VirtualBeam®

"VUF"

A Universal Framework (IDE) for AGI

Masoud M. Kamali / CTO

Virtualbeam, Inc.

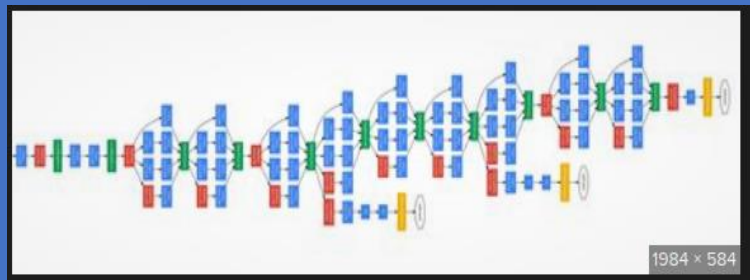
~~Confidential Document~~

~~Internal Distribution Only!~~

Sep 2023 VB-AGI Conference

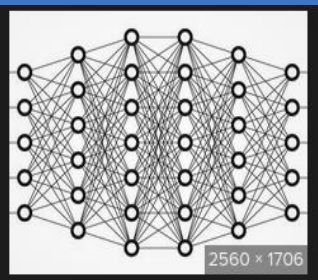
Revised and shortened for Public Release. VUF utilizes among other, the DAE technology, which is protected by US and International Patent law
(Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")

VUF: A Universal Framework for Enterprise GAI/AGI Application Development

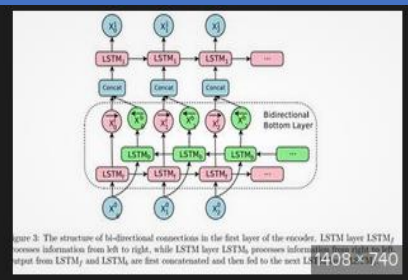


[原创]#Deep Learning回顾#之LeNet、AlexNet、GoogLeNet、VGG、ResNet - ...
zhuanlan.zhihu.com

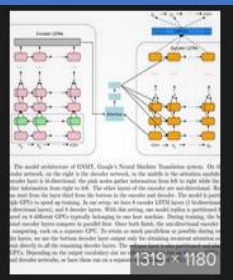
New Google mach...
technology.inquirer....



Neural Network: A Complete B...
gadictos.com

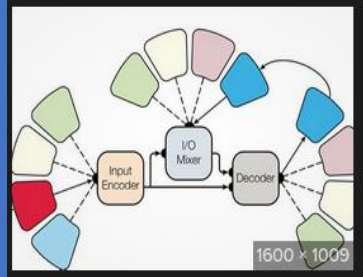


Google's Neural Machine Translation Syst...
hyunyoung2.github.io



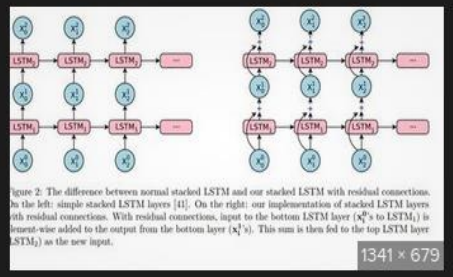
Google's Neural Mac...
hyunyoung2.github.io

Recurrent Neural Network: Understan...
simplilearn.com



Google's neural network is a multi-ta...
aivanet.com

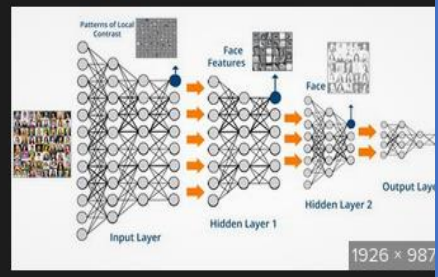
What Is a Neural Network?
lifewire.com



Google's Neural Machine Translation System
hyunyoung2.github.io

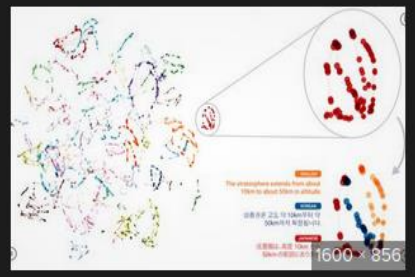
Neural Networks - 4. Convolutional Neura...
michaelfxu.com

Google is building deep neura...
androidcentral.com

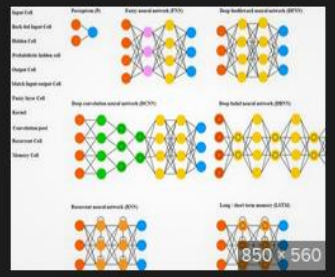


Deep-Neural-Network-What-is-Deep-Learning-...
thedatascientist.com

Cult of Android - Google's amazi...
cultofandroid.com



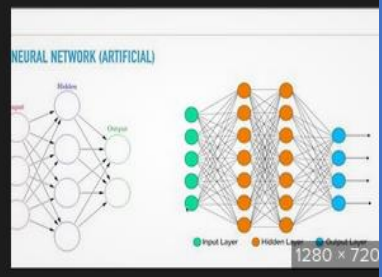
Google's new multilingual Neural Machine...
kurzweilai.net



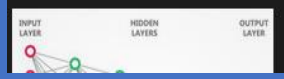
Structures of some typical neural ...
researchgate.net

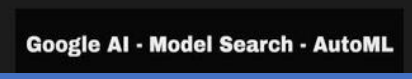
Google Neural Network Translates Web Pages...
softwarefocus.net

Google robots dream up crazy psych...
ibtimes.co.uk



Neural Network Tutorial 1 - Introduction ...
youtube.com





VUF: A Universal Framework for GAI/AGI

Emergent Phenomena

".. the coming out of properties linked to the complexity* of a system!"
Big Bang, Tornado, Flock of Birds, Society, Web Data, ..
great example: "evolutionary life"

Revised and shortened for Public Release. VUF utilizes among other, the DAE technology, which is protected by US and International Patent law
(Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")

Emergent Phenomena

Emergent Phenomena Property	VUF Supports
Collective Behavior	[1] Collections, Interconnections, .. [very large]
Individual Behavior	[2] Observer! Observed! Macro/Micro!
Emergence of New Properties	[3] Pre-conditions!
Multi-scale: Micro, Mesoscale, Macro	[4] Physics: Distinguishable. Distinct Scale?!
Emergence of Mesoscale Organizations	[5] Watch: Spontaneously emerge above threshold!
Units (sub systems) are interconnected - linked	[6] links encode Associations
Sub systems to Super System transformation	[7] w/ drop, keep, change, add new: property.
Multi types of interconnections	[8] See DAE (see Demo)

Self-Organization Phenomenon:

...Emergent Property of any Random Dynamical System!*

*theoretically and mathematically proven.

Self-Organization: one-way transformation. micro dynamics to macro order.

Emergent Phenomenon: recurring convoluted transformations

Evolutionary Life: true and real emergent phenomena

Emergent Phenomena

Properties	VUF (an AGI Development Environment)
Spatiotemporal Space, Universal	[1] $UNI_{entropy} = ENV_{entropy} + SYS_{entropy}$ time? Spacetime? $dSs/dt < 0$, $dSe/dt > 0$?
Multi-Dimensionality	[2] complex and complicated, multi layers, .. : R^N
Large Number of Single Organisms	[3] form new organisms with new properties
Formation of Ordered Structures	[4]"Self-Organization" and Spatially-bounded organizations.
Cooperative Decision Making	[5] Minimal to no communications among single units
Mechanical and Energy Efficiency	[6] Micro & Macro (Statistical Phy.) Meso-? Too Dynamic!
Multi-Stability	[7] U = E + S [must hold Post Emergence] Frame? Perspective?

Revised and shortened for Public Release. VUF utilizes among other, the DAE technology, which is protected by US and International Patent law
(Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")

Emergence:

"most beautiful and elegant concept in science*!"

"apparition of system-wide properties that are not present individually in the units, but have their origins precisely in the interactions!"

David Christian, The idea of emergence. 2013, deep, beautiful and elegant theories of how the world works

*

Emergent Phenomena (computer science - computation)

Emergent Phenomena Property	VUF Compute (watch Ascribe, Model, Execute, Deploy)
Weak or Strong Emergence	WE: Common, SE: computational/theoretical impossible?
Transformation of Information!	New Contextual / Spatiotemporal meanings (Observer POV?)
Self-Assembly Mechanism!	With minimum/no effort put in inter/intra-unit communications!
Interdependency | multiplexity | ..	Collective behavior with different flavors
Micro, Meso- and Macro System Properties [building blocks, actions, relationships, …, behavior,	A super-property post-emergence. Appearance of units and formations non-existent prior to emergence! Complicated and complex. Governing rules and bindings/links among units, and groups de/formations, forces, rate of expansion, spatiotemporal, .

Revised and shortened for Public Release. VUF utilizes among other, the DAE technology, which is protected by US and International Patent law
(Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")

Complex Network Structure:

"A large class of complex systems characterized by a structure represented in terms of units interconnected by links, which encode one or more kinds of interactions or relationships!"*

*Boccaletti,

Complex Network Structure

Complex Network Structure Property	VUF Demo
Large class of complex interconnected systems	[1] layers, Collections, Sets, Sequences, .., Dimensions, Concurrent Computing, Parallel Computing, Very Large Scale …
Multi-types of interactions	[2] Properties and Rules Emerging, , simultaneously
Dynamics of the network	[3] System Status. Behavior, Transitions & Transformations
Dynamics on the network	[4] System<-->Environment
Multi-layered VL Dimensional organizations	Rate of Expansion (finds meaning at Scale, may be negative)
Complex regular - Complicated Irregular Structure	[5] Rich Library – Building Blocks – Vector Based -

Revised and shortened for Public Release. VUF utilizes among other, the DAE technology, which is protected by US and International Patent law
(Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")

AI / ML / DL Toolkits for EP

Common Properties	VUF (Universal Model and TDE for AADD)
Theory, Concept (Optimal: A Universal Model, Complete, Well Formed, ...) Does/Can a UM Exist? Check out VUF! VUF: Full SDLC for AGI Application Development & Deployment - .	.., Raazi, Kant, Birooni, Newton, Einstein, …, Wolfraum! Perspectives? Perceptions? .. Weltanschaung!! (Philosophers, Mathematicians, Chemists, Med..., Information Scientists) ▪ UM is Complete: Energy, Matter, Particles, Forces, Time, …, Dimensions, Transformations, Dynamics, and … Observable, Identifiable, Measurable, … Transformations... EP! Building blocks, properties and interactions! Groupings! Systems' environment!
Analytical Proof (mathematical proof)	Individual action, vs. collective-action, appearance of regular and irregular recurring structures, deterministic flow (of information} within the network/system, non-deterministic stochastic decision making, energy* efficiency, .. Challenge: Strong Emergence (discover a new thing?)
Computational Framework (model / simulate in code)	[blanked in public release]
NN topological properties	[blanked in public release]

Revised and shortened for Public Release. VUF utilizes among other, the DAE technology, which is protected by US and International Patent law
(Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")

AI / ML / DL Framework for EP

Common Properties	VUF Features
Mapping non/topological properties	Declaration, Classification, …, distinct prop's supported! Model Flexibility. Multi Type? Type Casting? Extensions?
Model Complexity	Random? Dynamic? Organized? Ordered? Containment? Lower RoC at high scale! Formal Specification of: Define Change? Times? Spacetime? Cardinality of Units? Relationships? Governing Rules? Dimensions? Datasets? Containments? Custom Activation Functions? Formulas? Calculations? … Time!? Perceptual Time (and scale)! Local meaning? Globally present! Computer Simulations!? What if scenarios? Theoretically infinite scale!*
Layer Cascading, dimension reductions	Very large domain set --> very small result-set, e.g., vectors, weight- and bios- matrix multiplications (see table 1 – compare CNN convergence times: VUF running on 64bit Linux lap tops & TensorFlow running on 32/64 gpu cluster
Predict macroscopic outcome "possible for Weak Emergence"	Use VUF to define rules governing micro/mesoscopic units and collections! Add [super]human like senses to Units and deploy. Watch Demo! Scale: change in "meaning/type of Information" [observer – observed] Programmable Transformation Mechanism! meso->macro, stimuli/threshold? form flock?). Strong in multi layered recurring structures, Strong in pattern recognition

AI / ML / DL Framework for EP

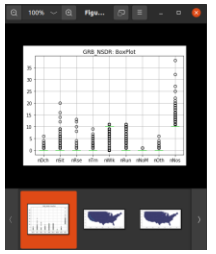
Common Properties	VUF [heading next...]
Define/declare the undefined!!	Known, not understood well enough: e.g., black holes! Solved? The Uknown, undefined, not discovered yet? Emergence of Life??
Future proof?	Is there an ideal framework! A Clairvoyant? ... Clairvoyant Scheduler (Prof. Herman Kopetz, project MARS, 1986)

We reviewed some properties of complex structures and the corresponding VUF Modules (don't miss the demo).
I use Emergent Phenomena, which are some of the most complicated structures and interactions known to human, to shed light on VUF.

See Notes section for references, articles, ... VUF utilizes among other, the DAE platform, which is protected by US and International Patent law (Patent Title "Distributed Association Engine". Assignee: Virtualbeam, Inc., Grant Date: Oct 2016")
1- theoretically and mathematically proven means it has a Markov blanket.
Life: Emerges from pre-biotic (chemistry) --> abiotic system (random, dynamic) --> cell (life) Complicated: Transition mechanism, rules, time, sub component interactions, …?
Consider a Tornado, Atomic Fusion, Supernova, …, a robot putting makeup, <<======== (sudo> bigbang)

VIRTUALBEAM™
THE NEXT DIMENSION IN SEARCH TECHNOLOGY

VIRTUALBEAM®



Mobile App Platform

Spatial – Social aware Private Commerce Apps

Direct Access to 3rd Party Cloud

VB Cloud Server for Authentication

Patent Applications

BtC, Viral?

Mobility Supply Chain

Partnerships (MEMs, CPU/MCU, OS, CE, ..)

Licensed SW Distributor

Offshore Agents, OEM (Chiina's 3rd)

BtB, Per SW Unit and Revenue Sharing

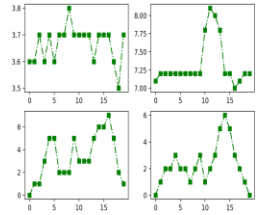
Product / Business Maturity

HCA, HUAWEI, Xiaomi, GN, RunMi, OEMs*

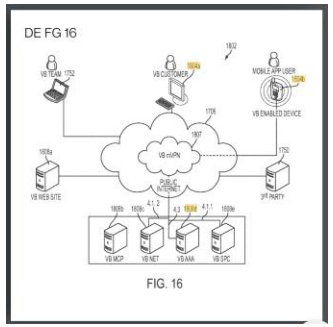
20+ separately license-able AI modules

[licensee list removed in pubic version]

M&A (2018)



2010 — 2020 — 2023



E Motion aware SWS for mobile devices

Per Unit/Feature Set SW Licensing

Sampling to Recognition, medical-grade

6/10 World Top Brands sign up

BtB, Market demand?

Licenseable SW Stack

VPC, VB4FF, VB4HCA

Device, App, GW App, Service, Analytics

FDA 510K Considerations

SaaS, microservice, API extensions, rt DAE. DIS, MRE

Rev: Device, service usage, AI reports

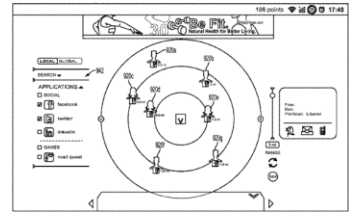
Enterprise Platform

IP Asset Protection

Business Transition

Restructure

VUF First Release



C19 Revival

2015: Interview: ARM Conference 2015, Silicon Valley (hardware agnostic on-device pattern recognition)
2014: Animation: Short Video on Human Activity Recognition technology by VirtualBeam