

SAT & Machine Learning Business + Research Opportunity

An overview of 3 months of R&D @algorithmes.org 

Charles Dana, H24, Discrete Mathematician, Entrepreneur   — 2024-02-21

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What can be made.

What has been achieved in the past 3 months.

1 – Low-level Machine Learning

Small Data, is a qualificative used to negate Big Data, which is at the core of modern neural networks.

The purpose of **Small data**, is to describe **an entity** rather than a whole system, in order to **capture the singularity** of a simple but exhaustive dataset.

The applications are multiple, but one example is a [did not survive] signal on the Titanic Kaggle Dataset that has been achieved with a **75% precision** on a random subset of **120 passengers**, backtested on the 771 remaining.

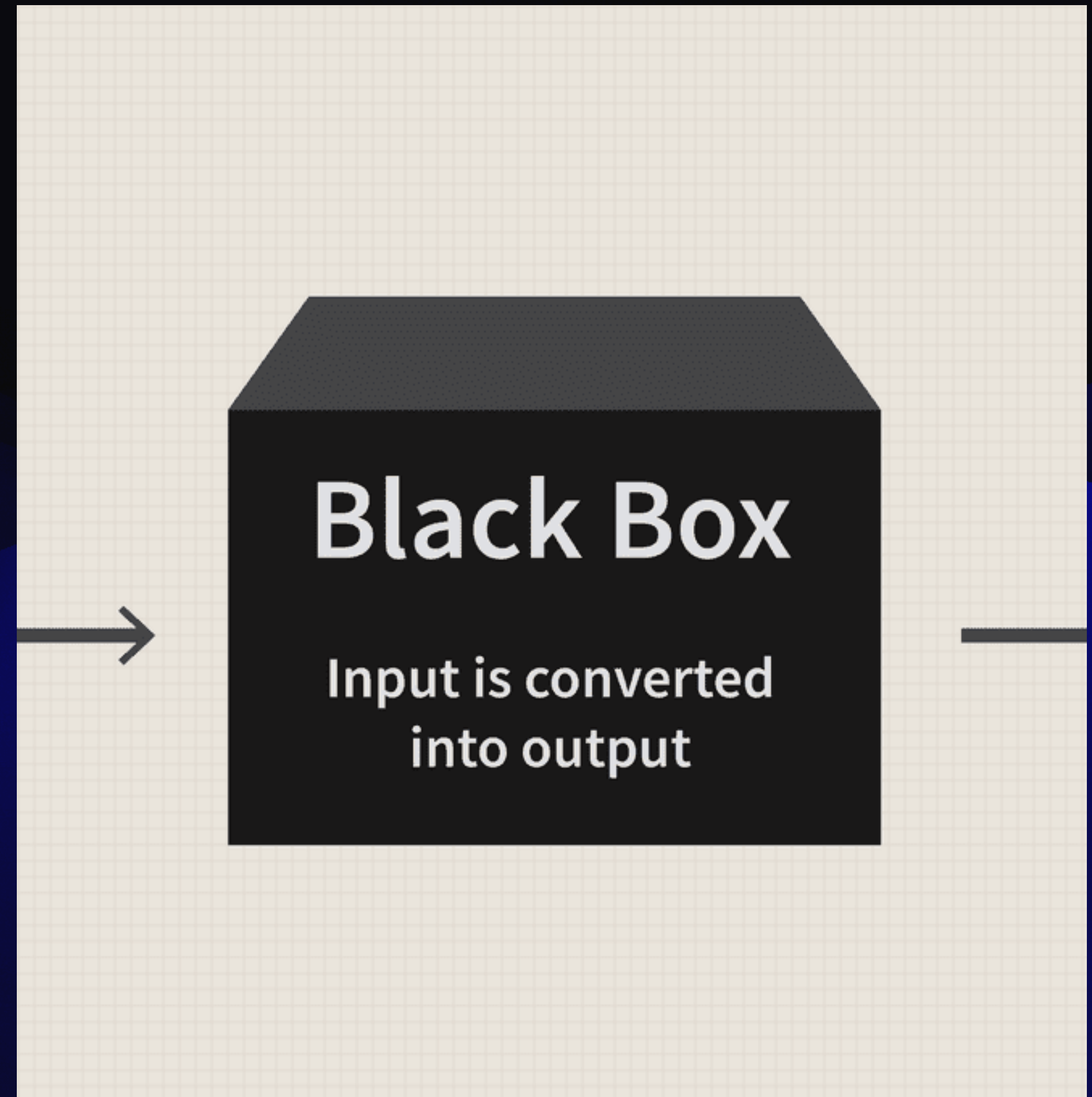


2– Auditable Machine Learning

Given a collection of **input output floating point coefficients pairs**, it is possible to train a machine learning model to audit and generate automatically a **source code that behaves like the training data with 100% accuracy**.

The initial purpose is to **comply** with upcoming **European AI regulation** that will make such audits compulsory for Black Box neural networks that impact the EU citizens lives on the daily.

It is also a useful tool to **improve and correct the biases** in an existing model, underlying the importance of the gender in an automated CV reviewing model.



3—

Fast Bitcoin Mining Machine Learning

An experiment was conducted on Bitcoin Mining in February, which led to the **refusal** of a **.500** equilibrated mining probability with a **p-value** of **7%**.

Experiments suggests that the current edge on the probability of having an additional leading zero can be improved by at least 1%, leading to a **.505** « **biased coin toss** » and an **effective x2 on computational power** through clever-mining.

This machine learning approach is innovative in an industry that focused on a **scalar approach** to complexity of Bitcoin Mining, rather than improving the success of the event [leading zero number k] which has a **theoretical probability** of **.500** on the original Satoshi Whitepaper.



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What is Expected.

What the next couple months will look like.

A — Document & Research SAT

At the core of all of these great discoveries that were brought by extensive research, lies a simple mathematical object.

SAT, short for Boolean Satisfiability Problem which can be formalized as:

AND(OR[])

$$\varphi = \bigwedge \left(\bigvee l_{a,b} \right) \text{ and we can prove } \varphi \subset \{0,1\}^{\mathbb{N}}$$

In short, **SAT is nothing but a solution set** described through computation.

It is possible to prove that $\mathbb{R}^{\mathbb{N}}$ sequences of real numbers are equivalent to a subset of $\{0,1\}^{\mathbb{N}}$, which legitimates the relationship between neural networks $\mathbb{R}^N \subset \{0,1\}^{\mathbb{N}}$ and a SAT Instance $\varphi \subset \{0,1\}^{\mathbb{N}}$.

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The Discrete Infinite

Charles Dana, H24, Discrete Mathematician

February 21, 2024

Abstract

The author of this manuscript dedicated 5 years of trial and error in the making of the problem of boolean classification. Basically, any SAT instance describes a subset of $\{0,1\}^{\mathbb{N}}$, where \mathbb{N} designs the natural integers. The purpose of this manuscript is to offer a discrete collection of $\{0,1\}$ as the only axiom. It is possible to prove that π is isomorphic to a subset of $\{0,1\}^{\mathbb{N}}$. Which is also true of $\mathbb{R}^2 \simeq \mathbb{C}$. It only takes a discrete amount of computation to claim that π can be seen as collection of integers. The intuition is about saying $\pi = \{3, 14, 159...\}$ increasing digit by digit to avoid redundancy. The intuitive considering in the literature we consider that the 'size' of \mathbb{R} , is \aleph_1 . But the twist, assume for one second, that \mathbb{R} is isomorphic to a subset of $\{0,1\}^{\mathbb{N}}$. \mathbb{R}^2 is

B – Practical Business Implications

Considering this field of research is the consequence of the author 5 years of independent research, the **results are fairly new** and practical business implications are not missing.

If you are under the assumption that a **traditional Neural Network Machine Learning Model** will not suffice to **fit your training data without over-fitting**, algorithmes.org has been constituted as an « auto-entreprise » on February 1st 2024.

I will explore your training data (which can be translated to binary for RGPD considerations) through an R&D Mission priced at 1200€. There are possibilities for:

- **Streaming of the restitution** through an API hosted by AWS.
- **Restitution of the model (python source code)** for your R&D team.
- **Settlement on the value** that the model will provide to your company.

The R&D Mission is **priced at 1200€ on success**, and reduced to 750€ if the model was not conclusive.



C— 👁️👁️ for a CEO / CTO Algorithmes

Algorithmes will be constituted in the Summer 2024.

As the original founder of the company I am seeking to surround myself with **an experienced CEO** with a **strong interest in Machine Learning and its applications**.

The **CTO** will have the mission to make a **SAT instance trustworthy and understandable to the public**, mainly UX and server architecture.

As for myself, I will remain a scientist and position myself as **founder and head of research**. I will pursue a PhD position, in order to push and formalise my research alongside with a « **contribution to industry** » bringing **my intellectual property as a valuable asset to the company**.

If you think you are up for the challenge — reach out to [👤](#) [✉️](#)



Infos

Discrete Mathematician 0-1, Entrepreneur.

Passionate about math and code, I believe in Computer Science for Greater Good 🌱

As of right now at algorithmes.org 🧠 we are capable of:

- Explainable Machine Learning Predictive Model (SAT).
- Source code generation from existing model.
- Labelling and Categorizing (sparse) binary data.

All of this starting with a 100 lines excel data set.

If you are concerned about RGPD a preprocessing demo is available on algorithmes.org (binary suffice).

We work as freelance, with missions of 1-3 days.

Also, I am the author of $A O(2^{\{n/2\}})$ Universal Maximization Algorithm; which introduced a new look on the Fourier decomposition of real functions with n Boolean variables. It can be applied to obtain an upper bound on the approximation of the root of any, integer real or complex, polynomial.

This was written in August 2023.

💎 Compétences principales

LaTeX • C (langage de programmation) • Apprentissage automatique • Vente • Pitch →

Charles Dana
algorithmes.org | H23

Formation

- HEC Paris**
Master's in Management
sept. 2019 - déc. 2023
Niveau : 12 - A
Master's Thesis - $A O(2^{\{n/2\}})$ Universal Maximization Algorithm
Under the supervision of Erwan Le Pennec (Applied Mathematics At École Polytechnique)
- HEC Paris**
Grande école
sept. 2018 - juil. 2023
Quintuple 20 aux épreuves de mathématiques du concours ECS.
- University of California, Berkeley**
Learn2Launch, Entrepreneuriat / études entrepreneuriales
janv. 2023 - mai 2023
- X-HEC Entrepreneurs**
août 2022 - juil. 2023
- 42**
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Programmation informatique
sept. 2019 - août 2021
7e sur 600 à la piscine de Juin 2019.
- Université Paris 1 Panthéon-Sorbonne**
Licence MIASHS, Mathématiques et informatique
2018 - 2019

Expérience

- Working on something new**
Stealth Mode · Indépendant
déc. 2023 - aujourd'hui · 3 mois
Ville de Paris, Île-de-France, France
algorithmes.org
- Founder's Associate**
Apl0 · Stage
juil. 2023 - déc. 2023 · 6 mois
Paris, Île-de-France, France · Sur site
Operations & Research
- Bras droit COO**
Bigblue · Stage
mars 2022 - août 2022 · 6 mois
Ville de Paris, Île-de-France, France
- Business Operations Analyst**
Mytraffic · Stage
sept. 2021 - mars 2022 · 7 mois
Paris