

Blurring the lines: Merging aspects of human cognition and artificial intelligence

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Abstract

The purpose of this article is to discuss the transformation of Twitter from a usable tool for spreading information to a space for learning. When we talk about different software, we in many cases can't phantom their outreach and connectivity. Specific software solutions have been integrated into our lives making them a part of ourselves. Specific tools can be designed to enhance specific functions within the software such as automatic accounts spreading keywords users write. Users are humans and perceive their cyber environment in the same way as they perceive human interaction in real life. The transformation changed the tool to an area of operation where different stakeholders can interact with each other. From an intelligence perspective, the distinction between technology and HUMINT no longer serves its purposes of classification – it has merged into one and the same. From the perspective of C2, information technology in itself is still emphasized at the cost of other dimensions, hence obscuring the very mechanisms of how what is only seen as social media in fact is a dimension of itself. While the human dimension is sometimes addressed, there is a dearth of research exploring its workings.

1 INTRODUCTION

It may be argued that the fundamental challenge of C2 agility is to increase the rationality of operations through the increased capability of generating, transmitting, and processing information. Bjurström & Nilsson (2012) argued that an important vehicle for doing so is by increasing the rationality of assessment, from seeing rationality as a mere matter of "facts" and "objective analysis", to seeing rationality as a function of human cognition in relation to the structures of the environment. In similar vein, Berggren et al. (2014) suggested assessment of C2 capabilities to become even more crucial in the face of changing world. A fundamental challenge at the heart of C2 remains the problem of dealing with uncertainty. However, expectations on assessment are in many cases unrealistic. While doubts about the possibilities to make a true science of warfare has been around since the Clausewitz vs. Jomini disputes, there is still a tendency to view intelligence, planning and assessment in a way resembling to engineering, i.e. as a matter of choosing between alternatives in terms of "objective analysis" of "facts".

Castells (1997) highlighted the social side of information, arguing that our place in society can at least partly be defined by the information we receive, how we process it and how and to whom we transmit it. Hence, from a social perspective, the transfer of information has far more profound consequences than just informing recipients about facts. Instead the very transfer of whatever is transferred shapes social interaction and communities, in turn developing patterns of interaction and namings of things, coining expressions of their authenticity as a group. Thus, the very act of communicating becomes constituent of a community or an informal structure within society or an organization. Hence, while ultimately possibly referring to external events, the communication within a networked community first of all refers to itself and its emergent properties as it expresses its specific feel and flavor of things (Eagleton, 2000).

Schöler et al. (2021) pointed at the ways in which Twitter could actually perform genuine C2 functions in the context of crisis and potentially also war. The study revealed that despite dangers of misinformation, policymakers need to tackle social media just because it is so influential on policy, politics and law enforcement.

However, as Bjurström & Nilsson (2012) suggested in line with (Gigerenzer, 2010), as the character of the context of decision-making changes, so should the norm for assessing what goes for 'rationality' in decision-making.

With the advent of social media came also a second wave of technological logic to networked human communication through various applications of artificial intelligence (AI). Once again, what was technical turned social and then turned again into something that is much harder to understand: the technological side of social information which amounts to an emergent hybridity of intelligence in warfare. Hence, it is becoming ever more difficult to judge the origin or the authenticity of a message, as it has typically been transmitted, edited and adjusted through long links and lines of communication, split and merged with others finally emerging as a true composite of human and machine. Consequently, the criteria for judging the value of information, as well as the criteria for judging what is 'rationality' in decision-making needs to be adjusted accordingly.

Ironically, this situation may bring the western tradition of skepticism to an end, rather promoting pragmatism over Platonism in the quest for applicable, rather than final knowledge through an attitude of wisdom i.e. one of simultaneous belief and doubt (Weick, 2006)

From an intelligence perspective, it is widely accepted that there is no meaningful distinction to be made between technology and HUMINT. However, from a C2 perspective, the conclusion hasn't been as clear, with a persisting insistence on information technology per se, at the cost of other, notably social and epistemological dimensions. This runs the risk of obscuring the fundamental mechanisms behind the logic and misses the point that what is traditionally seen as just 'social media' is taking on a dimension in itself. While the human dimension is sometimes addressed, there is a dearth of research exploring its workings.

2 ECOLOGICAL RATIONALITY AND ZONES OF PROXIMAL DEVELOPMENT

Until recently, information superiority seemed like a silver-bullet solution to speed up and improve decision-making, ultimately making operations more rational. However, as soon as changes and uncertainties start to be qualitative human imagination is the only tool to tackle the challenge. Furthermore, most things we would like to know are inherently hard to register or only at a high cost (including moral ones), such as people's sympathies, networks, loyalties, and dedications. Hence, the mixing of military business with the civilian sphere, as

well as the social with the technological fundamentally changed the rules and forced military assessment into a field where rules, patterns and predictability are but memories of the past and the plethora of perspectives makes any information credible or doubtable depending on viewpoint and interpretation. Consequently, as C2 needs to become agile, assessment needs to adjust its tools, methods and thinking as to support decision-making in creating a new paradigm for C2.

The probably most fundamental aspect of this change concerns the very notion of rationality itself. Although the notion of *bounded rationality* and its associated theory rendered Herbert Simon the 1978 Nobel prize in economics, these insights are still to be digested among a broad range of academics as much as among practitioners. With the over 60 biases documented by recent research there is little doubt that any assessment will be biased, at least to some extent (Klein, 2009) and the limited processing power of humans, more information will rather make the situation worse than better (Kahneman, 2011).

Gigerenzer (2010) argued that we need a more balanced view on human rationality. Humans are limited within bounds. However, this has often been mistaken to mean that humans are irrational or still optimizing their choices through calculation, albeit be it under constraints. He pointed at a third way of seeing it, emphasizing the *ecological rationality* suggested by Simon (1990) through the metaphor of rationality as a pair of scissors: "Bounded rationality is like a pair of scissors: The mind is one blade, and the structure of the environment is the other. To understand behaviour, one has to look at both, at how they fit. In other words, to evaluate cognitive strategies as rational or irrational, one also needs to analyse the environment because a strategy is rational or irrational only with respect to a particular physical or social environment." (Gigerenzer, 2010, p. 86).

In other words, instead of seeing rationality as a matter of optimization based on objective facts, ***rationality should be understood as the very process of adaptation*** to changing circumstances. Consequently, to opt for a more rational version of assessment also means to ***examine the both blades of rationality***: The character and structure of ***the task environment*** as well as the ***cognitive processes***. Hence rationality itself lies in the capacity to adapt (Simon, 1990).

In educational and psychological research Vygotsky is a known name. The zone of proximal development (ZPD) has its origin in the research on children's development

and learning (Vygotskij et al., 1998). ZPD is the space that occurs between learner and teacher. What the learner knows and can perform without assistance and what they need help with to acquire new knowledge and experience to perform on their own (Nicholas et al., 2021; Smagorinsky, 2018; Vygotskij et al., 1998; Xi & Lantolf, 2020).

In this article we argue that twitter users are unconscious learners and teachers submitted to constant development through the twitter feed. During the Ukrainian war users are constantly learning from what other users are posting. Tweets can contain: 1) videos with instructions on how to start combat vehicles, by teaching civilians they can be mobilized to disrupt or interfere with Russian activities. 2) The public can be made aware of war crimes committed during the war, mobilizing the international community. 3) Resource shortages can be visualized to mobilize international support. 4) Organizations and companies can be made aware of the situation and take continuous actions such as Epic games which has an information page in the videogame Fortnite for the Ukrainian side. Weapons have been created to mimic the NLAW system which is deployed and used by the Ukrainian Armed Forces.

3 ILLUSTRATIONS/EMPIRICAL

The war in Ukraine is not just a war of force it's a war of information. Daily updates from the Ukraine side are posted on Facebook and Twitter. Videos and pictures of different combat situations are commented by expert and novice users.

Social media have for several years been an important tool for human interaction. Several million use services such as Facebook, Twitter, and Instagram on a daily basis for communicating and interacting with friends, family, and unknown individuals. Facebook and Instagram differ from Twitter and have a stricter format with different types of boundaries which creates an individual storyline. Twitter on the other hand is designed after the criteria of short messages with 280 characters (tweets). Individuals interact with different tweets which alters the algorithm and creates an individual user feed with information. The individual interactions on Twitter are in many cases no different from human behavior in the real world and the Twitter feed can be seen as an online questionnaire (Schüler et al., 2021).

During the war in Ukraine Twitter seems to be used as a tool for communicating with the outside world and creating opinions for or against the war. The more orthodox reasons are education and logistics. Ukrainian accounts have posted videos on how to start Russian

combat vehicles, and an official Ukrainian account tweeted the need for satellite communication equipment to the Twitter user Elon Musk. Twitter bots are automatic accounts that retweet what they are programmed to retweet post messages when private jets owned by oligarchs take off or land at different airports (@RUOligarchJets). This complex environment creates a challenge, how do we know whether the user is a human or a computer user? - How can we determine the character and reliability of the information which we are presented with? – If not, how should we understand the very conditions for using e.g. Twitter as a powerful tool for intelligence and C2?

At the same time the lines between what is human and what is artificial intelligence (AI) or machine learning (ML) get blurred when the user is faced with embedded function which interfere in the interaction. Both Ukrainian and Russian accounts can tweet in their native language. Non-Ukrainian or Russian speaking individuals must then translate the tweet using the different software with AI or ML. The original message becomes obscured by the company's knowledge and experience of the Ukrainian or Russian language which the message was translated from and for example Swedish or English which the message was translated to. This creates an environment of uncertainty: 1) human or computer-generated message, 2) unaffected message or message affected by AI, 3) The creator's purpose for writing or generating the information.

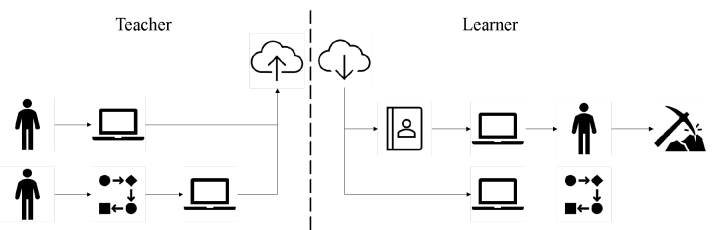


Figure 1: Pattern of interactions

To illustrate the challenging environment a simplistic model is used (see figure 1). Individuals create messages on social media which are distributed and read by others. The reader is unaware of the purpose and the true meaning of the message or if the message has been distorted in any way.

Table 1: Symbol explanation

Icon	Explanation
	Individual creating information with a purpose
	Computer or server used to distribute information
	Uploaded information to server
	Downloaded information from server
	Created function from a third party (company/individual) which affect the information (dictionary or interpretation function)
	Programed automatic function
	Human action

To exemplify the problem with messages which transforms online one Ukrainian message is used from the Ukrainian general staff (See table 2).

Table 2: Example of a distorted message posted on social media

Translation	Message
Original text	Ми зірвали плани кремлівського фюрера! Україна не капітулювала, як марилося російським фашистам. Тисячі окупантів вже знайшли свою смерть на нашій землі. Наші герої б'ють ворога: тримають оборону і переходять у наступ. Ми радіємо звільненим містам і оплакуємо вбитих. У нашому серці - лють замість страху і жага помсти. Ми платимо кров'ю за свою свободу. Щодня наш нескорений народ наближає перемогу. Але попереду ще багато

випробовувань – «крові, поту і сліз»
 Ми здолаємо цей шлях!
 Переможемо!

Imbedded translation

We've **interrupted** the plans of the **Kremliv** Führer!
 Ukraine did not **capitul лювала**, as Russian fascists dreamed.
 Thousands of **invaders** have already **found their death** on our land.
 Our heroes **beat** the enemy: **holding the defense and moving into the attack.**
 We rejoice in the **freed** cities and mourn the **killed.**
 In our heart - **rage instead of fear and desire for revenge.**
 We pay with blood for our freedom.
 Every day, **our worried people bring victory closer.**
 But there are still many **challenges** ahead - "blood, sweat and tears"
We will make it this way!
Let's win !

External translation software

We **thwarted** the plans of the Kremlin Fuhrer!
 Ukraine did not **capitulate**, as the Russian fascists dreamed **of.**
 Thousands of **occupiers** have already **died** on our land.
 Our heroes **are beating** the enemy: **they are defending and going on the offensive.**
 We rejoice in the **liberated** cities and mourn the **dead.**
 In our hearts - **anger instead of fear and thirst for revenge.**
 We pay with our blood for our freedom.
 Every day **our unconquered people are approaching victory.**
 But there are still many **trials** ahead - "blood, sweat and tears"
 We will overcome this path!
 We will win!

Yellow marking indicate differences in the translation, changing the meaning of the message.

The individual writing the original message most certainly had a purpose or an intention for performing the action. As seen in the example displayed in table 2 translation algorithms distorts the intention. For example, the changes made by the algorithm can generate two different messages “Every day, our worried people bring victory closer.” or “Every day our unconquered people are approaching victory”. An independent learner reading the message from social media can come to the conclusion that the war: 1) is not going so great for the Ukrainian side and the population is scared of defeat, 2) is causing a national resistance and the population will not give up. Why should western companies or countries support a nation where the people are thinking about giving up? Individual reading a post on social media can easily assume that the writer intended to write the information, which is posted on the account, but is the message a correct representation of the intention of the message? The translated message on social media creates a distorted space for the reader which affects learning and development.

5 IMPLICATIONS FOR C2

Algorithms which are used for translation must be identified by military staff before messages are posted on social media. When individuals have created a message on social media, they lose control when imbedded software reshapes the message. The software developer is in many cases a private company. To mitigate the risk of distorted translations the message could be posted in two separate languages. Another implication could be that social media takes an unconscious active part in a conflict by distributing a false narrative. An intended information operation could unconsciously support the opposing sides objective.

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