PHOENSIGHT
INSIGHT IN DATA

HUMAN SOCIETY AND AI TECHNOLOGY

WHITE PAPER

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ABOUT PHOENSIGHT

Phoensight is an international consultancy specialising in how technology can deliver better outcomes for society.

Specialising in data analytics, public policy and government, Phoensight is dedicated to tending to the interrelationships between people, their communities and technologies,

Phoensight empowers organisations to achieve their goals and visions using innovative and holistic approaches, while being on the leading edge of technology.

Working with accredited Warm Data hosts that are certified by the International Bateson Institute (IBI), Phoensight also offers clients the experience of a Warm Data Lab, as a practical approach in working with the complexities they encounter.

Phoensight has a deep respect for people and communities, and is committed to supporting diversity and inclusion. Phoensight also acknowledges the Traditional Owners upon whose ancestral lands we live and work, and pay respect to their Elders, past, present and emerging.

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INTRODUCTION

AS WE APPROACH A NEW FUTURE, OUR RELATIONSHIP WITH TECHNOLOGY WILL DEPEND ON HOW OUR EXISTING SYSTEMS EVOLVE.

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The nature and pace of emerging technologies bring to the fore many questions relating to our society, our collective values and how we interact with one another and the many systems we are part of.

While the challenges of adapting to an ever evolving technological ecosystem are complex, the many issues that surface are interdependent in ways that may not be easily perceived or understood.

That the technological forces are many and interconnected is undisputed - yet in seeking to address the unwanted consequences that emerge, we often revert to scoping problems into separate disciplines, issues and contexts.

With an urgency that only technology can demand, a large part of our responses focus on solutions to the individuated issues rather than addressing the underlying systemic problems.

While this approach may have sufficed in some situations, there is a very real danger in applying localised 'siloed' interventions to unfamiliar complex systems - such as for emerging technologies.

The nature and attributes of technology today are unprecedented in their speed, reach and impact - and any policy instrument or regulation that does not consider the broader contexts, may also result in unprecedented unwanted consequences. It is for this reason alone, that a systems perspective is critical.

Phoensight does not hold a stance that is either for or against regulation, but is emphatic that any proposed strategy, policy or research consider the impacts across and *between* multiple contexts.

This includes a re-examination of issues relating to social justice, human rights, consumer protection, ethics, data privacy and protection, surveillance and transparency within and across our existing systems - amidst new technologies.

This white paper tugs at what is currently referred to as Artificial Intelligence (AI), with the purpose of better understanding its role within our ecosystem, as well as its limitations and interdependencies within our society.

A process for working within these complexities, *Warm Data Labs (WDLs) [1]*, is presented as a practical tool for navigating multiple contexts for a new way of sense-making. The hope is that WDLs may provide the conditions to deepen our understanding of our technological world for new solutions.

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ARTIFICIAL INTELLIGENCE AND OUR SOCIETAL SYSTEMS

HOW AI SHAPES OUR ECOSYSTEMS DETERMINES HOW WE DESIGN NEW TECHNOLOGIES - AND ALSO THE SYSTEMS WE ARE A PART OF.

As Artificial Intelligence (AI) permeates deeper into our society, new manifestations of perverse societal outcomes are being unleashed. Public concerns about algorithmic bias and fairness [2], data privacy [3] and various forms of digital divides, such as accessibility, take up of AI services and inequality [4], put a new spotlight on the existing cracks in our systems.

The ethical implications and social impacts of AI [5] are the focus of much research and debate — and with these come a new wave of approaches and tools, such as the AI Fairness 360 Open Source Toolkit, to try to address these 'technological shortcomings'. But, as yet, there doesn't appear to be an easy 'patch' to the problem.

There is a tendency to either fix the symptoms that AI surfaces or embed measures of fairness and ethical considerations in the design of these algorithms [6][7]. Neither of these seek to address the deeper issues prevalent in our society that traverse multiple contexts.

What is neglected is a closer examination of the many connected systems we are a part of - and how *these* are evolving with our technologies.

We are beginning to see the distortions in our existing systems, through an AI lens, What we learn from these, and how AI is shaping our ecosystem, will determine how we design and build new technologies — but it also informs how we design and understand our systems.

We are coming face to face with a disruption of our systems as we know them to be — spurred on by the machines we have trained. This is not about an 'AI takeover' — it is about understanding the

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complexities of our social, economic, political, regulatory, educational, health and cultural frameworks, and the moral or ethical undertones that are ‘baked’ into these.

Building AIs that make decisions with very real human consequences, is taking us into uncharted waters that are more nuanced and require a closer examination of the interrelationships and interdependencies within our complex societies. New generations of AIs provide us with new avenues and contexts to understand how we relate to each other - and at the same time also transform our values, preferences and behaviours [8].

Yet, the creation of these new forms of intelligences does not come without its responsibilities — more so when we train technology to teach themselves on data and processes that inherently capture the best and worst of humanity.

Without them having the ability to contextualise their learnings or comprehend the broader implications of their decisions as they evolve, the use of AIs might drive humanity towards unimagined consequences.

We cannot separate the influences that AI has on our society from the influences that society has on AI — the two are inextricably diffused. Bolting on regulation, without a systems perspective, in an attempt to hold AI back from running wild may have unintended consequences for society — as will allowing it to run free, untamed and unchecked.

What’s needed is to work within the complexities of the AI-human ecosystem — and this means understanding the surrounding interactions, interdependencies and interrelationships within our changing ecology. It also means closely examining how our natural and human-designed systems interact across many contexts.

As a starting point, it is instructive to reflect on the differences between AI and humans - which at a fundamental level emphasises the essence of humanity itself and may point to the limitations of AI, including where its use may not be appropriate.

By doing so, we may also reflect on the suitability of our other human-designed systems in their currently evolving state.

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DATA AND HUMAN EMOTION

AS OUR INTERACTIONS BECOME MORE DIGITALLY TRANSACTIONAL AND LESS INTERDEPENDENT, CONTEXTS AROUND HUMAN PERCEPTION AND EMOTION WILL BECOME INCREASINGLY IMPORTANT.

Our human propensity to create and collect data as an abstraction of the world around us or as a form of our expression has played a significant role in our evolution - and our relationship with data itself has evolved over time.

The increased digital storage capacity and computational power we have today has resulted in a greater volume, velocity and variety of data than we've ever known. And the digitisation of modern products and services has allowed for the collection of transactional information that otherwise would not be possible.

Big data, now ubiquitous in our society, is not just restricted to technology, but is also pervasive in almost every aspect of our lives. Organisations are acquiring more data to gain deeper insights for better services, products and solutions - and these have extended to understanding and predicting outcomes for people themselves.

What is apparent is that data is becoming less 'abstract' and more relevant in its representation of the word around us. But is there a limit to how well it can translate and model the complexities in society - including human emotion and behaviour?

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A relatively new agent in our ecosystem, AI is advancing rapidly with a growing demand for more data to improve its performance. Yet, while these algorithms continue to become more sophisticated with more data, they are also *limited by* the data they're trained on.

The 'transactional' nature of the data we collect often overlooks the many interdependencies that are woven within our relationships. Although technology may afford us many new capabilities, we are yet to fully understand exactly *what* technology is replacing.

All the while, technologies like AI are playing an increasingly mediatory role in our relationships and interactions. But how technology changes our interrelationships and how we relate to our ecosystem is still unclear. Questions on whether, and to what extent, technology is capable of becoming a human substitute requires understanding its limitations and the many facets of human complexity across multiple contexts.

The comparisons between AI and humans have been the subject of much discussion [9][10][11], with many researchers believing that AI won't come close to replicating human Intelligence without being able to reason about 'cause and effect' [12].

And while 'solving' the causation problem alone is just one aspect of artificial general intelligence [13] - the complexity involved in understanding causality for living systems is not straightforward. What's also required, amongst many other conditions, is a deep understanding of human perception and emotions - and how humans interact and react in different situations, conditions and ecosystems.

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Human emotion and the capacity for empathy are some attributes that distinguish humans from AI - and many researchers and developers are attempting to close this gap by striving to embed empathy in AI [14]. That human relatability to machines may be supported by emotive technology is seeing new advances in AI [15], but how this changes us and the ways in which we interact in society is yet to be fully understood.

There is a nuanced difference between developing AI to emulate human emotions and designing AI to enhance and support our 'human-ness' within its messy complexities. According to Danielle Krettek, from Google's Empathy lab [16,] research shows that when technology is 'attuned' to strengthen our emotional connections, an 'empathic leap' is possible with machines.

What we are dealing with is much more complex than simply coding in ‘empathy rules’, based on collected human data, to upgrade our AI algorithms. Even mapping out the effects of human emotion says little about their causation — let alone the processes involved in their evolution.

The ocean between how we perceive the role of emotions in our lives and their true origin may be as deep and complex as sifting through innumerable life experiences and across multiple contexts — ecological, social, cultural, and economic amongst others. These cannot be captured in raw data, particularly as they are continually evolving.

What's more, the 'objective' nature of data, that's been extracted and stored for algorithmic consumption, make it difficult to understand the many contexts that were once tied to it.

Subjectivity and perception are crucial elements in learning from our environment and ecosystem - and these cannot be captured without some form of reductionism.

In a recent interview, psychologist and economist, Daniel Kahneman, spoke about 'time' being the currency of life- but also something that is not linearly represented in our memories [17]. Our perceptions of past events and the stories we tell ourselves also evolve across multiple contexts - and these cannot be reflected in data that is digitally stored.

Meanwhile, AI is evolving by incorporating new datasets, such as those used for facial recognition and emotional recognition, to better predict and respond to human behaviours and preferences. The AI Now Institute has recommended a halt in the deployment of this software, in 'sensitive social and

Photo by Ryoji Iwata on Unsplash

political contexts', till the risks are fully studied and adequate regulations are in place [18]. Research indicates that there is no substantial evidence or causation relating facial expression to emotion [19].

To understand the broader implications of facial recognition software and how it affects society, we need to consider not just the social and political contexts, but also how the other interconnected contexts and systems may be influenced.

For example, recruiting technology firms are starting to use AI to analyse facial movements for determining a person's employment suitability in many sectors such as hospitality and finance [20]. And whilst regulating the use of such software may go some way towards addressing some of the social issues, a closer examination of the contexts around health, economics and finance may reveal new ways to address concerns within these supporting systems.

Humans have evolved though many complexities that defy logic in favour of protecting the fragile and vulnerable [21]. It may not be possible to understand human behaviour, emotions and the reasons for them (in their multifaceted complexities) by decontexualising this information into data.

The complexities that are held within the human psyche are formed within multilayered contexts and numerous life experiences, objectivity and subjectivity, rationality and irrationality - and these must be blended together for a new type of sense-making.

FRAGILITY AND VULNERABILITY

In his essay on the evolution of humanity [19], French geophysicist, Xavier Le Pichon puts forward the idea that, like with plate tectonics, vulnerabilities within a system are important for facilitating its evolution. He notes that a system that is 'too perfect' is rigid and closed, and can only change through great disruption.

Le Pichon postulates that, contrary to what's often assumed, tending to system vulnerability is required for evolution, and any attempt to overlook this may prevent it from functioning at all. He argues that the evolution of human society through the years has benefited from ensuring that the fragile and vulnerable in communities are protected. Perhaps designing AI and technology for the vulnerable (across many contexts) will go beyond just inclusion and help ensure that the many interdependencies within our ecosystem are better regulated.

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TRANSPARENCY, TRUST AND AGENCY

TO UNDERSTAND HOW TO GOVERN AI WE HAVE TO GO BEYOND A MULTIDISCIPLINARY APPROACH TO A TRANS-CONTEXTUAL ONE.

While data scientists are navigating through the unfamiliar terrains of data privacy, ethics and regulatory concerns, they do so mainly because of the unintended consequences that emerge and the implications of decision-making as a result of AI [22].

AI algorithms may be unsuitable for use in many instances due to biases in the training datasets - and often the quality, provenance and nature of the data are brought into question [23][24].

That AI's tend to exhibit a 'black box nature' has also received much attention, and the need for transparency [25] is becoming increasingly important as it spreads across our many systems. While much of the focus has been around fairness and accountability [26], what's also occurring is that AI is affecting the *integrity* of our systems.

At the heart of transparency is the desire for 'trust' in the systems we are a part of - and trust is a quality that lies within our interrelationships, and relates to our wellbeing in society.

Transparency initiatives like Google's 'Explainable AI' are progressing in an attempt to improve the interpretability and accountability for the reasons behind decision-making.

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Yet, our existing systems that have existed prior to the deployment of AI are not often held to the same scrutiny and standards [27]. While this is not necessarily an argument for lowering the standards that AI must be held accountable to, we need to re-examine what 'trust' means in the contexts of the systems we are within.

Interestingly, research has shown that transparency in AI and machine learning algorithms may lead people to over-trust and misuse interpretability tools [28][29]. Studies examining the pitfalls of the provision of information and explanation emphasise the significance of contextual factors - including legal, social and ethical [30], They point to 'relational' concepts of transparency for future progress. In understanding the role of transparency we may need to go further - by considering a trans-contextual approach [31].

Underlying the need for understanding how AI algorithms work in society is the importance for people and communities to feel empowered and have 'agency' by having the ability to appeal decisions, and to help co-create the systems they live within.

In her work on trans-contextuality [32], which looks at information held within the interdependencies of contexts, Bateson explores the concept of 'agency'. She notes that although it implies individuation and independence, agency exists in many relational contexts - and is '*diffused into the larger contextual processes shared by the entire community*'. Agency and accountability in AI is no different.

That understanding the societal impacts of AI needs many disciplines, including the arts [33], is well acknowledged - but what's really at the heart of the complexity is its *transcontextual* nature.

THE ECOLOGY MATTERS

THE CONDITIONS WITHIN OUR ECOLOGY SHAPE HOW WE RESPOND AND EVOLVE WITH AI

Not all complexities are created the same— the complexities of systems created by humans, such as our social, financial, political and economic systems are different to those that exist within nature.

In the midst of these entangled complexities, we are continually learning and adapting through our participation within our many systems.

Studies identifying many interdependencies between our cognitive, emotional and social intelligences within our neural systems suggest that our ecologies and environment contributes significantly to our 'human intelligence' [34].

So it follows that *what* we learn from interacting with different types of complexities might also be different - and these go towards shaping our numerous perceptions. By contrast, the complexities that AIs work with, while processing large amounts of data, are inherently different to ones we encounter in our lives.

Although there is much debate as to when AI will reach 'singularity' (i.e. when AI surpasses human intelligence), what's still not clear is how these will be compared.

In his recent lecture at Lafayette College, Pennsylvania, Kevin Kelly spoke of the multiple dimensions and taxonomies of intelligence [35] — some of which are yet to be identified, and some that might be unique to animals and other species. And these are constantly evolving within our ecosystems.

How we perceive and relate to *any intelligence*, including within our existing inter-species relationships, will also contribute to our own ecological learnings — which then informs how we design *both* AI and our other systems, including our regulations.

The question we need to ask is - how do we create the conditions that allow for more trans-contextual learning in our relationship with intelligence, AI or otherwise?

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WARM DATA LABS

A TRANSCONTEXTUAL PROCESS FOR UNCOVERING NEW INSIGHTS IN COMPLEXITY

What's been missing from the AI narrative so far, is a broader approach — one that encompasses a rich and diverse ecology of the many evolving contexts that are tangled together, creating countless stimuli for mutual learnings.

These mutual learnings or '***Symmathesy***', as described by Nora Bateson [32], founder of the International Bateson Institute (IBI), go deeper than just taking a 'systems perspective' — because they also include the 'expression and communications' of the *interdependencies* within living systems.

By working within these complexities (rather than reducing them, which limits our understanding), we may discover new avenues and ways of sense making — ones that allow for a transcontextual exploration of our complex relationships with AI, technology and our many systems. But where does one begin with such an approach?

Pioneered by the IBI, ***Warm Data*** [32] is the continually evolving information that's held within the interactions of living systems across many contexts. '***Warm Data Labs (WDL)***' are carefully designed group processes that help provide the conditions to explore warm data across many contexts.

These allow for new insights into the many complexities we find ourselves in, and provide opportunities for learning about how the many elements and agents are interconnected and interdependent - which ultimately provides a deeper, more nuanced understanding of what we are dealing with.

By using a transcontextual approach, we have the unprecedented opportunity to re-design not just AI and regulation, but also our other human created systems - where we can work within moving complexities and allow for new shifts in our perceptions and the world we're creating.

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With a PhD in Physics and a Masters in Economic Policy, Audrey has over 10 years experience working with the Australian Treasury in areas related to personal taxation, housing, social policy, labour markets, demographics and big data.

An Open Government advocate, Audrey has presented on "*Evaluating Government Policies using Open Source Models*" and "*Publicly Releasing Government Models*" at the Linux Conference, Australasia. She was invited by opensource.com to contribute an Op-Ed piece on "*Why we need an open model to design and evaluate public policy*", which went on to be one of the top articles in 2017.

With a strong interest in open data, Audrey has co-authored, "*Open Data Supply: Enriching the Usability of Information*", which examined the 'usability' of government open data, and presented this work at the Strata+Hadoop World Conference (2016).

Audrey has participated at the 2017 Australian Financial Review (AFR) Innovation Summit' forum on, "*The national innovation agenda – are we ready for Industry 4.0?*", and presented the National Keynote on at the Australian CIO Forum in 2018. She has also presented at the Canadian FWD50 Conference on "*Open Models - by the people, for the people*" and "*La vie en Data*".

In 2018, she co-presented with LinkedIn at the Strata Data Conference in London on "*Leveraging public-private partnerships using data analytics for economic insights*".

Last year, Audrey partnered with the Canadian National Energy Regulator on research into social media and digital citizen engagement, and presented on "*Purposefully designing technology for civic engagement*" at the Strata Data conference in New York.

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