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Plenary Session 2 – Artificial Intelligence & Machine Learning
Background document[1]
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1. Introduction and context

When consulting on topics to include in the 2019 Work Programme, the Secretariat received many suggestions from EPRA members to consider the topic of "artificial intelligence and machine learning".

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[1] Disclaimer: this document has been produced for an internal meeting by EPRA, an informal network of 53 regulatory authorities in the field of audiovisual media services. It is not a fully comprehensive overview of the issues, nor does it represent the views or the official position of EPRA or of any member within the EPRA network.

Increased research activities focusing on algorithms, dramatically enlarged computational power and larger and more differentiated data sets have contributed to major progress in the sector of artificial intelligence (AI).[2] In the coming years, its use for everyday activities will increase to the same extent to which open source software for AI becomes available; besides, industry and research institutes are strengthening their efforts for cooperation while more and more engineers train in the AI sector.[3] All these aspects have turned artificial Intelligence (AI) into one of the most strategic technologies of the 21st century.

The opportunities and challenges raised by AI and its sub-segment of "machine learning", a class of algorithms that automates analytical model building and gives computers the ability to learn without being explicitly programmed are currently the subject of much debate in Europe. The Council of Europe has launched an expert group[4] on the impact of AI on human rights and fundamental freedoms and the implications for the concept of responsibility, and organised a high-level conference on 26-27 February 2019 in Helsinki under the Finnish Chairmanship.[5] On 11 September 2019, the Committee of Ministers set up an Ad Hoc Committee on Artificial Intelligence (CAHAI) that will examine the feasibility and potential elements of a legal framework for the development, design and application of AI, based on Council of Europe's standards on human rights, democracy and the rule of law. On 25 April 2018, the European Commission released a Communication on artificial intelligence for Europe which calls for an appropriate ethical and legal framework, based on the EU's values and in line with the EU's Charter of Fundamental Rights.[6] On 8 April 2019, the European Commission's high-level expert group on artificial intelligence published Ethics Guidelines for Trustworthy Artificial Intelligence[7].

Using AI and applications based on algorithms has become standard procedure for social networks, platforms and other intermediaries operating at an international level, and major media companies by now also quite naturally resort to AI applications with AI usually assisting in the analysis, production and mediation of content. Possible fields of usage of AI in the media sector include recommendation mechanisms, automatic content production, robotic journalism or programmatic advertising, which will inevitably put new challenges before regulators. Key factors for resorting to AI are cost savings and increased efficiency.

In its meetings over the last few years, EPRA has repeatedly looked into the use of algorithms by social networks and the potential impact they can have on the formation of public opinion.[8] Artificial intelligence is based on the use of algorithms. For this reason, in taking up the issue once more at its 50th meeting, EPRA will analyse the use of artificial intelligence by players in the audiovisual sector that are potentially subject to regulation, i.e. all types of "platforms" (social networks, intermediaries etc.) as well as "media actors" (broadcasting, on-demand, audio, possibly also online publications) and its implications for citizens, consumers and regulators.

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[2] Cambridge Consultants (2019), p. 14
[3] Cambridge Consultants (2019), p. 23
[4] https://www.coe.int/en/web/freedom-expression/msi-aut
[5] https://www.coe.int/en/web/freedom-expression/aiconference2019
[6] https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51625
[7] https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top
[8] See for instance the plenary session in Edinburgh in 2017 on "Promises and challenges of Digital Disruption; Filters, algorithms and diversity – turning concerns into opportunities?" and the plenary sessions in Luxembourg and Bratislava in 2018 devoted to "Political Communication and the Challenges of Social Media".

Against this background, an exploratory session with selected speakers from the industry and expert consulting firm will highlight the opportunities and challenges that AI raises for the media sector in practice, identify potentially adverse effects on key concepts of media regulation, such as editorial responsibility or media pluralism and diversity, and open a debate on permissible or necessary regulatory intervention. To focus the debate, this paper is intended to provide an insight into the most relevant AI technologies, putting the emphasis on aspects affecting the regulation of audiovisual media. AI as a topic and issue per se is cutting across many fields and can involve complex questions. For this reason, other fields of relevance with a bearing on AI are not dealt with in this paper; they might include, among others, questions of copyright, data protection or the right to privacy. The human rights and ethics aspects of the issue are also not dealt with in detail as this is not the objective of this session.

The paper offers some definitions and explains several technical processes using AI which are relevant for media companies and platforms before providing examples for the application of AI in the media sector and analysing the opportunities and risks they present from the viewpoint of media regulation. Furthermore, potential fields of regulation and first approaches for the regulation of and with AI in the media sector in Europe are outlined. Members are also asked to consider and reflect the questions in the final section of this paper.

2. Definitions

2.1 Artificial Intelligence

There is no end of definitions of the term "artificial intelligence"; in the public debate the notion is not clearly determined and differentiated.[9] The "Turing test" which was developed early by famous UK mathematician Alan Turing (1912 – 1954) already shows the difficulties in coming up with an appropriate definition of AI.[10] The Turing test basically means that a machine must be considered to be intelligent if the human who blindly communicates with it cannot distinguish whether the communication involves another human or a machine. Wide sectors of science dismissed the definition, arguing mainly that it told more about the abilities of the human operator as regards determining the source of communication, than about the source itself.[11]

Definitions of the term these days put the focus more on procedural aspects and properties of AI. Most of them cover the "capability of a machine to imitate human behaviour"[12], the capability to arrive at the solution of complex problems efficiently and independently.[13] Above all, AI can process data in a form that systems not based on AI could not achieve to this day. The European Union has accordingly developed the following definition of AI: "Artificial Intelligence refers to systems that display intelligent behaviour by analysing their environment and taking action – with some degree of autonomy – to

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[9] Goldhammer/Dieterich(/Prien (2019), p. 4
[10] Even though Turing strictly speaking never used the term "artificial intelligence" as such, in 1950 he published an article with the title "Computing Machinery and Intelligence"
[11] Pörksen (2018), p. 24 and following page
[12] Cambridge Consultants (2019), p. 14
[13] Goldhammer/Dieterich(/Prien (2019), op.cit.

achieve specific goals."[14] Another definition has been provided by the Council of Europe describing AI as "a set of sciences, theories and techniques whose purpose is to reproduce by a machine the cognitive abilities of a human being. Current developments aim, for instance, to be able to entrust a machine with complex tasks previously delegated to a human."[15]

2.2 Machine Learning

Machine learning as a sub-category of AI is the study of algorithms and statistical models, which enable a computer system to make decisions and predict outcomes without being explicitly programmed.[16] In particular, algorithms are to be trained with the help of sets of data to fulfil specific tasks and take on cognitive functions. Technologies, which are based on machine learning can recognise patterns and correlations contained in the data and apply the findings to new data in the form of complex algorithms. Depending on the purpose, relevant data can be identified, extracted and aggregated, statistical forecasts become possible and probabilities for specified events can be calculated, and processes can be adapted in line with identified patterns.[17]

2.3 Deep Learning

"Deep learning", a sub-category of machine learning, is based on the use of neural networks, which copy the mechanisms of the human brain.[18] Against this backdrop, deep learning is a technique, which employs multiple layers of neural networks, which are trained on large datasets to 'learn' specific characteristics of that data and then apply this learning to new data.[19] Applications from the fields of language and image recognition or the production of images and videos that appear to be realistic take deep learning as the basis.

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[14] COM(2018) 795 final Communication of the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of Regions of 7 December 2018 – Coordinated Plan on Artificial Intelligence https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2018:795:FIN

[15] Council of Europe – Artificial Intelligence, as available on 20 August 2019 via https://www.coe.int/en/web/artificial-intelligence/glossary

[16] Cambridge Consultants (2019), p. 18

[17] Dreyer/Schulz (2019), p 8

[18] Lossau (2018), p. 2

[19] Cambridge Consultants (2019), p. 12
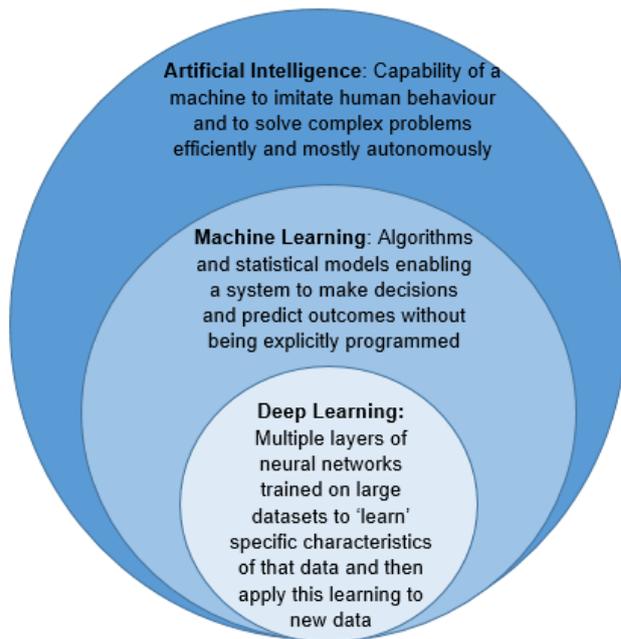
How AI, machine learning and deep learning build on each other (s. above, p. 2 and following pages; Source: Author)

3. The most relevant AI procedures and methods at a glance

A large number of differing processes on methods based on AI are now employed individually or in combination by enterprises. Below the processes most frequently used by media companies and platforms are described in brief.[20]

Big Data Analytics: used for analysing large amounts of data for identifying patterns, unknown correlations, market trends or user preferences. The process also comprises applications based on statistical methods and applications based on machine learning which summarise past events (*descriptive analysis*), assess (*diagnostic analysis*) and predict likely events (*predictive analysis*) and offer recommendations for action (*prescriptive analysis*).

Natural Language Generation (NLG): serves the automated generation of text. *Natural Language Processing (NLP)* is employed, among others, for automatically processing, summarising and translating text. *Natural Language Understanding (NLU)* presents the most sophisticated form of text-based AI applications; with the aid of deep learning technologies, NLU can understand the content and context of text. [21]

Generative Adversarial Networks (GAN): inter alia used for the production of photo-realistic images, modelling movement patterns in videos or generating 3D pictures from 2D images. So-called "deepfakes" are also frequently based on this high-performance AI process. In principle, GAN consist of two neural networks in a feedback loop which thus mutually train each other. [22]

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[20] For more detailed information on these and other methods, s. Cambridge Consultants (2019), p. 73 and following pages

[21] Goldhammer/Dieterich/Prien (2019), p. 5 and following page.; Cambridge Consultants (2019), p. 75

[22] Goldhammer/Dieterich/Prien (2019), p. 6 and following page.; Cambridge Consultants (2019), p. 22

4. AI use by media companies and platforms

4.1 Content analysis and control

4.1.1 Content Moderation

The massive increase of online content involving hate speech, other insulting communication and content harming minors today presents a considerable challenge. In response, the revised Audiovisual Media Services Directive now requires video-sharing platforms to make available suitable instruments for fighting and deleting such content. Alongside this, platforms and media content providers are increasingly committed to moderating content with the teams in charge of having to filter out problematic content from the masses of user-generated content that is uploaded on the platforms, and then deciding, whether or not to delete it. This is a major and complex challenge for all platforms (e.g. Facebook or YouTube). For content moderators it is by now almost impossible to identify and delete all harmful content in good time, adequately and correctly. [23]

Content moderation currently usually involves software designed to detect keywords, images or videos in the pre-moderation phase ("pre-moderation") which are brought to the attention as problematic content to the (human) moderator ("hash matching", "keyword filtering" etc.). However, such solutions are limited in their effectiveness as the significance and context of the posted content (sarcasm, irony, differing cultural values etc.) cannot be attributed correctly in all instances. Still there is a high potential of machine learning and deep learning applications designed to enhance significantly the precision and effectiveness of platform moderation. The applications are designed to better perceive problematic content and its context in the future.[24] Deep Learning mechanisms deliver more varied and more realistic data for training moderation systems based on AI.[25] And lastly, they could support human moderators in such a way that the latter could increase their productivity by being less exposed to the most harmful content as a result of pre-moderation processes being applied.[26]

Practical examples: The problems involved with platform moderation have attracted considerable media attention. For one thing, there is the issue of "over-moderation" which means the automatic removal of content available, e.g., on Facebook. This caused considerable criticism in the general public in instances where the cultural and/or historic context was ignored, e.g. in the case of a photo showing a 16th century statue of the Greek God Poseidon naked, or in the case of the historical document of the naked young girl fleeing a napalm attack during the Vietnam war. However, "under-moderation" equally persists as a problem: Irrespective of automated procedures, the platforms admitted to having major problems in deleting the huge number of videos uploaded which covered the Christchurch terror attack. And lastly, the public debate also covers the considerable psychological burden and strains to which content moderation teams are frequently exposed.[27]With particular regard to disinformation, while AI is able to generate false news, it can also contribute to detecting them. As an example, AFP's Medialab team has led several projects, such as WeVerify, that support journalists in detecting

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[23] Cambridge Consultants (2019), p. 30 and following pages

[24] In particular as a result of the support provided by national language processing and understanding, see section 3 above; Cambridge Consultants (2019), p. 47 and following pages

[25] In particular due to resorting to generative adversarial networks, see section 3 above., Cambridge Consultants (2019), p. 58 and following pages

[26] Cambridge Consultants (2019), p. 60 and following page

[27] https://www.cnet.com/news/facebook-content-moderation-is-an-ugly-business-heres-who-does-it/

disinformation. The algorithm is not a miracle solution though and most initiatives and tools work hand in hand with human beings: the datasets used to train the algorithm must be coded by human fact-checkers.[28]

4.1.2 Quality control and compliance

AI can provide considerable support to media companies aiming at meeting regulatory requirements and internal quality standards. With the help of machine learning and deep learning systems, live broadcasts of moving images can be analysed and categorised according to varying criteria at considerably higher speed and precision; criteria involve facial, object and environment recognition, voice recognition, the recognition of sensitive content, highlights etc. On the basis of these data, a contextual video analysis based on AI control allows faster and more precise action regarding disinformation, wrong titles, moderation errors and unsuitable content. In addition, AI can automate the creation of content metadata to improve archiving but also encourage discoverability of content.[29]

Such AI solutions could potentially be resorted to by media regulators for monitoring the compliance with legal provisions by for example identifying illegal content in the plethora of audiovisual content distributed via linear and non-linear infrastructures. Further use by regulators could include the conduct of research activities for internal or external use (for ex. in order to fulfil reporting duties).

Practical examples: Media companies Al Jazeera, RTÉ and Associated Press are cooperating with technology companies V-Nova, Metaliquid, QCRI & Tech Mahindra in a project named "AI content indexing for regulatory compliance".[30] CSA France has launched a study on the equal treatment of gender on-screen and on air with the support of AI-based technology[31]. CSA used a software tool developed by the French national audiovisual archive INA (Institut national de l'audiovisuel) called the "INA Speech Segmenter".[32] The tool has identified and assigned voices of 32'000 programmes to male and female speakers with an error rate of 0.6 per cent.

4.1.3 Opportunities and Challenges from a media-regulatory viewpoint

Opportunities: The use of AI technology for improved content moderation, regulatory compliance and quality control can lead to more efficient regulation and a reduction of regulatory expenditure. For independent media regulatory authorities in particular, AI-based control of broadcasting and on-demand content could offer an opportunity for more efficient and comprehensive regulation. Alongside this, AI-based control and analysis of journalistic content provides an opportunity to improve the quality of reporting. This is of relevance also for the regulators as quality standards are an integral part of the remit of many public service media in Europe.

Challenges: The use of improved AI for content moderation by platforms exacerbates the problem of decisions on the admissibility of content being outsourced to commercial Internet companies instead of being subject to the remit of independent national regulatory authorities and courts. Platforms can

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[28] Bremme (2019), p.4
[29] Bremme (2019), p.8.
[30] https://show.ibc.org/exhibit/media-telecom-catalysts/ai-content-indexing-for-measurement--regulatory-compliance
[31] Presentation by Sébastien Lécou, CSA (FR) for the Plenary Session 2: "Artificial Intelligence & Machine Learning" on 25 October 2019 in Athens (members only).
[32] https://github.com/ina-foss/inaSpeechSegmenter

develop standards, set rules and determine procedures. They standardise and control the forms of use and communication in their terms of business and thus potentially exert considerable influence on public communication.[33] They apply their own self-determined standards which may not always take adequate account of national legislation.[34] Against this background it appears doubtful that the problems of "over-moderation" or "under-moderation" can be solved with the sole use of improved AI systems and human intervention remains crucial. The right balance needs to be struck between human judgment and automation, experience and creativity to increase efficiency levels when it comes to the collection, processing and validation of information.[35]

Further, the use of AI cannot be understood as a "cure-all-remedy" to resolve every regulatory issue that arises. AI might be an excellent solution to identify problematic content with speed and precision and can therefore support media providers and regulators in their daily work. Nevertheless, these technologies are not yet suitable to conduct comprehensive quality analysis and to sufficiently understand the regulatory context – and it is highly questionable if they will ever be able to do so, without human intervention. The question, how and when to use AI solutions for regulatory purposes and if these solutions are always more effective and more efficient, needs careful case-by-case assessment[36].

Finally, content analysis and content moderation tools based on AI can only be as good as the quality of the training data involved. There are risks of a distorted or imperfect database, which can lead to incorrect labelling. This specific topic is further explored below, in the section on content production.[37]

4.2 Content production

4.2.1 Automated text production and translation

AI is increasingly resorted to for the partial or totally autonomous production of journalistic contributions. Standardised news items and reports are produced from automatically generated text; robotic journalism in this context produces the best results when it is based on up-to-date structured and machine-readable data. As a result, this form of text production is found most frequently for the generation of information covering the sectors of sports, weather or finance.[38] Researchers are currently working on the improvement of automated journalism so that the AI employed can achieve a better content understanding and thus produce more complex news reports.[39]

In addition, AI has also brought about considerable quality improvements for the automated translation of texts already – under ideal circumstances, readers will no longer notice that a text they are consuming had originally been written in a different language.

Practical examples: The Washington Post is employing the automated storytelling software "Heliograf" which produced more than 500 articles largely autonomously during the election campaign in

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[33] Jarren (2018)

[34] Hasebrink et al. (2017) call this phenomenon "tensions between company-internal and societal standard-setting", p. 211

[35] Bremme (2019), p. 3

[36] [Presentation by Niamh McCole (RTÉ) on "AI for measuring & Monitoring Editorial Standards & Regulatory Compliance"](#) for the plenary 2: "Artificial Intelligence & Machine Learning" on 25 October 2019 in Athens (Members only).

[37] Section 4.2.4, p. 10

[38] Goldhammer/Dieterich/Prien (2019), p. 11

[39] Lossau (2018), p. 4

November 2016. By comparison, during the 2012 elections, four members of staff could complete just a fraction of this work over a period of 25 hours.[40] The IBM platform "Watson" designed an entire issue of the British magazine "The Drum".[41] Finland's YLE Television uses its Voitto bot to generate 100 articles and 250 images per week[42]. German company DeepL offers an automated translation service which generates very good results in seven languages.[43]

4.2.2 Automated audio and video content

Employing AI technologies including GAN and NLP, media companies can now produce audio and video clips that are generated largely automatically. Regarding video, the applications on the market analyse large amounts of text for specific keywords; thereafter, the software will look for clips in the video data bases offered by agencies or others, which are then used for the automated production of a video. Some platforms also offer the integration of content management systems as well as interfaces to social media outlets; videos can thus be published in different formats. In this way, media companies can edit text for the generation of videos that can be used in different platforms. The automated generation of audio clips follows a similar regime under which keywords are used to summarise text contributions with the help of artificial intelligence and offer them as audio clips that can be made available via Alexa or Google Assistant.[44]

Practical examples: "Wochit"[45] and "Wibbitz"[46], the two most successful software applications, allow for the generation of video contributions on the basis of texts requiring very few steps only. The software is employed among others by AP, AFP, Reuters, Bloomberg, Forbes etc. "Wibbitz" entered into a partnership arrangement with Reuters for providing automated news videos to Reuters customers at speed.[47] In the audio sector, the IBM platform "Watson" offers a service that allows text to be converted into language with the help of AI. [48]

4.2.3 AI-based audiovisual services for people with disabilities
Another important field, which is also part of audiovisual content production, is to make content accessible to people with disabilities. Automatic transcription technologies can also contribute to this task through the automation of subtitles, audio synthetizing of text, contextual recognition of images for real-time audio description or translation and the use of "avatars" for sign-language solutions.

Practical examples: AI Media TV offers captions and transcriptions for live events and in replay[49]. Swiss PSB SRG SSR (by its multimedia affiliate SWISS TXT) and Belgian PSB VRT joined forces with renowned research institutes for the EU-funded project "Content4All". This project aims at making more content accessible for the sign language community by implementing a sign-translation workflow with a photorealistic 3D human avatar, which is based on machine learning.[50]

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[40] https://www.wired.com/2017/02/robots-wrote-this-story/
[41] https://www.thedrum.com/news/2016/06/15/ibm-watson-drum-team-first-magazine-edited-ai
[42] Bremme (2019), p. 2
[43] www.deepl.com
[44] Goldhammer/Dieterich/Prien (2019), p. 13 and following page
[45] www.wochit.com
[46] www.wibbitz.com
[47] https://www.thomsonreuters.com/en/press-releases/2016/september/reuters-partners-with-wibbitz-to-create-videos-using-automation-technology.html
[48] https://www.ibm.com/watson/services/text-to-speech/
[49] Bremme (2019), p.10
[50] http://content4all-project.eu/

4.2.4 Opportunities and Challenges from a media-regulatory viewpoint

Opportunities: The production of journalistic texts, audio and video spots controlled by AI is of particular interest to media companies as it provides economic advantages for them. The negative consequences of the structural changes in the media ecosystem hit media companies particularly hard. Economising on the cost of content production – in particular in the areas of routine texts such as sports and weather reports – would under ideal circumstances free resources for producing other reports on issues that are relevant to society and democracy.[51] AI-based translation services also offer great opportunities to media companies as they would enhance cross-border co-operation and media products in smaller markets.[52] Finally, AI presents an opportunity to produce more accessible content for persons with disabilities because it increases efficiency and reduces costs of accessibility. It could help promoting a cultural shift by making accessibility part of the normal course of business in audiovisual content production.

Challenges: In the process of journalistic creation, the use of AI could lead to mistakes or errors if data or forecasts are classified in the wrong way. For instance, a media company and the audience might come to wrong conclusions, e.g. if an algorithm wrongly labels an object or a person on a picture or does not recognise the targeted object at all. The use of AI could also result in a systematic imbalance in treating specific groups of persons, as algorithms take decisions on the basis of historic training data. They could thus have socially destructive effects for certain groups of persons.[53] Another scenario would be the deliberate programming of the AI by a human to include distortions and thus accelerate and increase the production of disinformation. The new risks presented by deepfake images and videos which can hardly be recognised as fakes must also not be underestimated.

4.3. Content mediation and distribution

4.3.1 Personalised recommendations and content

Platform providers, social networks and other intermediaries select, prioritise, recommend, aggregate and filter content on behalf of their users. For doing so, they resort to highly automated software systems which aggregate the content identified or recommended by the respective user on the basis of content aspects and individual factors.[54] Providers of on-demand services and traditional media companies also use AI and algorithms for offering personalised content to their users.

External players resort to AI in the form of "bots" on social networks. Bots can be defined as user accounts characterised by an automated exchange with other users which is effected by specific programmes. Bots can pretend to be humans by analysing the content of communication and leading dialogues. These programmes are able to react to keywords or events, look for interesting content in the Internet and publish such content themselves, connect to other users or react to customer enquiries. "Voicebots" and voice-controlled digital assistants in addition use the human voice for

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[51] It must not be overlooked that the use of AI for the automated production of content also brings with it considerable organisational upheavals in media companies including, for instance, cut-backs of journalistic staff or an increased demand for IT experts, see Hasebrink et al. (2017), p. 207; Goldhammer/Dieterich/Prien (2019), p. 29
[52] Lossau (2018), p. 3
[53] Goldhammer/Dieterich/Prien (2019), p. 29 and following page
[54] Dreyer/Schulz (2019), p. 7

communication and thus offer an attractive alternative to search engines and other text-based recommendation systems. In the opinion of experts, voicebots will become even more relevant in the future and could present a paradigm shift as regards the way in which we receive information and news.[55]

Practical examples: Netflix uses algorithms and machine learning systems for developing tailor-made content for its viewers. A statistical analysis of customer data allows for the production of content that fits perfectly for a specific target group.[56] The European Broadcasting Union (EBU) is currently working on a recommendation system for public service content called PEACH as well as an open data platform for data scientists. The algorithms employed in these systems allow for taking into account the public service remit on information, education and entertainment.[57]

4.3.2 Promoting social engagement online

As outlined in an expert report commissioned by Ofcom UK from Cambridge Consultants, AI can help to reduce the work involved in the preventive content moderation by being adopted for promoting socially positive online engagement in differing ways. This includes automated warnings against harmful content for users.[58] Other forms resort to "nudging techniques" stopping users from posting harmful content (e.g. with the aid of an AI-controlled question whether the problematic content in question may be posted)[59], or users are offered proposals on alternative texts for commenting so as to avoid slander or vulgar language.[60] It would also be feasible to motivate users to report harmful content or to intervene against hate speed by using chatbots which are controlled by AI.[61]

4.3.3 Programmatic and targeted commercial communication

Programmatic advertising based on AI already allows the automated distribution of commercial communication that is geared to the preferences and characteristics of specific target groups of persons and even individuals. There is also a trend towards *programmatic creation* using socio-demographic data, exogenous factors (e.g., the weather or the time of the day) and behavioural data in order to automatically generate personalised and highly relevant advertising content.[62]

Practical example: German TV group ProSiebenSat.1 Media SE has been utilising software for image analysis for several months to determine the perfect moment for placing an advertising spot. AI here allows for the automatic identification of objects in films, plots and content as well as emotions. The results are then matched to the content and communications objectives of advertising spots.[63]

4.3.4 Opportunities and Challenges from a media-regulatory viewpoint

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[55] Goldhammer/Dieterich/Prien (2019), p. 7
[56] https://www.wired.co.uk/article/how-do-netflixs-algorithms-work-machine-learning-helps-to-predict-what-viewers-will-like
[57] http://peach.ebu.io/
[58] Cambridge Consultants (2019), p. 69
[59] Cambridge Consultants (2019), p. 69 and following page
[60] Cambridge Consultants (2019), p. 70
[61] Cambridge Consultants (2019), p. 70 and following page
[62] Goldhammer/Dieterich/Prien (2019), p. 15 and following page
[63] (in German only) https://www.absatzwirtschaft.de/wie-kuenstliche-intelligenz-bei-prosiebensat1-die-werbung-veraendert-154300/

Opportunities: Platforms mediating and personalising content based on AI and algorithms provide an important social function. They ensure that great amounts of online content can be found and offer important navigation and orientation in the online world. They make possible varied partner networks, contribute to the formation of identity of users with the option of interaction, and create far-reaching opportunities for participation. Overall, the platforms help the generation of fundamental rights regarding information and communication in the digital environment.[64]

Against this backdrop, it is to be welcomed that traditional quality media are also developing AI tools to improve the mediation, distribution and participation of their public service content, as the EBU PEACH project shows.

For media companies, AI-based applications for commercial communications including programmatic advertising and programmatic creation present an opportunity to minimise advertising wastage and to offer higher-quality advertising space in online offers.[65]

Challenges: Owing to their dominant position in the market and their huge data resources, platforms can also exert a considerable impact on the formation of public opinion. The AI operated by the platforms will decide on what its users can see and what they will not be able to see. Platform operators are driven by commercial interests; since they are funded through the advertising space they market, they gear their activities less towards public welfare and more to maximising and capitalising on the attention of consumers. This can bring about risks which were described in such catchwords as "filter bubbles" or "echo chambers".[66] Investigations have, however, shown that the use of social media rather contributes to the variety in discourse and that the existence of filter bubbles can be reliably proven only for groups located at the political margins at best. Algorithm-based personalisation does not automatically result in less variety than the selection of news by journalists; users not interested in variety will not receive variety through platforms.[67] The latest research available indicates that the readiness to comment on a socially relevant topic via an online platform goes down if the user believes that his or her view does not correspond to the general opinion – and this in turn could promote the generation of echo chambers.[68] Another recent empirical study conducted by CSA France on the use of algorithms by YouTube regarding recommendations on videos surrounding controversial topics showed that more than a third of the recommended videos express the same point of view as the original video that has been selected first by the user.[69]

Whether echo chambers and filter bubbles exist or not - it is unquestionable that there is a *potential* that AI and algorithms operated by platforms or their users for commercial or political reasons could be used for the manipulation of an audience. In addition, AI can deliver distorted results for search enquiries or recommendations of articles and videos as this was learnt from the data used. In the programming process, values and assumptions on the world ("values in design") slip in. This can result in existing imbalances being reproduced.[70] If there is a distortion in the data used for training, the

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[64] Dreyer/Schulz (2019), p. 20 and following page
[65] Goldhammer/Dieterich/Prien (2019), p. 15
[66] Dreyer/Schulz (2019), p. 10
[67] Dreyer/Schulz (2019), p. 11, 16 – 19; Bodó et al. (2018); Möller et al. (2018); Borgesius et al. (2016); Pörksen (2018) doubts the existence of "filter bubbles"; he sees the problem more in a "filter clash" in the form of the constant confrontation in social networks with differing worlds and content, p. 116 and following pages
[68] Neubaum/Krämer (2018)
[69] Conseil Supérieur de l'Audiovisuel (2019), p. 5
[70] EMEK (2019), p. 9

algorithm will also pick up the distortion in the learning process and will reproduce the "bias" in the form of distorted selections.[71]

Furthermore, external actors can exploit platforms by operating bots. As an example, bots can make users believe that a political view is shared by many users or that a candidate has many followers ("astroturfing"). They can make reports of persons in an undesired discussion untraceable and thereby suppress these political positions by fabricating masses of other reports on the same topic. With the help of bots, an unlimited amount of false reports and hate messages can be generated for the purpose of harming other organisations or persons with negative comments.[72]

Lastly, the idea of an AI-controlled promotion of socially positive engagement online also raises ethical questions as there may be a potential conflict with the freedom of opinion and the risk of patronizing. In addition, such engagement could under certain circumstances compromise the integrity of the users.[73]

5. Potential fields of regulation

5.1 Determining the risk potentials

As shown by this paper, AI applications bring with them not merely risks and dangers, but also considerable potentials and opportunities for society. Before any regulatory measures are taken into consideration at all, the potential harm must be defined which the respective fields of application and AI systems could pose for the individual and for society as a whole. Once the risks have been determined, it will be easier to assess the adequate regulatory approach required and to determine regulatory instruments, which may be needed in responding to the risks.[74]

5.2 Determining responsibility

The deployment of AI and algorithms by platforms and media companies raises complex questions as regards the responsibility and liability in the event of breaches of media law. Prior to any debate of regulatory measures, it must first be determined whether, and if, to what degree platforms, media companies, software providers and programmers can be held responsible for content which is distributed in a personalised fashion or produced or moderated automatically, and where the limits have to be drawn. After all, the production of media content on the basis of AI does not necessarily concern media companies alone, but possibly also involves software providers and programmers.

5.3 Obligatory labelling

The integrity and identity of communicators is key to whether communication is considered trustworthy, true and credible.[75] It is therefore necessary to make consumers aware that they are interacting with a system based on AI. This leads to the question whether the use of AI in the

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[71] Dreyer/Schulz (2019), p. 9
[72] Goldhammer/Dieterich/Prien (2019), p. 30; Dreyer/Schulz (2019), p. 10 and following page
[73] Cambridge Consultants (2019), p. 71
[74] Blinn/Glatzner (2019), p. 13 and following page
[75] Pörksen (2018), p. 29

production of content or the employment of bots must be transparent using a labelling regime or a similar system.

5.4 Making the use of AI and algorithms transparent

In theory, companies could be obliged to lay open the algorithms applied in a decision process involving AI. The "black box" nature of the more complex forms of AI (in particular as regards "deep learning") makes it difficult to explain to the viewer, in a comprehensive and intelligible way, the process and functioning of the AI system applying. Even developers of deep learning systems do not understand fully the inner workings and weighting factors of their AI solutions. Facebook recently issued a statement explaining that in any way perfect traceability why one or another specific content is displayed to an individual is an "unobtainable object".[76] In addition, the major Internet players operating on a global level are hardly willing to lay open the AI mechanisms and algorithms they use for reasons of business confidentiality. Civil society organisations now employ so-called "auditing techniques" to measure the functioning of algorithms and AI by using varying inputs and analysing the respective outputs. The resulting correlations between inputs and outputs can thus demonstrate the way in which the algorithms or AI systems operate. For instance, the German organisation Algorithm Watch used this technology for analysing the personalisation of Google search results.[77] [78]

However, the question should be decided whether the companies should make the algorithms and their mode of operation more transparent as a matter of principle. As already stated, media services and in particular global platform operators have a huge influence on public sphere and public opinion making. For reasons of fairness, the user should know why and by whom certain information has been selected and personalised for him by using these services. He should know in which way and with which agenda he receives certain information and if there are possible distortions in the automated distribution mechanisms. Only then is the user in a position to correctly assess the information and decide whether to expose himself to it.[79] Another point worth investigating is the question whether AI algorithms have to be designed in a technical fashion that allows the decision-making process to be understandable ("understandability by design").

5.5 Verifying unfair distortion

If the prerequisites for increased transparency regarding the use of algorithms are met, it must be further investigated whether there are ways allowing potential decisions and statements based on algorithms and AI to be verified; this would lead to users being better protected against distortions and discrimination. Distortions resulting from the use of AI, which could lead to prejudices against and the discrimination of certain groups of persons should ideally be avoided or determined during the collection of data already. An independent test procedure could be carried out to evaluate whether there is a case of distortion resulting from algorithms; it could involve an analysis of the question whether there is bias in the database, whether the predictions of the algorithm are correct and precise

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[76] (in German only) https://www.sueddeutsche.de/medien/geplanter-medienstaatsvertrag-mischung-fuer-millionen-1.4364339
[77] Diakopoulos (2018), p. 5
[78] https://algorithmwatch.org/en/
79 Pörksen (2018), p. 214f.

or which long-term effects could be caused by the application of AI. Persons affected should further be able to have distortions in a database corrected or to contest inappropriate decisions.[80]

Further consideration needs to be given to how such a review should take place. Self-regulation and co-regulation models are currently being discussed. For example, there is the idea of a "platform council" or "social media council" in which the relevant stakeholders, i.e. platform operators, representatives of the editorial media, scientists, representatives of civil society etc. come together. In such a council, points of criticism and complaints could be discussed. The debates and the alleged or actual violation of standards would have to be published by the platforms themselves or and made prominently accessible to the users.[81]

5.6 Securing plurality of opinions and findability of editorial content

It is also feasible to oblige platforms and media companies to employ AI in such a way that the visibility and findability of content that is desirable for society and relevant for democracy is increased. A possible path could be the incorporation of diversity into recommender systems through software design in order to establish better exposure to diverse content.[82] "Exposure diversity" as a concept could therefore extend individual choice and afford individuals more opportunities to realise their interests. [83] It could promote rational debate and the formation of a reasoned debate as well as being a corrective to the tendency of public debates to be dominated by powerful interests.[84] Indeed, diversity-sensitive recommender systems could provide a tool to even "nudge" people towards diversity in their information exposure. Overall, diversity-sensitive design could be an option of interest to governments that wish to give more effect to their commitment to the promotion of media diversity. That said, any involvement of the regulator must maintain the precarious balance between promoting positive liberties and refraining from curtailing people's negative liberty.[85]

On the other hand, it is a very complex task to find the "right" criteria for AI to select and display socially desirable content to users. Hundreds and thousands of factors could matter for the selection of such content[86]. It is politically sensitive to define the institution that decides what content is fulfilling the desired societal goals. Furthermore, granting media companies that distribute "valuable content" a right of legal action on the ground that their content is ranked too low in the newsfeed causes not only issues on the empirical verifiability of such complaints. It is also doubtful whether a justiciable priority ranking of media content is in the interest of users.[87]

However, regulation to promote diversity by design is not entirely unprecedented in Europe. Several legal initiatives to promote PSM on Electronic Programme Guides (EPG) have been put forward in the past years, particularly in the UK. In July 2019, Ofcom UK issued recommendations to the UK Government to ensure that PSB content remains easy to find in an online and on-demand world. The

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[80] Goldhammer/Dieterich/Prien (2019), p. 35 and following page
[81] Pörksen (2018), p. 217; As an example, the international NGO ARTICLE 19 proposes in its consultation paper the establishment of social media councils as "a model for a multi-stakeholder accountability mechanism for content moderation on social media". https://www.article19.org/resources/social-media-councils-consultation/
[82] Helberger/Karppinen/D'Acunto (2016)
[83] Helberger/Karppinen/D'Acunto (2016), p. 194
[84] Helberger/Karppinen/D'Acunto (2016), p. 195 and following page
[85] Helberger/Karppinen/D'Acunto, (2016) p. 203 and following page
[86] Goldhammer/Dieterich/Prien (2019), p. 38
[87] Goldhammer/Dieterich/Prien (2019), p. 38

UK regulator emphasised that any new legislation should aim "to secure discoverability of PSB in a proportionate way as well as supporting continued consumer choice and innovation".[88]

6. First regulatory approaches in Europe

At present, there are only a few developments in Europe aimed at underpinning the application of algorithms with national legislation. The most relevant examples with a bearing for media regulation are largely focused on legislation requiring social networks, platforms and other intermediaries to generate transparency, be it concerning the fact that algorithms are used, or be it regarding information on the way in which algorithms operate. With the exception of the German draft Interstate Media Treaty, no European approaches for regulating the automated production of content by media companies seem to exist as yet.

France: The French law on fighting false information now requires social networks to ensure transparency as regards their use of algorithms, the certification of "trustworthy accounts" and the information of users on the type, origin and transmission modalities of content.[89]

Germany: The Draft Interstate Media Treaty of the German States, which is to replace the current Interstate Broadcasting Treaty includes far-reaching transparency requirements for media intermediaries who have more than one million users. They are to be obliged to make the principles and key criteria of the technical processes governing the selection of content easily recognisable, and to keep them directly available on a permanent basis. Some thematic specialisations must be clarified. Media intermediaries with a major position in the market are subject to non-discrimination requirements for journalistic offers to secure plurality of opinion.
The draft further requires providers of electronic information and communication services available via the Internet in social networks to make the fact of automation transparent for any content or information which has been automatically generated by means of computer programmes.[90]
The draft has been adopted by the prime ministers of the German States. However, it still has to be submitted to the European Commission, because it also includes the implementation of the audiovisual media services Directive. The Treaty is expected to come into force in autumn 2020.[91]

United Kingdom: The White Paper "Online Harms" of the UK Government proposes, among other things that "as part of a movement towards greater transparency, companies should also work in conjunction with the regulator to build a shared understanding of the mechanics of their associated platforms or services. Where necessary, to establish that companies are adequately fulfilling the duty of care, the regulator will have the power to request explanations about the way algorithms operate. The regulator may for example require companies to demonstrate how algorithms select content for children, and to provide the means for testing the operation of these algorithms. In determining where such explanations will be appropriate and what form they should take, the regulator will work closely

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[88] https://www.ofcom.org.uk/__data/assets/pdf_file/0021/154461/recommendations-for-new-legislative-framework-for-psb-prominence.pdf

[89] Article 11 of the "Loi n° 2018-1202 du 22 décembre 2018 relative à la lutte contre la manipulation de l'information" (in French only) https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000037847559&dateTexte=20190920

[90] §§ 52f, 53d and 55(3) of the Draft Interstate Media Treaty (in German only) https://www.rlp.de/fileadmin/rlp-stk/pdf-Dateien/Medienpolitik/MStV-E_Synopse_2019-07_Online_.pdf

[91] (in German only): https://www.die-medienanstalten.de/service/pressemitteilungen/meldung/news/next-stop-erreicht-moderne-regulierung-einer-digitalen-medienwirklichkeit/

with the Centre for Data Ethics and Innovation, the expert body that has been set up to advise government on the regulation of data, including algorithmic tools. Appropriate safeguards will be needed to ensure commercial confidentiality, although the regulator is unlikely to require direct access to companies' proprietary codes if necessary explanations have been provided.[92]

7. Structure of the session

The session will open with a keynote by **Tim Ensor**, Director of Artificial Intelligence at Cambridge Consultants (UK). As part of his functions, Tim is in charge of research, design and deployment of state-of-the-art AI systems and services. During the session, he will first elaborate on a recent study (that we frequently quoted in the present paper) on "The Use of AI in content moderation" Cambridge Consultants have authored for Ofcom UK. He will then cover other topics that are not elaborated on in depth in the study, such as deepfakes, bias, testing and audits.

The keynote will be followed by two contributions presenting the point of view of a media regulator and a public service broadcaster:
- **Sébastien Lécou**, Head of Department Competition and Foresight at French audiovisual regulator Conseil supérieur de l'audiovisuel, will present the CSA's approach to the subject of Artificial intelligence and report on an ongoing research on algorithms.
- **Niamh McCole**, Compliance Editor at RTÉ, the Irish public service broadcaster, will report on RTÉ's ongoing Catalyst project (with other media and Telco partners) on AI Indexing for regulatory practice. This project is exploring ways to intelligently automate the identification of on-air content using AI, in order to measure and report against metrics set by external regulatory bodies as well as for accurate measurement of internal editorial, creative and technical standards.

The last part of the session will be devoted to a debate with the three speakers and the audience.

8. Questions to EPRA Members

- *Does your authority conduct or commission research on AI? If so, what particular aspect of AI are you investigating?*
- *Is your authority involved in assessing the risks of the use of AI by platforms and media companies? If so, how?*
- *Do you think that AI standards used by platforms and media providers should be regulated? If so, do you think that NRAs should be involved in the regulation of such AI systems? Or should potential risks be better tackled by data protection law, copyright law and privacy law and the respective competent authorities?*
- *Does your authority use (or is planning to use) AI solutions for its own supervisory work? What is your opinion on a possible use of AI tools to assist media regulators in their work?*
- *Can you think of other possible fields of regulation, not covered under section 5 (p. 12) of this paper?*
- *Are you aware of any further developments in your country (reports, public consultations, draft acts etc.) regarding possible future regulation of algorithms and AI?*

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[92]sections 3.22 and 3.23 p. 48 of the "Online Harms White Paper"
éhttps://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/793360/Online_Harms_White_Paper.pdf

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