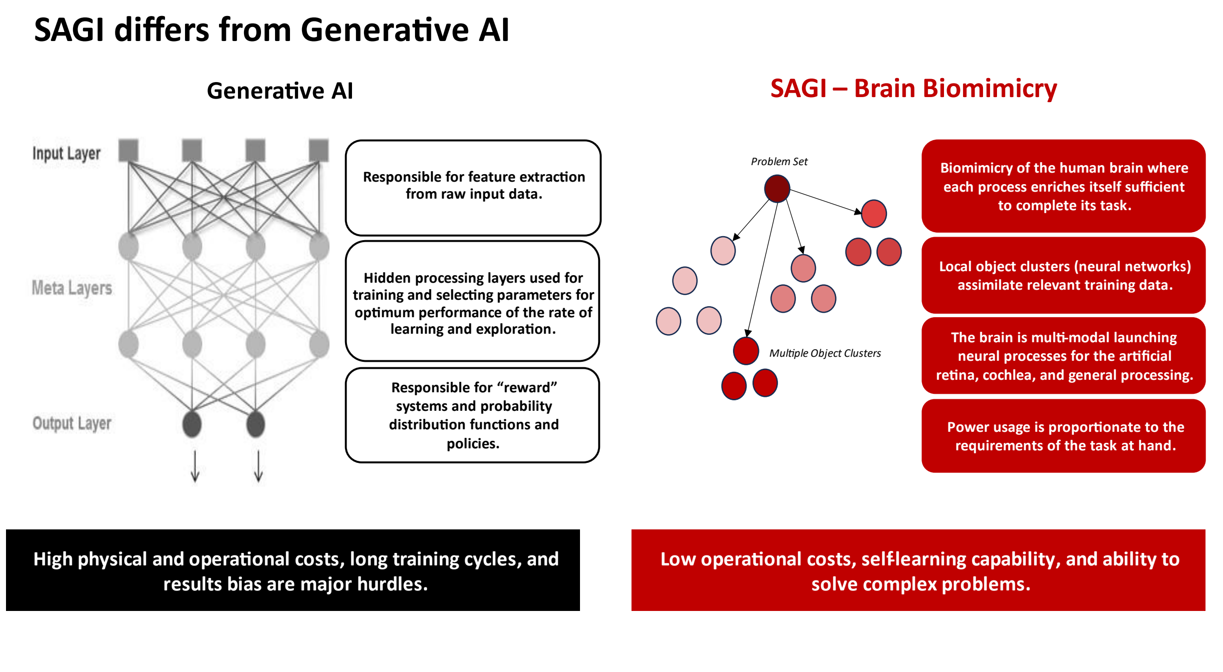
INTRODUCTION TO SAGI
WHITEPAPER

Introduction

SAGI is an Artificial General Intelligence company focused on building artificial brains that mimic the human brain. The SAGI team uses biomimicry of the human brain involving advanced mathematics, brain biology and object-oriented computer technology. All assets, patents, software and applications are owned by the corporation. There is zero Open Source in the code base.

<u>Our differences with respect to standard or Generative AI are stark:</u>



Generative AI is a deep reinforcement learning (DRL) system. It is not a thinking system. In DRL systems, input data is subjected to meta layers which send input data from one layer to the next. They require trainers to condition the data, layer by layer and use various reward systems, probability weights and other mechanisms. The depth of the meta layer stack is commensurate to the degree of difficulty of the problem set. It can chew up an enormous amount of power both for training and execution. This conditioning also applies to the output layer.

Training data must be collected or manually generated. This process can be very difficult as trainers and engineers must prevent the neural network from learning characteristics of the training patterns which, although there is some correlation with the result in the training set, cannot be used for decision making in real-world situations. The way of presenting "learning" data to the DRL can have a material impact on the rate of learning speed and whether the problem can be resolved by a DRL at all.

The SAGI artificial brain is a neuronal network system employing concepts such as Entanglement & stochastic processes (new math). The SAGI artificial brain models the human brain in a biotech manner and comes with 2-4 million cortical columns. Each column contains approximately 100 neural networks. Each neural network contains 160-240 neurons with around 10,000 synapses per neuron. In addition, we have modeled different types of cells from the human nervous system to allow for more accurate thinking processes in our artificial brain. These cells include glial cells (fibrosis and protoplasmic astrocytes) and various neurons including pyramidal neurons, stellate neurons, matrix neurons, unipolar neurons, bipolar neurons, and central neurons. Our methodology allows learning, training and thinking to be carried out using biomimicry algorithms as opposed to DRL algorithms.

SAGI Benefits

There are major benefits to using human biomimicry including two orders or more of power savings per implementation over Generative AI. Why is this? Namely, a Generative AI system shunts decision making from one meta layer to the next using "probable" weights applied to conditioning the layer data (manual training process) and relying on complex linear algebraic expressions for managing the resultant data bloat. This is the nature of deep reinforcement learning (DRL). There is no deductive pruning and no thinking taking place.

SAGI uses stochastic processes & Entanglement, which allows the weights associated with sets of synapses or individual synapses to be updated concurrently by adjusting the weight of a single synapse during computational processing. By using stochastic processes & Entanglement effective learning algorithms can be realized by a neural network with significantly less training data. It is possible to train neural networks using up to 90% less learning data compared to what is usually required with DRL, and providing significantly more accurate results.

SAGI runtime brains use standard operating environments (SOE) such as Linux, Solaris, etc. The following graphic illustrates the power savings over traditional DRL systems. In this example, SAGI uses a Sparc 10 CPU and Solaris O/S to deliver its capabilities when compared to a GPU based SOE. GPUs are optional for SAGI.

Hardware Execution Metrics (Power Drain)

	Sparc 10 CPU	A100 GPU	B100 GPU	B200 GPU
Max Execution Load	150W	400W	700W	1000W
CPU Power Savings Factor		62.5%	78.6%	85%
Nominal Rack Power	13.7 kwh (max)	30 kwh	50 kwh	70 kwh
Rack Power Savings		54%	72.6%	80.4%

Source https://www.cudocompute.com/blog/nvidia-blackwell-architecture-breaking-down-the-b100-b200-and-gb200

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SAGI artificial brains can be scaled from small Telco closets to tier V facilities depending on the needs of the applications and customer. The power savings to date have been impressive.

SAGI Customer Application Examples

SAGI is deployed in multiple industries including Financial, Transport, Insurance, Medical, Forestry, Meteorological, Technology and Defense. There are three highlighted applications below.

Medical Insurance

ICD-10 [international coding for diseases version 10], is a global standard coding system and determines how hospitals, doctors and urgent care providers are reimbursed for their services. This is an error prone process that requires the service facility to provide a completed Electronic Medical Record (EMR) to Insurance along with an ICD-10 form most often completed by a human coder. If the form is incorrect or does not match the transcription on the EMR, it is rejected, therefore prolonging payments to the institution. Often ICDs are missing additional Primary diagnoses and Secondary diagnoses leading to this prolongment. Our application is outlined below and is currently running in 19 hospitals. That number is currently in the process of growing.

Example 1: ICD 10 Coding (Healthcare)

Problem: In every country in the world, diseases must be diagnosed in hospitals (main and secondary diagnoses and treatment codes are standardized as international IDC10 codes). This requires extensive medical knowledge. For hospitals, this means allocating dedicated financial and human resources. Due to the lack of time and personnel, the quality of coding is often so poor that **hospitals lose up to 33% of reimbursements** from insurance companies.

Input: Patient files in natural language with diverse medical findings (e.g. X-ray, ECG,…)

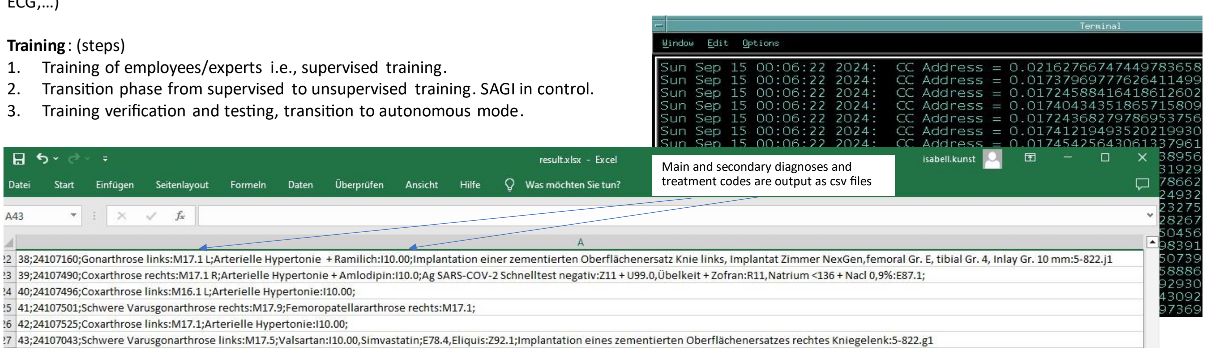
Training: (steps)

1. Training of employees/experts i.e., supervised training.
2. Transition phase from supervised to unsupervised training. SAGI in control.
3. Training verification and testing, transition to autonomous mode.

Results: As the SAGI AGI is 100% neuronal, it understands natural language from any context point of view just as human beings do.

Transparency: Each diagnosis is accompanied by an explanation of how it came about.

100% automated, 95% error-free diagnoses, duration per patient file ~ 30 seconds, took 8 weeks to train the brain



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Another example application is a visual demonstration of the SAGI artificial retina. In this case, 3-D orthodontic aligners are produced from photographs and/or videos of the subject's mouth. This is a labor-intensive process requiring dozens of pictures and videos and scans. Our application was able to streamline this process as outlined below.

Example 2: Dental System (Biomedical)

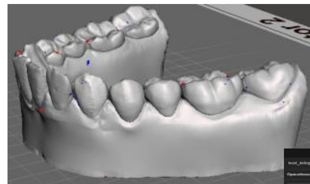
Problem: Treatment plans for orthodontic aligners are created manually by dental experts. The entire process (dentist sends 3D scan of teeth to dental experts for processing) takes about one to two weeks. Disadvantages: Long processing time, 40-40% of patients drop out, high costs and lack of skilled staff.

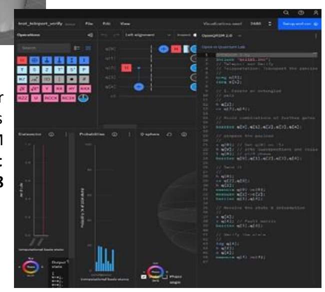
Input: 3D Scans of teeth or pictures of teeth or x-rays of teeth. Input data can be 2D or 3D via SAGI Mini-Brain(s).

Training: (steps)

1. Using image data, the dentist trains the system for cluster analysis and for determining the key parameters and data in preparation for cognitive work tasks.
2. Analysing the Clustering Data, the system uses genetic algorithms and actual datasets for determining the optimal self-learning and thinking parameters.
3. The system becomes autonomous.
4. Final output checks performed by dental experts. Corrections are fed back into the system, if any.

Results: Through its ability the do machine thinking, SAGI is the only system in the world which is currently able to create 3D objects on its own, analyze them and rotate them. The result for the customer is that the orthodontic process has been significantly improved.





To increase the performance for large amounts of treatment plans SAGI decided to run app on the IBM quantum computer. Final **output time** per treatment plan: **0.8 seconds**.

Customer costs reduced by 76%, with results available in secs, with an 11% gain in quality

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This application is currently being marketed by channels with access to over 5500 dental practices.

Financial

This is an example of a highly complex application for determining the liquidity risk of an international bank based on statistics, historical data and the bank's own risk provisions and rules.

Example 3 - Predictive Analysis for Liquidity Risk (Financial)

Problem: Liquidity Risk relies on statistical models. In this use case the bank needed a solution which combined quantitative (historical risk data) and qualitative (Reuters streaming data in natural language) data, performing real-time predictive analysis.

Input: 15 years of historical risk data & Reuters streaming data and indices.

Training: (Steps)

1. The real user (employee) acts as a 'teacher' for the software to learn its initial tasks. The real user is communicating with the software Mini-Brain (artificial brain) to feed it the required information on tasks that need to be performed. This includes both delivering commands to the software as well as the software 'observing' the actions a real user performs on the computer.
2. Upon completing the learning phase, the system becomes creative in the same way as human beings are and operates autonomously.
3. The system improves its performance and eliminate any mistakes the real user made based on its 'thinking' processes.
4. After a period of supervised training (four weeks), the SAGI system started learning in the unsupervised mode, while doing so the trainer was correcting it if necessary. After two months of training, the system was working autonomously.

Results: SAGI can be seen in the red circle which is enlarged to the right. The golden line represents SAGI, and the grey is market reality. **SAGI achieved 98% accuracy in its predictions.**

Results: Savings of $78 million annually.

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Technology

SAGI developed a Random Number Generator (RNG) that is software generated and does not use a hardware security module (HSM). The SAGI RNG finds starting seeds on Abelian elliptic curves through random filter functions using a form of Cohomology applied to the Abelian curves/groups.

The below table outlines how SAGI's RNG compares to other popular RNG algorithms for the listed tests. SAGI LLC's RNG is best in Class for overall score when comparing how the algorithms performed for RNG tests.

Example 4: Random Number Generator

Generator	CHI^2	Generator	KS	Generator	Serial	Generator	Permutation	Generator	Correlation
SAGI	0.06	Random.org	0.00	SAGI	0.03	SAGI	0.04	Random.org	0.00
MT	0.06	CMWC	0.02	Middle Weyl	0.04	KISS	0.06	Xorshift32	0.00
Xorshift32	0.06	Middle Weyl	0.02	KISS	0.08	Xorshift1024	0.12	RANDU	0.00
Random.org	0.08	MINSTD (R)	0.02	Xorshift1024	0.10	CMWC	0.12	SAGI	0.01
Xorshift1024	0.08	SAGI	0.03	CMWC	0.10	Middle Weyl	0.12	MINSTD (O)	0.02
CMWC	0.08	Xorshift1024	0.04	ECRUYER	0.11	Xorshift32	0.14	Xorshift1024	0.06
Middle Weyl	0.10	MINSTD (O)	0.04	Random.org	0.12	RANDU	0.14	KISS	0.06
MINSTD (R)	0.10	KNUTH	0.04	Xorshift32	0.12	MT	0.18	Middle Weyl	0.06
Park Miller	0.12	Park Miller	0.04	MINSTD (O)	0.12	Random.org	0.20	MINSTD (R)	0.06
KISS	0.16	RANDU	0.06	MINSTD (R)	0.12	KNUTH	0.22	MT	0.08
MINSTD (O)	0.20	Xorshift32	0.08	MT	0.16	ECRUYER	0.22	KNUTH	0.10
ECRUYER	0.20	ECRUYER	0.08	Park Miller	0.18	MINSTD (R)	0.24	Park Miller	0.10
KNUTH	0.21	MINSTD (R)	0.10	KNUTH	0.19	Park Miller	0.25	CMWC	0.12
RANDU	0.52	KISS	0.16	RANDU	0.50	MINSTD (O)	0.28	ECRUYER	0.12

Furthermore, SAGI has developed a Quantum RNG together with a Quantum Computer API that generates quantum keys for additional security and even higher quality in application such as cryptography, simulations, gaming, statistical sampling, and scientific experimentation.

Commercial Status

SAGI is a TRL-9 status product. It is deployed in several industries and in unique applications, with reference customers. In 2025, SAGI will be releasing certain open APIs including its Quantum APIs. SAGI remains in stealth mode, but is open for customer trials, R&D partnerships and scale testing.