artificial Intelligence (AI) and present it publicly at the Digital Summit 2018 in Nuremberg. The These cornerstones are based, among other things, on the recommendations of the expert forum Autonomous Systems of High-Tech Strategy of March 20, 2017 and Expert Consultation on Invitation by the Federal Chancellor on 29 May 2018 as well as preparatory work by the Federal Ministries. The Federal Government will be responsible for drawing up the strategy for further expert hearings, among others special fields of application and the regulatory framework as well as social issues carry out. There will also be a consultation process with nationwide working Give to associations, organizations and institutions. The cornerstones serve as a basis for the process of drawing up the strategy and giving orientation to goals and action areas the strategy and actions to be initiated directly by the ministries until Adoption of the strategy in the Cabinet.

1. goals

a. The federal government is committed to both research and development as well Application of AI in Germany and Europe to a world leading level too bring and keep there. Germany is to become the world's leading location for AI especially through a comprehensive and rapid transfer of Research results in applications as well as the modernization of the administration. "Artificial Intelligence (AI) made in Germany" is to become a globally recognized seal of quality become.

b. The Federal Government has a duty to develop a responsible and joint well-oriented use of AI in cooperation with science, industry, state and civil society. Based on European values like the inviolability of human dignity, respect for privacy and the

Equality principle, we want to raise the potential of the new technology.

c. We want a European response to data-driven business models and new ones
Find ways of data-based value creation, that of our economic, value and
Social structure corresponds.

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d. We want to broaden the very good scientific basis of AI in Germany and
with promising other technological developments and applications
link to new applications in different industries, public
Administration and in social areas.

e. We want Germany to combine its good position in AI research as well
with European partners and technology leaders to a leading position.
We strive to be an attractive research and business location for AI experts
and to be experts from home and abroad who are the world's brightest minds in the world
KI area attracts and holds, and our education capacities in the AI area
expand.

f. We want to create value from the application of AI, the benefits of AI for
put the citizens in the focus of our efforts - both at the
personal, individual level as well as on the social - and in particular
Minimize risks due to change, make systems verifiable and
prevent inadmissible discrimination.

G. With regard to the use of AI in the world of work, we are committed to a human
centered development and use of AI applications. We want to take care of that
Contribute to the workforce in the development of AI applications in the
Be focused on: the development of their skills and talents, theirs
Self-determination, safety and health.

H. We want to use the potential of AI in order to secure for all citizens.
safety, efficiency and sustainability in fields of application of particular importance
continue to improve while at the same time promoting social participation, free agency and self-reliance
promote citizenship.

i. We want our specific datasets to be for the benefit of society,
Environment, economy and state are harnessed and AI-based
Develop business models in Germany and become new export hits.

j. We are creating infrastructure for real-time data transmission in the
Gigabit society a key foundation for AI applications. Of which should also the
public administration and federal network infrastructures.

k. We want to ensure that IT systems that use and deploy AI,
ensure a high level of IT security, thus manipulation, abuse and
Risks to the public safety of this sensitive technology best possible
be prevented.

l. We want both developers and users
of AI technology for the ethical and legal limits of the use of artificial
Sensitize intelligence and consider whether the regulatory framework for a high level
Legal certainty needs to be further developed.

m. The recommendations of the Data Ethics Committee will be used in the preparation and

To implement the strategy.

2. Initial situation

Artificial intelligence has reached and developed a new phase of maturity in recent years become the driver of digitization and autonomous systems in all areas of life. Country, Society, business, administration and science are encouraged to take chances and Risks of AI. The Federal Government strives to improve the AI in all policy areas. actively shape fields of activity. The current progress made by the AI, especially in the area of Machine learning is based on the exponential growth in performance Hardware and its use for the processing of large databases. German Research institutes have long ranked among the best centers in the world.

AI is increasingly finding its way from research to application in the broader sense Economy. Large digital companies invest heavily in the development and use of AI technologies. You expect more efficiency for existing or the entry in new business models. Public investment is also rising in many countries worldwide. far. Increasingly, AI technologies are penetrating economic sectors, industries and the like Everyday life of the people. Crucial for the successful application of AI are the Access to data, the systemic embedding of AI technologies in complex products, Services and business models as well as justified trust on the basis of transparent Procedures and traceability for the citizens. For the others Using the AI in Germany, it is also essential to develop the digital infrastructure and continue to expand.

In addition, AI can help provide new insights into the origins and spread of To gain diseases, to recognize them faster and to treat them more individually. Their use can, in perspective, contribute to further improving our health care system, to enable new business processes and applications and thus to improve their health Political significance to set economic and employment policy impulses.

AI-based applications can also help citizens with their investment and Support consumer decisions and contribute to climate and environmental protection Afford.

In the security area - also in the sense of a national security precaution - is the Use of AI-based systems is an important building block for digital sovereignty Germany and thus contribute to the preservation of the security of the citizens and of the business location Germany. Thus, the supporting evaluation case-relevant KI data lead to better use of task forces and evaluation processes optimize, discover unknown patterns in data or storylines as well To support investigation approaches or to detect targeted misinformation.

In the area of linking user data, American and Asian companies have in In recent years a worldwide dominance and a lead over German and European companies, which also helps them in the further use of AI technology. currently provides competitive advantages. In the economic use of companies

company, process and product data from complex value chains and their
Linking with hybrid services - a perspective much larger market -
However, the competition begins only here Germany has in particular because of his
Economic structure with a strong share of the manufacturing industry, a worldwide
Leading position in the field of logistics as well as excellently trained specialists

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particularly favorable starting position. Not least by a head start in key fields
the AI like Industry 4.0 and Mobility. Germany offers great opportunities here.

The challenges exist for Germany, as for other states, in the
accompanying structural changes in the economy, labor market and living conditions of the
Citizens and in the rapidly growing international competition for talents,
Technologies, data and investments. At the same time, AI already requires decisions
with a view to sustainability and the training of our specialists. Add to that
Challenge of the transfer of new AI technologies into the middle class.
Especially in this complex transfer process and the exchange of data between central and
For German companies, however, the largest value creation
potential. There is an urgent need for action in these areas. Is accompanied by the
technological development of social changes and the possible emergencies
the adaptation of the legal framework for the use of AI as well as the
Creating a basic knowledge base around AI in order to facilitate public debate
factual. The strategy of the Federal Government should also contribute to an "AI made in
Germany ", a special and specific handling of the technology for the benefit
and benefits of the state and society.

Individual states have already recognized the special potential of AI and their own strategies
submitted (eg USA, China). The European Union has recently adopted a strategy for the EU to
a series of measures to increase investment in AI in Europe,
preparing for socio-economic change by AI and improving the legal
and ethical framework for the further development of AI. The federal government
Welcomes this EU strategy explicitly and will support an appropriate and future-oriented
equipment of Horizon Europe and Digital Europe, as well as in the common
seed declaration on the occasion of "Digital Day" on April 10, 2018 with 23 other member states
and Norway created.

The General Data Protection Regulation (DSGVO) forms a reliable legal framework for
innovative technologies and applications also in the field of AI. It contains regulations
for the protection of individuals with regard to the processing of personal data and
free movement of such data. The revision of the E-Privacy Regulation aims to do this
Round off the protection concept.

Essential steps have already been taken in Germany: within the framework of the high-tech strategy of the
Federal Government, with reference to the AI applications which are particularly relevant for Germany.
Mobility, Health, Autonomous Systems, Production and Smart Home
Developed action recommendations. The Platform Industrie 4.0 has been successful and
continued attention Networking and cooperation in the field of Industry 4.0 improved and
to set standards. Also in parts of the federal administration AI is already used, eg. B.
by the German Patent and Trademark Office. The federal government has also been promoting it for a long time
AI projects in support of basic research and research
application-oriented research. We will now strategically bundle these measures,

remove and complete.

3. Fields of action

To achieve these goals is the collective action of business, science,
Politics and civil society required. Measures are taken both in individual economic
branches or supply areas (vertical) as well as in cross-section across sector borders
away (horizontally). The necessary fields of action will be the Federal Government
Consult with experts in the coming months. The measures
are the responsibility of the responsible ministries and all financial needs
or additional needs will be borne by them within the budgetary and financial
financed or counter-financed in the relevant section of the budget.

On this basis, the Federal Government regards the following fields of action as a priority.

3.1. Strengthen research in Germany and Europe to be innovation drivers

We will significantly expand AI research in Germany. This is the purpose of the promotion
further competence centers for machine learning and their networking with the existing
the centers and research institutions of federal and state to AI and big data in the
Framework of construction of a national research consortium. The principle is that
Diversity in research is the prerequisite for later diversity in the market.

- Supraregional competence centers in the AI field internationally attractive and
  enable competitive working conditions and pay.
- Review existing funding schemes for their applicability to research
  AI as well as the implementation of the results of AI research. This is about, among other things, in
  existing instruments such as B. the SME promotion special offers for the
  Use of AI to establish or faster or novel funding formats too
  develop.
- Support of the combination of software and processor development in the sense of a
  Systems approach.
- Establishment of cooperative structures between research and external stakeholders from the
  Areas of government, civil society, business, privacy and information security.
- Supporting the development of cooperative structures in the field of AI research
  together with other partners of the European Union. In a first step
  Germany and France are building a German-French
  Research and innovation network based on existing structures and technologies
  Promote the competencies of both countries. The focal points of the cooperation are the
  Basic research, the transfer of research results into the economy, the
  Focusing on innovation and the development of regulatory approaches and
  be ethical standards.
- Raise the data resources of the research institutions both nationally and Europeanly
  Generation of knowledge by means of AI taking into account the interests of the legitimate interests of the

Generality and the individual and the structure of the necessary structures.

- Developing the distributed in the diagnosis and therapy in health care Data sources as a basis for the use of AI in the health and research, taking into account the legitimate interests of patients and patients on their data.
- Responsible use of the potentials in the combination of AI and Key technologies, such as biotechnology or environmental technology.

- Research and development of AI-based technologies as a contribution to the civilian Safety.
- Promote the development of procedures for control and traceability algorithmic forecasting and decision systems.
- Promote privacy technologies and technologies Consumer protection technologies to a differentiated and self-determined To handle personal data.
- Early involvement of regulatory expertise in research and development Development activities, which - as in the health sector - are highly regulated Meet the requirements to successfully find their way into the application.

3.2. Transfer to the economy

The know-how from the German research landscape must be stronger in Germany and Europe can be converted into added value. We will therefore be a focus of our Acting on the transfer of research results and AI methods into the economy lay. For this we see the following options:

- Strengthen the transfer activities in the field of AI and integration into an overall concept to increase the transfer of technology taking into account the change in the Working world. Here, an ecosystemic approach is needed to cover the entire To cover the value chain.
- Creating transparency on the AI landscape as a whole with the help of a continuous technology monitoring.
- Promotion of SME access to AI technologies, computer capacity and cloud platforms, as well as building platforms for data exchange, z. For example, according to the model of mCLOUD, including assistance for small and medium-sized students medium-sized companies. The competence centers, Mittelstand 4.0 could be used for this purpose that we have built nationwide in recent years.
- Promotion of regional clustering, analogous to the top clusters, and KI Ecosystems. On existing structures like the Digital Hub Initiative or the national or bilateral competence centers could be established.
- Initiation of projects supported by science and industry in various application areas in Germany, if possible together with ours European partners.
- Launch of special programs for the temporary exchange between science and industry to improve the networking of innovators with the demand side.
- Construction of real laboratories, test fields and support of pilot projects for the Use of AI to do there the testing of new technologies and business models in the To enable practice and identify adaptation needs in the regulatory framework.

- Promoting cooperation between companies in the context of Competition law and support for the establishment of consortia representing the Competitiveness of the German and European economy in the global Strengthen competition.
- Examination, albeit in the area of AI an important project of common European Interest (Important Project of Common European Interest, IPCEI) is possible.

Individual economic sectors have due to common business models or Production processes different starting positions for the digital transformation. The Strategy must take these peculiarities into account. For this purpose, appropriate in advance Led industry dialogues.

3.3. innovation competitions

So that Europe will continue to offer the best possible conditions for pioneering innovation in the future, existing potentials for leap innovations must be used more strongly. As part of In an initiative to promote leap innovations, artificial intelligence could be one of the first and central topics. Another, concrete instrument to jump innovations to push and attract talent, are innovation competitions ("Challenges"). Therefore, applies It also puts existing innovation competitions on a stronger footing to review conceptual orientation towards AI.

3.4. Arouse start-up dynamics and lead to success

For start-ups, access to venture capital is an essential resource especially in the particularly difficult growth phase. To create a start-up dynamic for AI To stimulate based business models and products, incentives must be created for investors and spin-offs from research institutions are specifically promoted. This sees the Federal Government the following options for action:

- The scientific competence centers for big data and machine learning will be enables you to implement your own spin-offs.
- Expansion of holistic consulting and promotion of start-ups.
- Establishment of a TechGrowth Fund.
- EXIST, the program for business start-ups, will be expanded.
- Under the Digital Hub Initiative and other programs, the cooperation will between founders and established companies, in particular small and medium-sized enterprises, promoted.

3.5. The world of work and the labor market: shaping structural change

AI will lead to a new level of change in work, with marked differences lead to previous levels of automation and digitization. Against this background the previous employment forecasts and scenarios must be critically reflected and the Strategies for the design and further humanization of work are readjusted. On People-centered approach is essential for the development and positive use of AI. The The world of work will focus in particular on the requirements for competences,

Changing jobs, work organization and labor relations. Not just in technology must be invested, but also in the workforce and their skills.
Businesses and workers need to prepare for the changes and the
Can handle the transformation process together. Here are the following
Approaches:

- Development of an international and European framework for AI in the world of work involving the ILO and the OECD.

- Development of AI observatories at international and EU level for the regular, comprehensive assessment of current developments and an assessment of possible effects and subsequent developments of AI on employment and the world of work.
- Development of European and national institutions for the systematic Impact monitoring of new applications in the workplace with regard to Employment, technical design, human-machine interfaces, data protection etc.
- Initiation of a transatlantic and European, especially German French exchange on human-centered technology design.
- Development and implementation of a comprehensive specialist strategy within the framework of the social partnership "Partnership for Professionals".
- Development of a national training strategy together with social partners, the answers to the digital transformation of the working world as a whole and to change through AI technologies in particular and a broad-based toolkit developed for the counseling of employed persons and promotion of their competences.
- Establishment of a support program for company experimental rooms for AI Applications in the workplace.
- Examination and, if necessary, further development of employee participation options when introducing AI applications.
- Organization of a comprehensive knowledge transfer to HR managers, Works councils and employees based on the New Quality of Work initiative; Establishment of future centers for the development of competences in particular in Personnel and works councils.

3.6. Strengthen training and attract skilled workers / experts

Germany must be the world's best scientists in the field
AI will be an even more attractive location and attract talents from all over the world. We see that the following options:

- Promotion of new KI chairs in Germany at selected locations, within the framework the possibilities of the Basic Law.
- Increase the attractiveness of working and remuneration conditions for young people Scientists from Germany and abroad.
- Expansion of the offer for young scientists and early support understanding of young people for AI through opportunities to "understand" and join in.
- Promotion of training, further education and training programs, taking into account the specific features of individual areas, such as health care or the Food supply chain.

- Creating a framework for AI professionals to incentivize the recruitment by experts abroad ("brain drain") and for extraction international experts ("brain gain").
- KI basic knowledge as an integral part of teaching content, not only in computer science, but also in other natural, social and engineering sciences Anchor courses and integrate them into vocational education and training where appropriate.

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3.7. Use AI for government tasks and adapt administrative competences

The use of AI offers the opportunity in the field of public administration information and services targeted, tailored and low-threshold for citizens and provide businesses. In the sense of a national security precaution are security aspects of the AI are also important. For the state and administration Change demands, conditions and possibilities, through the use of AI, which trigger the following action:

- Examine the uses of AI in public administration.
- Transparency, verifiability of data processing, data and fundamental rights protection and freedom from discrimination must be ensured.
- The AI competencies of the public administration must be consistently developed and expanded. For citizens, the comprehensibility of administrative decisions must decisions and thus effective legal protection in the use of AI.
- The Federal Government will play a pioneering role in the use of AI and Improve the efficiency, quality and security of administrative services contribute.
- Security policy aspects and potential of the AI are in the sense of a state security.

3.8. Make data available and usable

For methods of AI and machine learning are the availability and quality of data central prerequisite and determining factors for the quality of the results. simultaneously the security of a usable database is of vital importance. Access to data but is often limited - partly for legal reasons, partly due to the factual data control of state and private entities. The amount of usable, high-quality data must be increased significantly, without sacrificing personal rights, to violate the right to informational self-determination or other fundamental rights. Under We have planned the following steps for these premises:

- Public and academic data are increasingly being used for AI Research is open and its economic and public benefit use in the Meaning of an open data strategy.
- Further implementation of the European Data Area to be available throughout Europe Making data more usable and scaling data-based offers in the EU to facilitate.
- Investigation of whether and, if applicable, how the access to and use of data is re-regulated

particular sector-specific rules. The goal is a clear one
Legal framework. Access and use of data will also be part of the
Particular attention will be paid to the upcoming revision of competition law.

- Networking of private and public actors to strengthen process optimization
  Help of AI and support of data co-operation between state and
  Private sector in the sense of a public-private data pool.
- Examining the possibility of supporting mutual "data partnerships"
  between companies.
- Expansion of the activities to establish the interoperability of data systems in the
  Healthcare.

- Supporting the interoperability of data platforms such as the "International
  Data Space (IDS) ".
- Expansion of the necessary infrastructure in the area of hardware / computer capacities as well as
  Taking into account energy efficiency and looking at the cloud
  Climate protection.

3.9. Adapt regulatory frameworks and ensure legal certainty

The increasing use of AI will possibly lead to adjustments in the regulatory
frameworks to give providers investment and legal certainty, as well as
a basis for legitimate trust and acceptance for users
create. Here are the following points to consider:

- Review and, if necessary, adapt the legal framework for the use of data and the
  Application of AI technology, in particular clarification of the legal relationship between
  the participants. We will consider suggestions from the Data Ethics Committee.
- Ensuring the transparency, traceability and verifiability of the
  Systems, allowing more effective protection against distortions, discrimination,
  Manipulation or other improper use, especially during use
  algorithm-based forecasting and decision-making systems is possible.
- Promote the development of innovative applications that promote self-determination,
  support the social participation and the privacy of the citizens.
- Strengthening social partnership in the integration of AI into the world of work.
- Adapting the Copyright Legal Framework to Text and Data Mining (TDM) as
  Machine learning foundation for both commercial and non-commercial purposes
  to facilitate. The interests involved are to be brought to a fair balance
  become.

3.10. Set standards

Who sets the standards, determines the market. Common standards and standards ensure
The removal of technical barriers, support the opening of markets and thus increase
the competitiveness of the economy. Common standards can be the
Increase application usability and enable interoperability. Therefore
an adequate impact of Europe in international standardization processes.
deliver. To do this, we will work with experts from science and industry
check the following options for action:

- Launching an initiative to bring European interests into international standardization

stronger representation of bodies.

- Stronger commitment to the development of open and international standards.

11.3. National and international networking

Cross-cutting technologies like AI sooner or later affect all areas of science, Economy, administration and everyday life of the citizens. The development is global, that's why politics has to think and act cross-border.

For this we plan:

- Coordination of the measures of the AI strategy with other activities of the Federal government such as the Data Ethics Commission, the Industry 4.0 platform, digitization im Gesundheitswesen, zu Mobilität 4.0, dem Kinder- und Jugendmedienschutz, der IT-Konsolidierung Bund, der Zentralen Stelle für Informationstechnik im Sicherheitsbereich (ZITiS), sowie, den Maßnahmen zur Zukunft der Arbeit und des Sozialstaats oder für Maßnahmen zum Klimaschutz.
- Stärkere Zusammenarbeit mit den EU-Institutionen, insbesondere mit der Europäischen Kommission und anderen Mitgliedstaaten in Fragen der Rahmenbedingungen für die Nutzung des gemeinsamen Digitalen Binnenmarktes und weiteren Maßnahmen der KI-Strategie. Eine Förderung bedarf eines effektiven Systems komplementär aufeinander abgestimmter Instrumente auf nationaler und europäischer Ebene unter Beachtung des Subsidiaritätsgrundsatzes und unter Einbeziehung bestehender Instrumente.
- Austausch und möglichst Verständigung über gemeinsame Leitlinien mit international führenden Regionen und Wirtschaftsräumen. Wir sind offen für internationale Kooperationen im Bereich KI und werden die bilaterale und multilaterale Zusammenarbeit dafür suchen, zum Beispiel im Rahmen der G7 und der G20. Auch die deutschen Auslandsvertretungen sowie die Deutschen Wissenschafts- und Innovationshäuser können für diese Art der Zusammenarbeit genutzt werden. Dabei werden wir unsere Wertvorstellungen beim Einsatz von KI-Systemen und deren Nutzung zugrunde legen.
- Aufbau von Kapazitäten und Wissen zu KI in Entwicklungsländern im Rahmen der wirtschaftlichen Zusammenarbeit, damit dort die wirtschaftlichen, gesellschaftlichen und sozialen Chancen genutzt werden können. Entwicklungs- und Schwellenländer dürfen vom technologischen Wandel nicht abgehängt werden.

3.12. Dialoge in der Gesellschaft führen und Handlungsrahmen weiterentwickeln

Die Entwicklung der KI schreitet dynamisch voran, demgemäß muss auch die Strategie KI in ihrer Umsetzung dauerhaft mit Vertretern aus Wissenschaft, Wirtschaft, Politik und Gesellschaft rückgekoppelt werden, um eine vertrauens- und innovationsfördernde KI-Kultur in Deutschland zu etablieren.

Dazu sehen wir vor:

- Organisation gesellschaftlicher Dialoge über den Umgang mit KI und deren spezifischer Regulierung in unterschiedlichen Anwendungsfeldern unter Beteiligung der Zivilgesellschaft. Hierbei werden wir z. B. die sozialen und räumlichen Wirkungen sowie ethisch relevante Fragestellungen erörtern.
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Weiterentwicklung der Plattform Lernende Systeme zu der Plattform für Künstliche Intelligenz, in welcher der Austausch zwischen Politik, Wissenschaft und Wirtschaft auf breiter Basis geführt und der Dialog mit der Gesellschaft organisiert wird. Wir werden im Rahmen der Plattform Anwendungsszenarien entwickeln, die die Klärung technischer, ethischer und rechtlicher Fragestellungen unterstützen können. An ihnen sollen auch der Nutzen von KI verdeutlicht sowie die Herausforderungen sowie ethische und rechtliche Grenzen der Nutzung sowie Gestaltungsmöglichkeiten aufgezeigt werden.

- Ausbau der multidisziplinären Forschung zur Technikfolgenabschätzung im Bereich KI.
- Organisation eines interdisziplinären Dialogs der Wissenschaften als Basis für einen gesellschaftlichen Dialog über den Umgang mit KI und deren spezifischer Regulierung und Nutzerorientierung in unterschiedlichen Anwendungsfeldern.

- Begleitung von sozialpartnerschaftlichen Dialogen bei der nachhaltigen Integration von KI in die Arbeitswelt.

4. Sofortmaßnahmen der Bundesregierung

Insbesondere bei der Forschungs- und Innovationsförderung werden in der Umsetzung entsprechende Schwerpunkte im Bereich KI gesetzt. Auch die Gewinnung und der Halt von KI-Expertinnen und Experten in Deutschland genießen programm- und politikübergreifend unmittelbare Priorität. Die Vernetzung und der Ausbau der Kompetenzzentren mit Frankreich werden unverzüglich umgesetzt. Darüber hinaus wird die Einrichtung von thematischen Kompetenzzentren in Angriff genommen. Zu den Sofortmaßnahmen gehört auch der Infrastrukturausbau. Die Bundesregierung wird im Rahmen laufender Programme und des Haushaltes 2018 die einschlägigen Maßnahmen im Sinne dieser Eckpunkte umsetzen.

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