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"Toward a Sustainable Future for Interdisciplinary Synergy of Education, Technology, and Social Science"
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Optimization of Drug Design Composition by Hybrid Islamic and Evolutionary Medicine for Covid-19 and Its New Variants Using Geometric Time Variants Extreme Genetic Algorithm

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Introduction

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Integrated Al-Qur'an, Hadith, Sains and Technology

- **Every medicine from Al-Qur'an and Hadith it's no need step by step to test start from in silico, in vitro until in vivo. Because it's must to true from Allah SWT. It's only need to control composition by optimization and directly can be use to Human.**
- **We call now it's hidden state era Covid-19 Endemic & it's new Variants**

Covid-19 + new Var.

- **Few Policy of Government (Indonesia):**
  - **Stay to prevent silent new Variants**
  - **Level Up research about modern approach by high end technology to create smart adaptive drug design, and vaccine formulation thought non-injection and others.**
- **Need Clever Algorithm to helper smart adaptive drug design by Hybrid Islamic & Evolutionary Medicine.**

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Literature | Al-Qur'an and/ Hadith

Integrated Al-Qur'an, Hadith, Sains and Technology

- **Al-Qur'an**

وَيُسْقَوْنَ فِيهَا كَأْسًا كَانَ مِزَاجُهَا زَنْجَبِيلًا

Meaning: "In heaven they will be given a glass (of drink) the mixture of which is ginger." (Surah Al-Insan: 17).

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Literature | Al-Qur'an and/ Hadith

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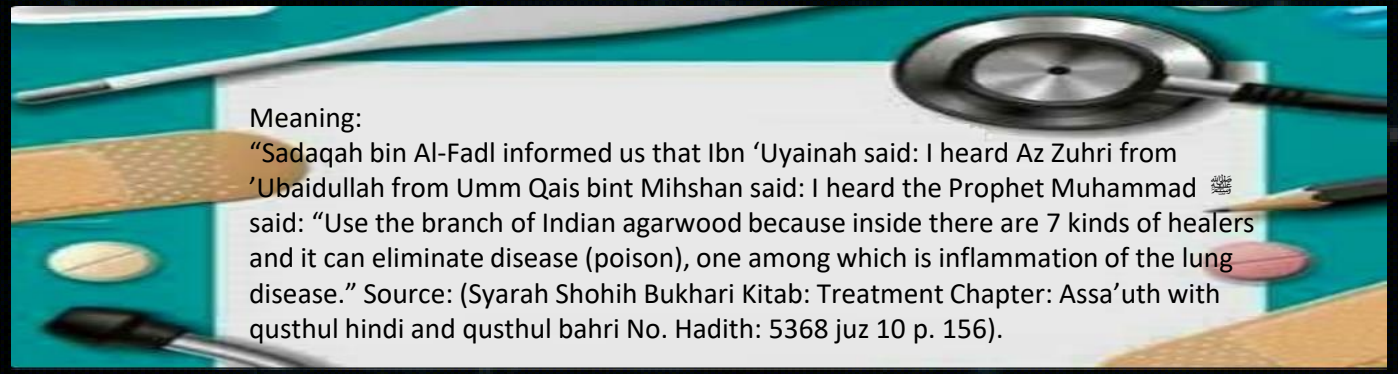
Integrated Al-Qur'an, Hadith, Sains and Technology

- **Hadith**

حَدَّثَنَا صَدَقَةُ بْنُ الْفَضْلِ أَخْبَرَنَا ابْنُ عُيَيْنَةَ قَالَ سَمِعْتُ الزُّهْرِيَّ عَنْ عُبَيْدِ اللَّهِ عَنْ أُمِّ قَيْسٍ بِنْتِ مِحْصَنٍ قَالَتْ سَمِعْتُ النَّبِيَّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ يَقُولُ عَلَيْكُمْ بِهَذَا الْعُودِ الْهِنْدِيِّ فَإِنَّ فِيهِ سَبْعَةَ أَشْفِيَةٍ يُسْتَعَطُ بِهِ مِنْ الْعُذْرَةِ وَيُلَدُّ بِهِ مِنْ ذَاتِ الْجَنْبِ وَدَخَلْتُ عَلَى النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ بِابْنٍ لِي لَمْ يَأْكُلْ الطَّعَامَ فَبَالَ عَلَيْهِ فَدَعَا بِمَاءٍ فَرَشَّ عَلَيْهِ رواه البخارى



Meaning:
"Sadaqah bin Al-Fadl informed us that Ibn 'Uyainah said: I heard Az Zuhri from 'Ubaidullah from Umm Qais bint Mihshan said: I heard the Prophet Muhammad ﷺ said: "Use the branch of Indian agarwood because inside there are 7 kinds of healers and it can eliminate disease (poison), one among which is inflammation of the lung disease." Source: (Syarah Shohih Bukhari Kitab: Treatment Chapter: Assa'uth with qusthul hindi and qusthul bahri No. Hadith: 5368 juz 10 p. 156).

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Literature | Previous Research

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$$fitness = \sum_i y_i\_optimal + \sum_j \frac{1}{y_j\_\min}$$

https://iopscience.iop.org/article/10.1088/1742-6596/1665/1/012003

- **Smart Development of Big Data App for Determining the Modelling of Covid-19 Medicinal Compounds Using Deep AI Core Engine System, ISSMART 2020, Publish on IOP**
- **Propose as Contribution:**

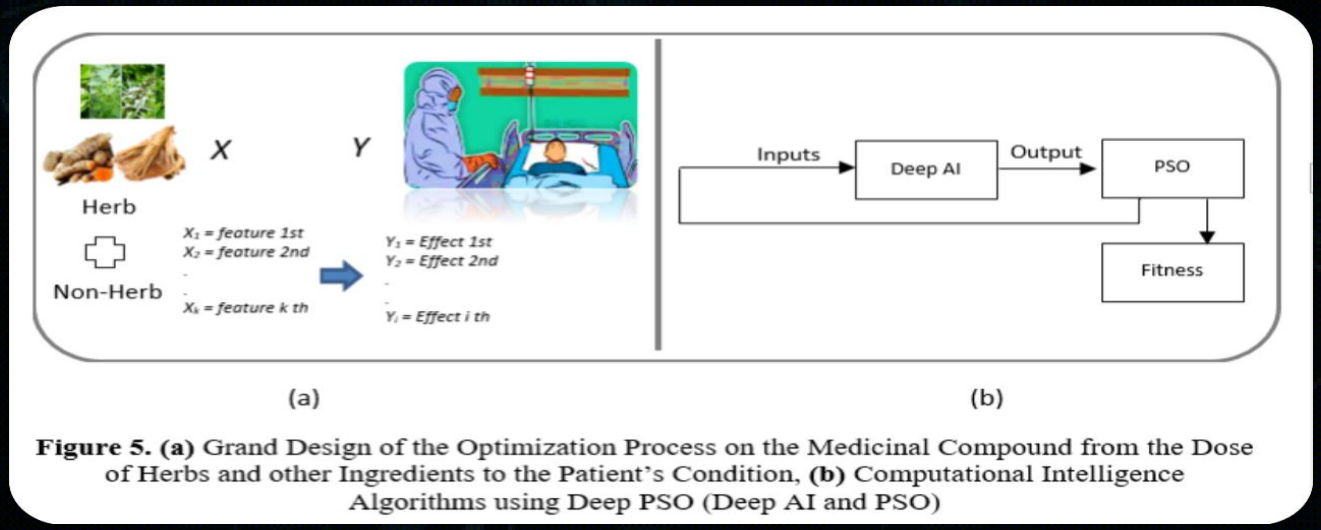

Figure 5. (a) Grand Design of the Optimization Process on the Medicinal Compound from the Dose of Herbs and other Ingredients to the Patient's Condition, **(b)** Computational Intelligence Algorithms using Deep PSO (Deep AI and PSO)

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Literature | Previous Research

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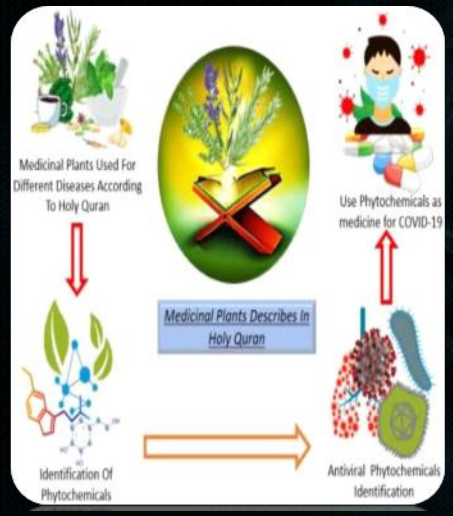
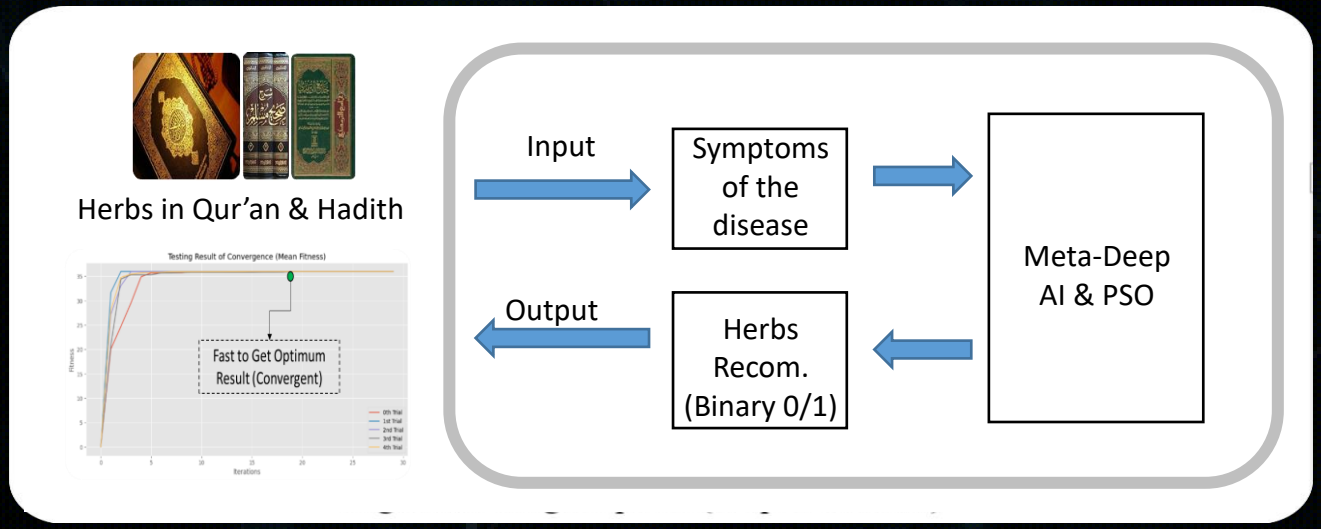


https://www.atlantis-press.com/proceedings/iconetos-20/125955684

$$fitness = \sum_{i=1}^{\#HerbFromQur'an\&Hadith} Match_i$$

- **Design Framework as a Prototype of Islamic Medicine Engine to any Disease Especially for Covid-19 based Al-Qur'an and Hadith Using Meta-Deep AI and Particle Swarm Optimization, ICONETOS 2020, Publish on Atlantis Press**
- **Propose as Contribution in 2020 (2 year ago, from 2022):**



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Propose | meta-Deep AI GTVeXGA

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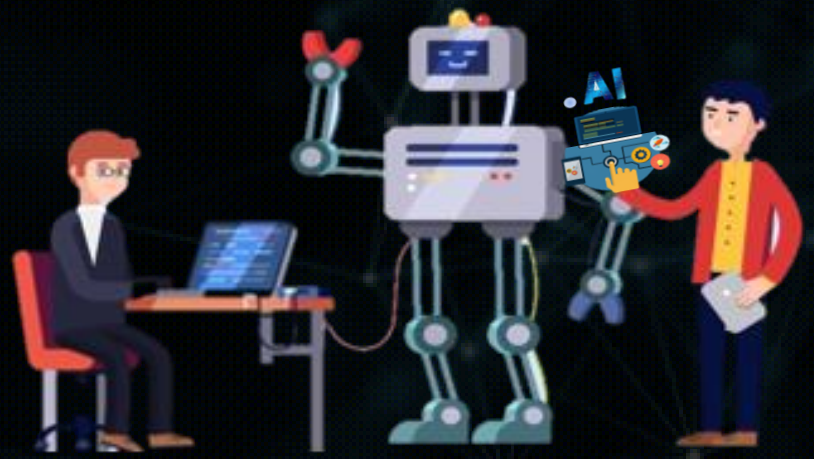


$$Cr = c_{2i}\left[\left(\frac{c_{2f}}{c_{2i}}\right)^{\frac{1}{t_{max}-1}}\right]^{t-1} \qquad Mr = c_{1i}\left[\left(\frac{c_{1f}}{c_{1l}}\right)^{\frac{1}{t_{max}-1}}\right]^{t-1}$$

Adaptive Crossover rate (Cr) & Mutation rate (Mr) as Geometric Time Variants (GTV) to acceleration Optimization result

- **Step by Step meta-Deep AI GTVeXGA algorithm:**

ELM training process with bias:

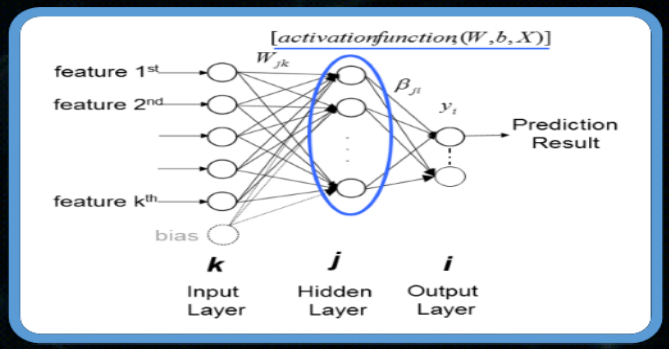
1. Build W_{ik} as input weight and bias value b if any. The size of matrix b is [1 x j].
2. Calculate the output matrix of hidden layer $H = 1/(1+exp(-(X.W^T + ones(Ntrain,1)*b)))$. $Ntrain$ is the number of training data.
3. Calculate output weight $\hat{\beta} = H^+.Y$ where $H^+ = (H^T.H)^{-1}.H^T$
4. Calculate $\hat{Y} = H.\hat{\beta}$

ELM testing process with bias:

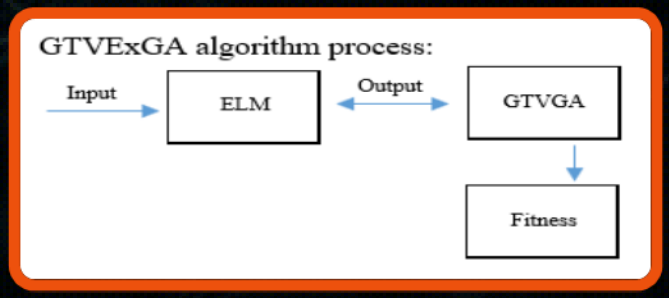
1. Load W_{jk}, bias b value if any, and $\hat{\beta}$
2. Calculate $H = 1/(1+exp(-(Xtest.W^T + ones(Ntest,1)*b)))$
3. Calculate $\hat{Y} = H.\hat{\beta}$
4. Calculate the evaluation value, with MAPE, or others.

GTVGA process:

1. begin
2. $t = 0$
3. initialization $P(t)$
4. while (not terminated condition) do
5. reproduction $C(t)$ from $P(t)$ based GTV
6. evaluation $P(t)$ and $C(t)$ using Eq. 3
7. selection $P(t+1)$ from $P(t)$ and $C(t)$
8. $t = t + 1$
9. end while
10. end



Architecture of Extreme Learning Machine (**ELM**)



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Contribution | Ai Medical Engine

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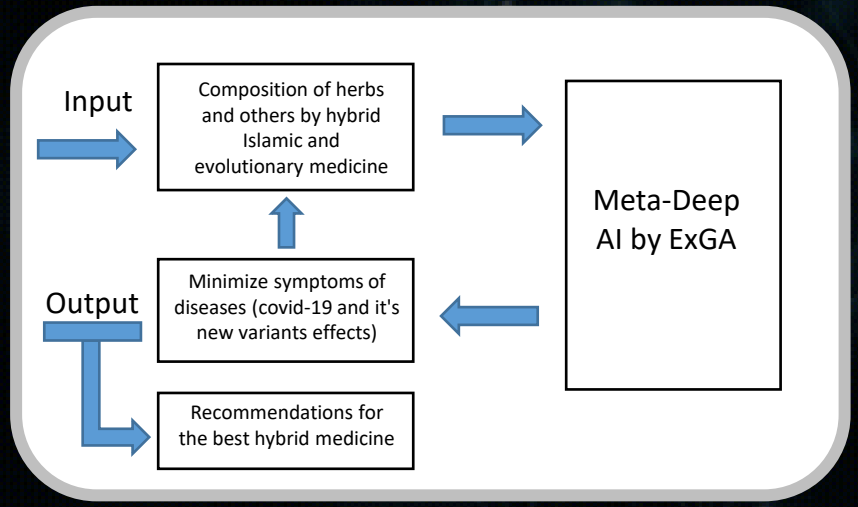

Block Diagram of meta-Deep AI Medicine Engine by GTV Extreme Genetic Algorithm (ExGA)

- **Load Dataset (**Scheme of Tables for Dataset**)**

Composition of herbs (Islamic x Evolutionary) as $(Herb/Evo.)_{1,2,..,16}$	Symptoms or Diseases (covid-19 and it's new variants effects) as $Target_{1,2,..,10}$
16 column	10 column

- **Chromosome Representation to Optimization using GTVeXGA (value of 16 gen is 0 ≤ cont. value ≤ 1)**

	$(Herb/Evo.)_1$	$(Herb/Evo.)_2$	..	$(Herb/Evo.)_{16}$
P_1	[0;1]	[0;1]	[0;1]	[0;1]
P_2	[0;1]	[0;1]	[0;1]	[0;1]
..	..	..	..	..
Ppop_size	[0;1]	[0;1]	[0;1]	[0;1]

- **Objective Function as Fitness**

$$Fitness = \sum_{i=1}^{nTarget} \frac{1}{Val.\ of\ Target_i\ to\ Minimize}$$

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Result & Discussion

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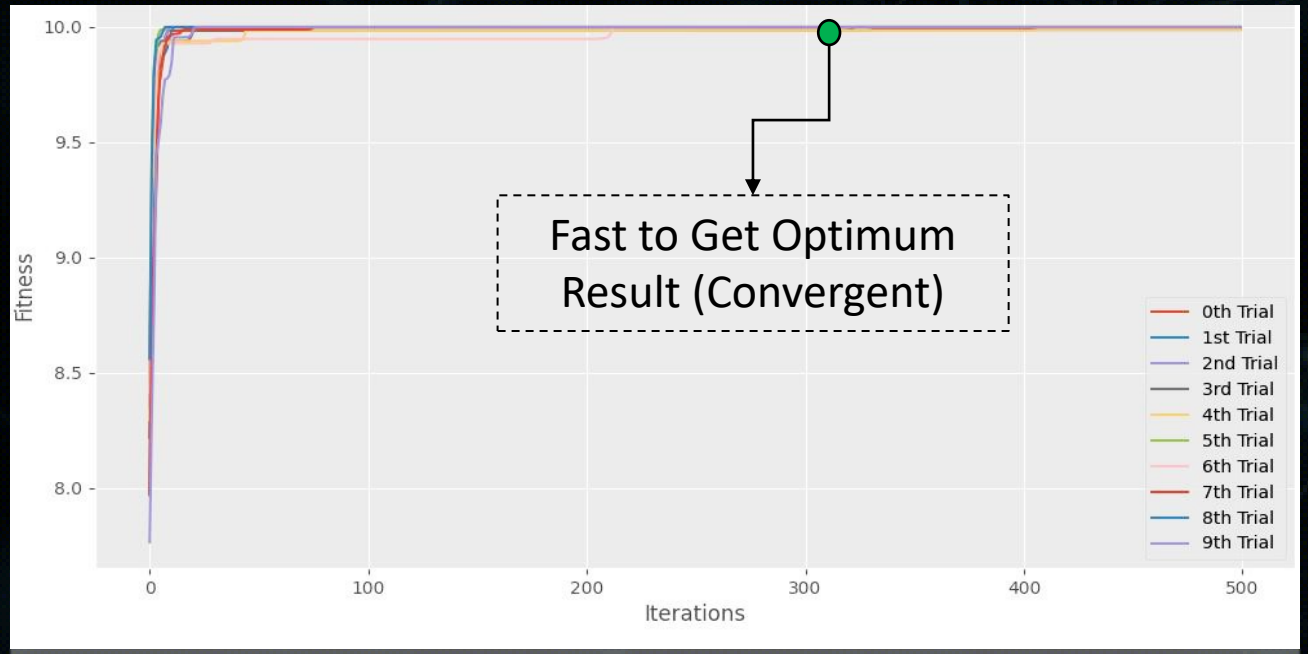
- **Graph of Fitness Value as Performance Measure has Reached a Convergent (Stable) Condition using GTVeXGA Algorithm**



Link open source code from our Teams:
https://github.com/imamcs19/Optimization-Drug-Design-by-Hybrid-Islamic-n-Evolution-Medicine-for-Covid-19-n-New-Var-with-GTVeXGA

Result of the best Chromosome from the beside Figure (included fitness value) :

---

best = [0. 0. 0. 0. 1. 0. 1. 1. 0. 1. 0. 1. 0. 0. 1. 1.]
Fitness of best = 10.0
y_topi = [0. 0. 0. 0. 0. 0. 0. 0. 0. 0.] *=> target is have been success to minimized*

Number of features = 16
['Jahe (Ginger)', 'Kunyit (Turmeric)', 'Madu (Honey)', 'Sari Kurma (Dates)', 'Zaitun (Olive)', 'Kayu India (Indian Wood Branches/ Qust Hindi)', 'Habbatussauda (Black Seed)', 'Minyak Kayu Putih', 'Propolis', 'Batang Tanaman Serei', 'Garam Krasak/Dapur/Himalaya', 'Kalsium (Calcium)', 'Zinc', 'Vitamin C', 'Vitamin D3', 'Vitamin E']

Number of target = 10
['Demam dari Suhu Tubuh (Celcius/100)', 'Batuk Kering', 'Lelu dan Lelah', 'Sesak Nafas', 'Nyeri/ Ngilu Sendi', 'Sakit Kepala', 'Pilek', 'Sakit Tenggorokan', 'Hidung Tidak Bisa Membedakan bau apapun', 'Diare']

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Conclusions & Future Work

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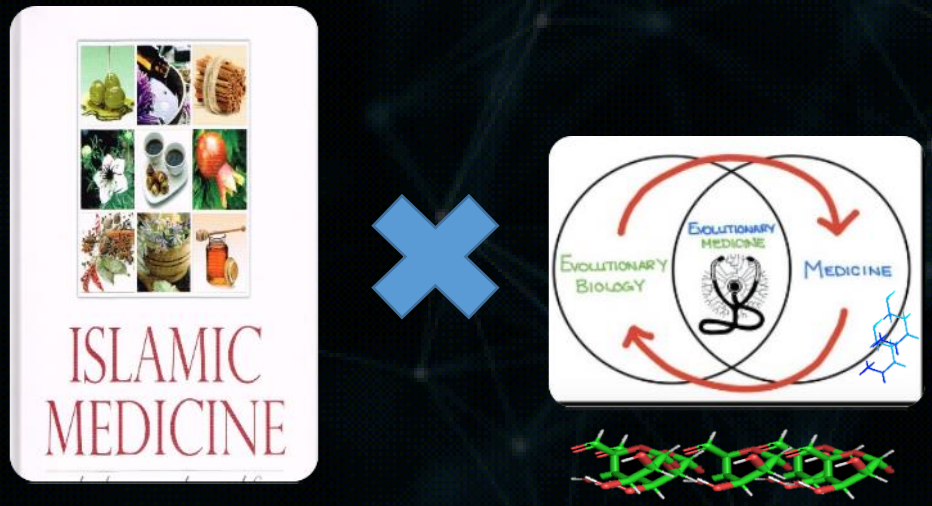

Build Drug Design based **Ai Medical Engine** with meta-Deep AI, Anywhere, Anything, Anytime, & Any Devices in Cloud-Ai App

- **Ai Medical Engine have been done to build Optimization Drug Design base Intensity of Composition by Hybrid Islamic and Evolutionary Medicine. Especially Islamic medicine, it's no need step by step to test start from in silico, in vitro until in vivo. Because it's must to true from Allah SWT. It's only need to control composition by optimization and directly can be use to Human.**
- **The results of the tests carried out several times showed convergence results. The more iterations used, the better the results with smaller error values generated. These results show that the Extreme Genetic Algorithm (eXGA) provides optimal results in determining the dosage of compounds from drug candidates for many diseases, especially in this study which focuses on COVID-19 and It's new Variants.**

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Thank You

#Lab. Computational Intelligence (a.k.a KC) Filkom UB
#Presenter on International Conferences ICONETOS 2022
#Fight to Covid-19 and Its New Variants

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