Datafied Bearbaiting and Emotional AI

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Datafied Bearbaiting and Emotional AI: Anticipating the Quantified Jeremy Kyle Show

Submission to DCMS Committee Inquiry into Reality TV

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1. Overview

1.1 This submission focuses on the following questions posed by the DCMS Committee inquiry into reality TV: *What is the future for reality TV of this kind? How does it accord with our understanding of, and evolving attitudes to, mental health?*

1.2 We offer a cautionary note on a likely future of reality media - where the media industry makes use of data about emotions to add new layers of engagement through "emotional AI". This emotional AI entails affective computing and AI techniques that read and react to emotions through text, voice, computer vision and biometric sensing. While usage of emotional AI has scope to enhance experience of media, there is scope for abuse when competing for audience attention, engagement and advertising revenue.

1.3 Key recommendations

1.3.1 Regulators and policymakers are suitably aware of media and technological trends described in this document: namely, the potential dangers of a media environment in which emotion is quantified and utilised by the media industry.

1.3.2 Media companies and home technology providers understand that regulators and policymakers are aware of these developments and are willing to regulate if there is misuse, or if individual, collective or technological vulnerabilities (such as lack of awareness of "consent" to domestic profiling) are exploited.

1.3.3 There is further engagement with academics and other specialists on these questions.

2. What is the issue?

2.1 This submission focuses on two key drivers of why reality TV programming exists: (a) the value of emotional AI in creating engaging content; and (b) audience building.

2.2 We live in a world where the media industry is keenly attuned to the value of emotions. This includes advertisers who speak of emotional sales propositions, nudges and behavioural hacks; programme developers who see that emotion and strong authentic reactions generate audiences and audience engagement; and a news environment that is increasingly emotionalised.

2.3 Beyond generalised emotion, data about emotion is increasingly being collected and used for diverse purposes. Channels, including the BBC[1], have employed emotional AI companies to

[1] In 2014, the BBC used CrowdEmotion to gauge how viewers react and behave towards BBC TV shows, including *Sherlock* and *Top Gear*: see www.bbc.co.uk/mediacentre/worldwide/2014/labs-crowdemotion

optimise and emotionally tweak their programming and marketing. These developments should be seen in reference to a sector of the media industry that, since its inception, has been highly innovative. Endemol's reality TV show, *Big Brother* (2000), for example, uses camera, format and interactive technologies (such as online voting), as well as complex psychological and emotional dynamics (not least pain, boredom, private moments, emotion and sex) to entertain. Indeed, the reality that people see is arguably not real at all – but a highly constructed artefact designed to entertain, rather than inform[2]. This should be seen against the view of technologists from companies such as Microsoft, that assert that emotional AI 'brings newfound realism and immersion to entertainment applications, such as games, interactive media exhibits, and shows.'[3]

2.4 We can increasingly speak of "datafied emotion" across all sorts of media, technologies and content. These range from social media (emojis, analysis of posts and behavioural profiling); online advertising (programmatic and sentiment analysis); digital assistants (such as Amazon's Alexa that will soon detect emotion); wearables that track moods across the day (biometrics);[4] and "fake news" that may be targeted in reference to data about emotions.[5] Closer to the matter at hand, many companies that are developing and applying emotional AI are keenly interested in how to: (a) optimise media content for maximum audience impact; and (b) measure home audience emotion. *Such applications have scope to create entirely new forms of reality media*.

3. Is this for real?

3.1 Yes. There is personal, collective, commercial and governmental value in understanding individual and group emotion. The commercial dimension is especially important: if there is commercial and creative advantage for the advertising, media and technology industries, datafied emotion will, in time, become routine. McStay interviewed over 100 "elite" individuals with expert knowledge of emotional AI and its commercial value. Most gauged that by the early 2020s the UK will see increased usage of emotion-sensing technologies.[6]

4. Datafied emotion, who's using it?

4.1 Emotional AI is an emergent phenomenon appearing across diverse devices and life contexts. It includes media, yet is a much wider phenomenon. Emotional AI entails use of affective computing and AI techniques to sense and react to human emotional life. It is a weak form of AI in that it reads and reacts to emotions through text, voice, computer vision and biometric data, but it does not have sentience. AI in this context is narrow rather than general. Applications and supportive forms of machine learning vary, but involve convolutional neural nets for multi-category and multi-label classification of images[7]; region proposal networks[8] for fast object (face) detection and tracking;

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[2] Corner, J. (2002) 'Performing the Real: documentary diversions', *Television & New Media*, 3(3): 255-270.

[3] See pg 74 of McDuff, D. & Czerwinski, M. (2018) Designing Emotionally Sentient Agents, *Communications of the ACM,* 61(12): 74-83.

[4] McStay, A. (2017) And Then There's Emotional AI …. Submission to the House of Lords Select Committee on Artificial Intelligence. http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/artificial-intelligence-committee/artificial-intelligence/written/69364.pdf

[5]McStay, A. & Bakir, V. (2017) Fake News: Media Economics and Emotional Button-Pushing. Submission to DCMS Inquiry into Fake News and Disinformation. http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/culture-media-and-sport-committee/fake-news/written/48101.html

[6] McStay, A. (2018) Emotional AI: The Rise of Empathic Media. London: Sage. Also see market analyst Gartner (2018) *How artificial intelligence is being used to capture, interpret and respond to human emotions and moods* that recognises emotional AI as 5-10 years away from mass adoption.

[7] This is an approach to machine learning especially suitable for images, involving fewer connections to increase efficiency and reduce processing and storage. See Altenberger, F. & Lenz, C. (2018) *A Non-Technical Survey on Deep Convolutional Neural Network Architectures*, arXiv, https://arxiv.org/pdf/1803.02129.pdf

[8] These show multiple objects identifiable within a particular image. See Ren, S., He, K., Girshick, R. & Sun, J. (2015) Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks, *arXiv.org*, https://arxiv.org/abs/1506.01497

and recurrent neural networks[9] for audio and video processing. Table 1 outlines sectors already using emotional AI in 2019, with the most relevant for this Committee italicised.

Table 1 Sectors using Emotional AI in 2019

Sector	Form of tracking	Reason for interest in tracking emotions
Advertisers & marketers	*Sentiment, voice, facial coding, biometrics*	*Understand preferences, behaviour, reactions to brands; optimise creative components of adverts*
AI/cognitive services	Sentiment, voice, facial coding, biometrics	Enhance interaction with devices, services & content
Artists	Sentiment, facial coding, biometrics	Create artwork & measure audience engagement
City experience analysts	Sentiment, facial coding, biometrics	Gauge citizens' feeling about initiatives
Data brokers	*Sentiment, facial coding, biometrics*	*Commercial value of data*
Education	Facial coding, biometrics	Analyse in-class behaviour, learning, engagement
Finance	Sentiment (social media)	Chart market emotionality
Gaming	Facial coding, biometrics	Input devices enhance gameplay
Health	Sentiment, voice, facial coding, biometrics	Track mental states
Home Internet of Things	Sentiment, voice, facial coding, biometrics	Personalise services & adverts, e.g. assistants, devices, media
Insurance	Sentiment, facial coding, biometrics	Understand customers' emotional disposition & mental health (e.g. in-car behaviour assessment)
Police/security	Sentiment, biometrics. voice	Gauge civic feeling/disturbances, track front-line workers' stress levels, *gauge lies and sincerity*
Political parties	*Sentiment*	*Gauge people's reactions to policies & initiatives*
Robotics	Facial coding, voice	Enhance interaction between robots & people.
Sextech	Biometrics	Enhance sex life/make devices more responsive
Social media	*Sentiment, facial coding*	*Assess sentiment, emoji usage, group behaviour, individual profiling, altering & posting behaviour*
TV/media/film	***Sentiment, facial coding, voice, biometrics***	***Test reactions to content, shows, movies and scope to create novel interactive content.***

[9] These are especially suitable for inputs that are sequences (time series prediction, video analysis, translating natural language, engaging in dialogue and/or controlling a robot). Recurrent neural networks are neural networks that can be said to have a memory. Whereas feed-forward neural networks only consider inputs it has been exposed to, the recurrent form draws upon present inputs and those from the recent past, to determine how they respond to new data and how it should be labelled. See Lipton, Z.C., Berkowitz, J. & Elkan, C. (2015) A Critical Review of Recurrent Neural Networks for Sequence Learning, *arXiv.org*, https://arxiv.org/abs/1506.00019

Retailers	Sentiment, voice, facial coding, biometrics	Assess in-store behaviour (potential to link reactions with online/loyalty profiles)
User testing	Sentiment, facial coding, biometrics	Assess reactions to products & specific features
Wearables	*Biometrics*	*Track reactions, emotions & moods*
Workplaces	Sentiment, biometrics	Organisationally track emotions & moods.

5. What is datafied emotion?

5.1 It is useful for the Committee to understand the various forms of emotion sensing and data (see Table 2). With the exception of sentiment analysis, each of these are biometric. Legally, this refers to personal data resulting from specific technical processing relating to the physical, physiological or behavioural characteristics of a natural person (Art. 4(14), General Data Protection Regulation).

Table 2 Tracking types, sensing and what they do

Tracking/ sensing types	**What they do**
Sentiment analysis	Analyse *language, emojis, images and video* for evidence of moods, feelings and emotions
Facial coding	Analyse *facial expressions* from camera feeds, video and photos
Voice analytics	Analyses *how people speak* (rather than what they say). Elements include *rate of speech, change in pauses and tone* to gauge emotion, stress and sincerity
Eye-tracking	Measurement of *point of gaze, eye position and eye movement*
Wearable devices	*Galvanic Skin Response*: sweating on hands and feet triggered by emotional stimulation *Electromyography*: muscle activity and tension that correlates with negative emotions *Blood Volume Pulse*: infrared light to assess heart rate *Skin temperature*: increase/decrease in temperature that correlates with change in emotion *Electrocardiogram*: rhythm of heart's beats that are associated with change in emotional states *Respiration rate*: respiratory behaviour that correlates with emotional states
Electroencephalography	Records *electrical signals* to measure brain activity
Gesture and behaviour	Cameras track *hands, face and other parts of the body*
Virtual Reality	Remote viewers can understand and *feel-into* what a wearer is experiencing
Augmented Reality	Remote viewers can *track attention and interaction* with these digital objects

6. Contemplating possible scenarios: some thought experiments

6.1 *The uncancelled Jeremy Kyle show, early 2020s*: where lie detection tests are not conducted in private, but in real-time via a range of sensing types. (Vendors of facial coding, voice analysis and other biometric services all claim to be able to detect lies and sincerity.)

6.2 *The Piers Morgan show, early 2020s*: in addition to robust interview techniques, interviewees in the name of transparency to citizenry are asked (coerced?) into appearing on shows where their sincerity and honesty are scored and colourfully visualised on screen as the interview unfolds.

6.3 *Match of the Day, early 2020s*: to assist in generating extra advertising/sponsorship revenue footballers are asked to wear vests that track heart rate and respiration to gauge affective and emotional states. (Catapult Sports for example already works with teams such as Chelsea FC to track biometrics.) Stadiums likewise register the facial expressions and audio emotion of crowds to assist with online advertising to multi-screen audiences (a technique trialled by Mindshare and Kinetic in 2015 at Wimbledon).

6.4 *Big Brother, early 2020s:* to maximise audience engagement, members of the house are asked to wear wearables that track their heart rate, respiration and skin conductivity to gauge their affective and emotional states. This emotional AI data is used to optimise live footage for story

development within the show, by modulating the emotional interactions of the reality show participants: for instance, creating situations that encourage participants to express more conflict, hatred, jealousy or love. Note that Endemol Shine Group is already using AI (in the form of Microsoft Azure AI workflow) to replace the manual selection process in the Spanish version of Big Brother. This uses machine learning and AI algorithms to 'learn patterns of interactions happening in the relationships and dynamics of the house members. The output of these learnings is used to infer and anticipate relationship dynamics of the group interactions and direct resource content development efforts'.[10]

6.5 *Mid 2020s, a new genre of interactive reality TV emerges that toys with, and displays, viewers' emotions at home in order to generate more engaging media content*. Many legacy media technology companies have patents for home camera systems to track screen watchers and deliver targeted advertising[11]. There is every reason to foresee that media companies would also use domestic profiling to create more engaging media content across all media genres. For reality TV, this could involve changing the format, tasks, competitions and personas of the reality TV participants (remember "Nasty Nick" from UK's Big Brother 1?) in order to elicit greater emotional engagement from audiences at home. Further developments could see a move away from formats where reality TV participants are surveilled for mass entertainment, towards formats that focus on collecting and projecting the emotional experiences of audiences at home for public consumption. One should not underestimate citizens' willingness to participate in mass media experiences and the interest in non-celebrity reality media (e.g. Gogglebox[12]). This may be married with: (a) online livestreaming (such as that offered by Facebook Live and Tik Tok); and (b) emotional AI surveillance tools in the home (such as cameras with facial coding, and microphones with verbal analytics). This would raise ethical issues, as identifiable data about emotions in private spaces (the home) is deliberately provoked (by programme makers seeking engaged audiences), collected and surveilled (via emotional AI tools), and fed back into the programming. On *why* people would do this, the answer is partly due to: (a) enrichment of existing forms of reality media provision, but also; (b) new formats that realise that all media interactions are in a sense social, which means there is scope to develop socially intelligent interfaces and screen personalities based on memory, learning and audience emotional reactivity.

6.6 *UK General Election Specials 2020: mining audience emotions.* Election campaigning on TV (e.g. via political debates) tells politicians in real time how the studio audience (via facial coding) is emotionally responding to the politicians' performance. Alongside this, emotional AI tools (e.g. sentiment analysis of social media) generate a live picture of emotional reactions of audiences at home. These emotional AI tools enable the politician to change discursive tack in order to trigger specific emotions (e.g. fear, disgust, sadness, joy) and intensify connections to the audience both in the studio and at home. Seen positively, this scenario allows politicians to better understand, and connect with, their audience. Seen negatively, this scenario allows politicians to better manipulate people, rather than engaging them in rational, fact-based discussion of policies. This scenario is feasible, given two factors. *Firstly*, the technologies already exist. Also, in the UK's 2017 General Election, market research firm onefourzero offered a move away from traditional polling tools towards "social listening tools" to observe what "populations are saying about the issues of the day, live, and train bots to analyse it through social media data".[13] This is the latest manifestation of a

[10] International Telecommunication Union. 2019. *Artificial intelligence systems for programme production and exchange.* Rep. ITU-R BT.2447-0. https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-BT.2447-2019-PDF-E.pdf (p.4)

[11] See a recent patent from US emotional AI market sector leader, Affectiva. This foresees camera-enabled smart TVs that allow Affectiva to capture facial data about emotion expressions to gauge if a person is engaged, and thereafter to infer mental states, score engagement, emotional responses and modify content provided on the basis of these machine insights.

[12] Gogglebox: an award-winning UK TV reality show (2013 -) that features families and friends from different places around the UK reacting to UK TV programmes from their own homes.

[13] Onefourzero (2017) *Can sentiment analysis help predict the 2017 general election?* 28 April.

decades-long offer by the political marketing industry to show parties and candidates how to exploit and target powerful appeals to emotional instincts among the electorate.[14] *Secondly*, psychologists argue that issues that arouse emotions have the biggest impact on voting and voter mobilisation: such issues tend to be contentious issues.[15] There is likely, then, to be political appetite for intensified understanding of potential voters' emotional triggers.

7. Methodological error

7.1 Emotional AI should not be seen as an arbiter of truth (as neither should traditional polygraph tests) because:

- There are debatable understandings of emotion "baked in" to emotional AI;
- Understanding and reacting to emotional cues is context dependent and relies on tacit knowledge;
- There is concern about biased training data;
- Error-free emotion-sensing systems are unlikely in the near term.

7.2 Should emotional AI and/or emotion-sensing applications be deployed in media, there should be utmost care that this information (likely presented in an attractive graphical form) is not taken as the truth of any given situation.

8. Harms

8.1 High-level concerns are:

a) That systems have not been subject to academic and independent scientific scrutiny.
b) The desirability of having one's emotions profiled in the first place (not least because of privacy and data protection concerns).
c) Exploitation of people on-screen (coercion, manipulation or decisional autonomy).
d) Opacity of decision-making about emotional states and how a citizen would challenge it.
e) The problem of universality: proponents of facial coding are adamant that "basic emotions" are universal, but what of: ethnocentric considerations; representative training data; location variation in emoting; and individual-level variation in affective reactions and emoting?
f) The risk of creating an understanding of emotional life that suits data analytics, but not people.
g) That these data visualisations are believed.

9. Conclusion

9.1 While some of the suggestions may raise alarm, it should be noted that these media technologies may be used in ways that serve, entertain and delight, rather than exploits. While this reality is someway off, we must ensure the following.

9.1.1 Regulators and policymakers are suitably aware of media and technological trends described in this document: namely, the potential dangers of a media environment in which emotion is quantified and utilised by the media industry.

9.1.2 Media companies and home technology providers understand that regulators and policymakers are aware of these developments and are willing to regulate if there is misuse, or if individual, collective or technological vulnerabilities (such as lack of awareness of "consent" to domestic profiling) are exploited.

9.1.3 There is further engagement with academics and other specialists on these questions.

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https://onefourzerogroup.com/can-sentiment-analysis-help-predict-2017-general-election/

[14] Jamieson, K. H. (1996) *Packaging the presidency*. New York: Oxford University Press.

[15] Westen, D. (2008) *The Political Brain.* New York: PublicAffairs, p.173.

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