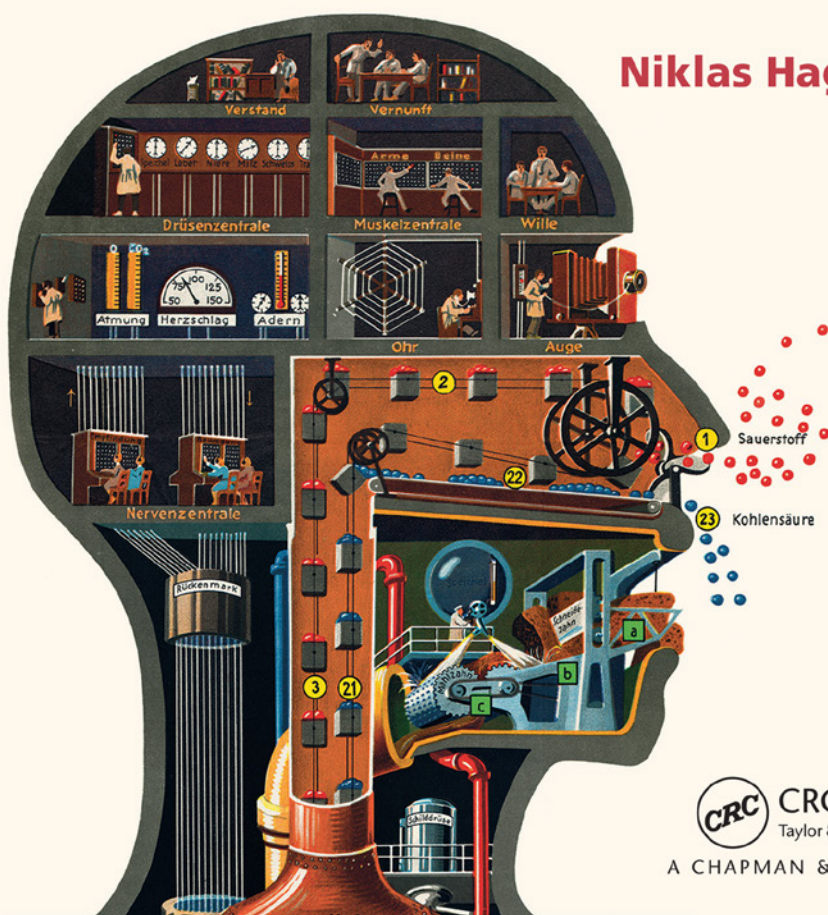


Chapman & Hall/CRC
Artificial Intelligence and Robotics Series

THE VIRTUAL MIND

Designing the Logic to
Approximate Human Thinking

Niklas Hageback



CRC Press
Taylor & Francis Group

A CHAPMAN & HALL BOOK

The Virtual Mind

**Designing the Logic to
Approximate Human Thinking**

Chapman & Hall/CRC
Artificial Intelligence and Robotics Series

Series Editor
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Aims and Scope

As the field of AI and Robotics continues to grow, the timely dissemination of emerging research and developments is increasingly important. This new book series serves as a publication venue for innovative technical contributions in AI and robotics, with coverage of both theoretical AI research and applied AI and robotics. The scope of the series includes, but is not limited to, titles in the areas of knowledge representation and reasoning, affective computing, deep learning/neural networks, natural language processing, AI safety, machine ethics, superintelligence, technological singularity, multi-agent systems, programming languages for AI, robot navigation, military, medical, humanoid robotics, autonomous robot, artificial consciousness, computer vision, pattern recognition, and other relevant topics which might be proposed by potential contributors.

Published Titles

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Niklas Hageback

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Niklas Hageback has extensive experience in the financial sector working at tier-one financial institutions and consulting firms, such as Deutsche Bank, KPMG and Goldman Sachs, where he held regional executive risk management and oversight roles in both Europe and Asia.

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Introduction

I never came upon any of my discoveries through the process of rational thinking.

Albert Einstein (1879–1955)

The computer, sometimes considered an electronic counterpart to the mind, operates on Boolean logic; however, any approximation with human thinking is usually very poor. The structure of the mind seems to be working on a dialectic intrinsically more complex.

It seems odd that although we have now lived with machine-generated computation for more than 70 years, its underlying logic has still not advanced to more closely resemble human cognition. Why is it so?

How the human mind works has long been pondered upon; traces can be found among the earliest known writings, often in a religious context debating the soul, and leading up to the theories of the early twentieth century by Sigmund Freud and Carl Gustav Jung, among others, proposing and documenting an unconscious part of the mind.

The study of the mind, spanning from religion and philosophy to the various facets of psychology and in the current setting, neuroscience, have all concluded the existence of an unconscious part of the mind that functions distinctively differently from the conscious part. Thus, the holistic human mind forms an amalgamation of an unconscious and a conscious part, incorporating a structure for the decision-making process that operates in stark contrast to the standard logic framework.

Human thinking is a concoct of the largely rational reasoning by the conscious part of the mind of a skewed and truncated reality that is set by the reigning narrative to which a society conforms, and the particular logic of the unconscious that absorbs a broader sphere of reality. It interacts in accordance with a protocol, which often manifests in decision making that can be perceived as seemingly irrational but is far from it;

rather it follows a diverging schema that can be replicated and standardised into machine-generated thinking.

If attempting to replicate human thinking in the aspiration of developing a new computer architecture, the dual process theory provides a promising starting point, introducing two different kinds of thinking: one that is based on reasoning, often similar to Boolean logic, and a more intuitive form based on associations where previous perceptions serve as references. The dual process theory is an attractive proposition as we can in it recognise our own thought processes with the interspersed mix of rational thinking, and what often is labelled as ‘gut feel’ or intuition, where the path to our decision making cannot exclusively be described in terms of rationality but where emotions to an extent relaxes such properties. But where the dual process theory, in its various variations from William James up till more recently Daniel Kahneman’s bestseller, *Thinking, Fast and Slow*, falls short is in amalgamating the timing in selection, and any dynamic constants, between these two systems of thinking. While in hindsight, the dual process theory can provide explanations to which of the two systems that dictated a particular outcome, there has as of yet been no comprehensive methodology presented on the prospects of forecasting the patterns of human thoughts.

But overlaying the dual process theory with Freudian and Jungian concepts, such as the abstract notion of the mind and the (collective) unconscious in a multidisciplinary approach, provides a promising framework for establishing a rule-based mechanism to replicate human thinking.

While the century-old theories of Freud and Jung might appear antiquated, recent findings in *neuropsychanalytics* are breathing new life in them by confirming the existence of an unconscious playing an active part in decision making and how

perceptions are interpreted. To Freud, the unconscious stored perceptions repressed by the conscious, and Jung theorised that the unconscious organised itself in innate patterns, *archetypes*, that activate when an accumulation of repressed perceptions overextends and starts to influence conscious thought patterns. How then to assess the contents of the unconscious? Empirical studies highlight that activities in the unconscious can be tracked through figurative language that indicates the themes around which the unconscious evolves. By extracting, categorising and statistically analysing these, it is possible to establish mechanistic rules and dynamic constants that are tested through a big data approach from public media, and with that standardisation and machine-generated thinking and thus the introduction of a new computer architecture becomes possible.

There is reality and then there is a social reality...

That humans truncate reality has long been an established fact. Every time époque operates by a different narrative and context that sets the overall cultural, political -isms, norms, mood entiments and moral ambience, such as the *Victorian* era.

Certain fixed ideas or themes will come to exist within this social reality, or *zeitgeist*, and carry strong emotional power to become the core of a belief system with rationality not applied on them but rather *within* them as they form the axioms which cannot be questioned. So, what in retrospect might appear to have been absurd statements or decisions made by someone were, in fact, highly rational, under the rigorous context and thought pattern dictated by the prevailing *zeitgeist*. A model of human thinking thus needs to be able to distinguish between reality and social reality.

The unconscious operates on a different logic...

In psychoanalysis, one of the most important characteristics of the unconscious is its aspiration towards symmetry, where concepts such as space, time and causality become one. It can be formulated through a suite of axioms that points out the anomalies from Boolean logic. These are the *principle of generalisation* and the *principle of symmetry*. Hence, the unconscious is marked by symmetry, where sameness is preferred, and its processes work with classificatory activity; they seek the similarities (associations) between objects, whereas for the conscious, distinguishing difference, or asymmetry, is the focus. These two logic systems work in a mixture, in what is termed *the bi-logic thinking system*, which operates in a transcending manner where particular combinations of symmetrical logic and asymmetrical logic are morphed into bi-logic.

For whom is this book written?

This book, *The Virtual Mind: Designing the Logic to Approximate Human Thinking*, through an in-depth review in a multidisciplinary manner, takes aim at defining the makeup of the unconscious and conscious part of the mind and its integrated patterns.

From this perspective, the author proceeds with formulating a unique concept to designing the logic that approximates human thinking, which can be implemented on a variety of platforms to better forecast human behaviour.

Equipped with this insight, the reader will be facilitated with the knowledge to develop and produce a machine-generated virtual mind presented in a step-by-step blueprint manner. *The Virtual Mind* is therefore a must-read for anyone with an interest in the construction of the next generation of computer logic and artificial intelligence, and enhancing the understanding of the workings of the mind.

The book, *Virtual Mind: Designing the Logic to Approximate Human Thinking*, consists of six chapters:

- **Chapter 1: The Theory of the Mind.** This chapter provides the historical background to the various theories of the mind; from the ancient Greeks as well as considering the religious viewpoints on the characteristics of the human soul. In the early twentieth century, Sigmund Freud and Carl Gustav Jung made ground-breaking progress when they presented a structured approach to the human mind, including an unconscious part. Modern psychology has further elaborated on these perspectives, as have neuroscience, taking the anatomical view through the now ongoing large-scale projects to fully dissect the functioning of the brain. Other models of the mind, including the dual process theory, will also be dissected to draw out common generic features that are shared cross-disciplinary to give us what to date have been ascertained in our knowledge of the mind and its capabilities.
- **Chapter 2: There is Reality and Then There is (Social) Reality.** Why is it that humans blind out certain aspects of reality in a way that best can be described as an *Emperor's New Clothes* syndrome? There is an obvious discrepancy between *social reality* and *physical reality*; however, it seems what is being blinded out shifts over time and societies and cultures. To explore and further the discussion, the author will examine what is and what is not considered to be normal as it comes to serve as a distinguisher to what parts of reality are to be considered at any given time. As certain objects or topics become taboo and other become norms of society, and albeit hard to exactly pin down, together these define the social reality highlighting the preferences and providing

the contemporary narrative. And while these concepts are well recognised by academia, they have fallen short in providing explanations on how social reality forms in structure, duration and content.

Psychological notions, such as groupthink, a tendency to conformity and Freudian defense mechanisms, all supports the creation of a social reality constrained by boundaries, which at times appears arbitrarily set. The social reality dictates to a large degree the perimeters that rational thinking is confined to operate within and any attempt to machine-wise replicate human thinking must be able to reflect that. This chapter presents a plausible hypothesis on how it emerges and it can be precisely defined, which will provide a foundation to distinguish social reality from the physical reality.

- **Chapter 3: How Does the Unconscious Part of the Mind Operate?** Following up on the previous chapter, perceptions dimmed by social reality, where do they go? We know through neuroscience that they are registered and stored in the unconscious, but although not recognised by the conscious part of the mind, can they still influence human decision making? If so, by which set of logic, if any, is this consciously unrecognised information arranged and operated by? Both Freud and Jung formulated rules and structures which the unconscious adhere to. Freud's proposition was later on picked up by the Chilean psychologist Ignacio Matte Blanco, who proposed a bi-logic schemata of the juxtaposition of conscious and unconscious that establishes the framework which the human mind functions by. This chapter aims to construe and present the algorithms which regulates the unconscious part of the mind.