

Membrane Technology and Deep Learning Applications



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Vishal Nandigana

Founder, AIDesign, BlueFMa, AICartoon, BestBookRead, WellWrittenLyrics, Engineernig Documented, symbolforall, industries, Assistant Professor, Mechanical Engineering, IIT Madras, Chennai, India

Membrane Technology and Deep Learning Applications

Fantasy and Artificial Life Creatures to Reality



Fantasy and Artificial Galaxies to Reality



Membrane Technology and Deep Learning Applications

Fantasy and Artificial Life Creatures in World, Stars, Galaxies and Universe to Reality



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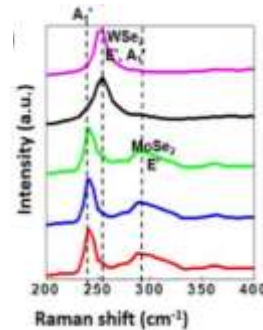
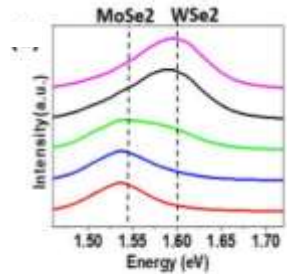
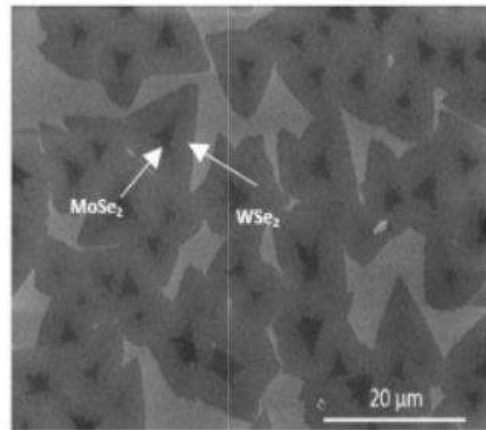
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Membrane 1: MoSe₂ / WSe₂ on SiO₂ substrate

2 2 2



Membrane 2: MoS₂ on SiO₂ substrate

2 2

Membrane-2 Schematics of CVD process for growth of 2D TMDs (MX₂, M= Mo,W and X= S, Se, Te)

Growth Parameters
MoO₃ (800 °C), S (150 °C), Ar flow (100 sccm)

CVD Grown MoS₂ membrane on SiO₂ substrate

➤ Characteristic Raman modes of monolayer MoS₂ i.e. E_{2g} and A_{1g} were observed at 385 cm⁻¹ and 405 cm⁻¹ respectively.
➤ Sharp PL peak observed at 1.85 eV confirms the formation of monolayer MoS₂.

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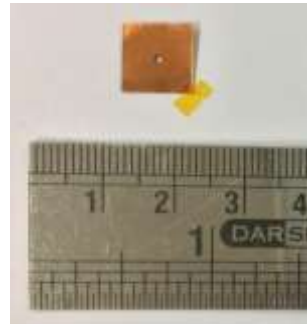
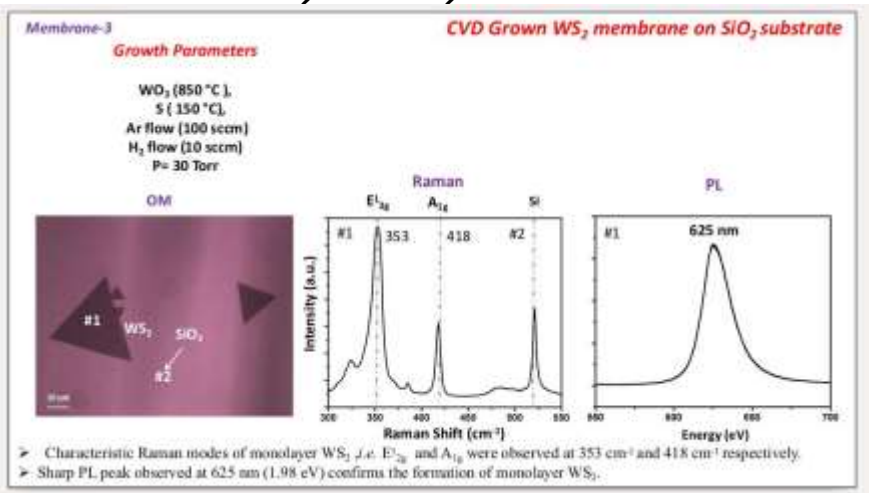
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Membrane 3: WS₂ on SiO₂ substrate

2 2

Membrane 4: Growth of Meso/MM scale (10 μm – mm size) Gr/Cu membrane with (a) single hole (b) multiple holes



(a)



(b)

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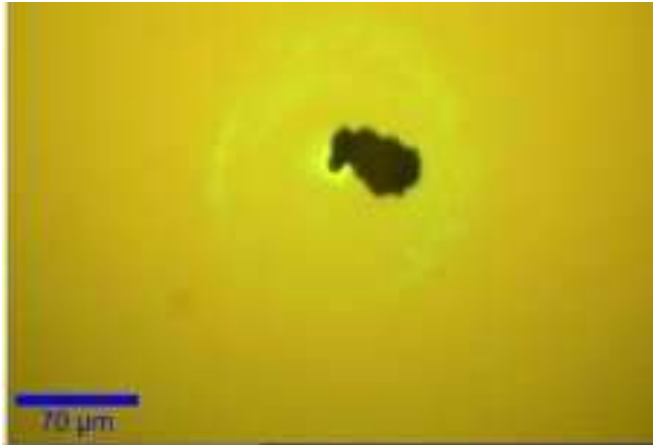
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Membrane 7: meso/mm scale Anodic Aluminum Oxide or AAO membrane with micro scale tortuous hole



Membrane 8: MM/cm scale Silicone membrane with mm scale hole





Membrane Technology and Deep Learning Applications

Device 1: Micro-Nano Fluidic Chip, MM scale fluid storage



Device 2: MM/cm scale Osmotic Power Generator, large cm scale fluid storage



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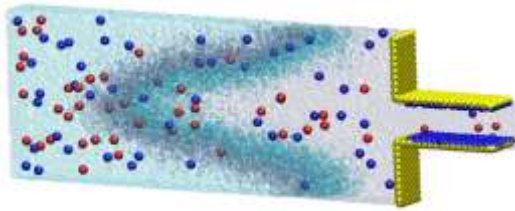
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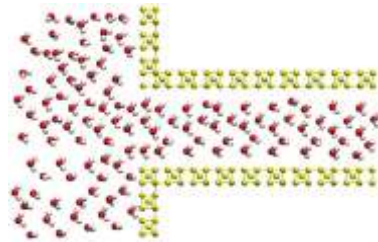
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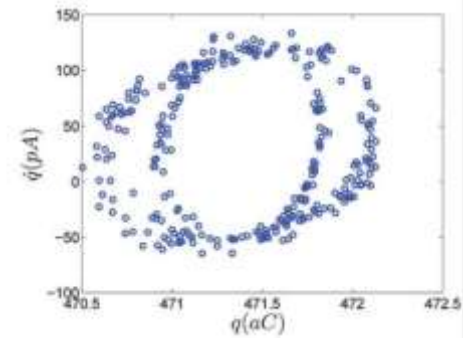
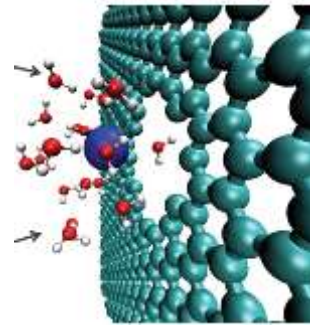
Controlling fluid right, left, rotation, phase movement with voltage switch in nm scale membrane and nm channel



water is mixed controlled with voltage and tight theory



water phase is locked to ice phase



water shell is created and locked with voltage and tight theory, charge amount in nm scale membrane and nm channel is fluid/membrane/salt under use/voltage needed tight theory is available

Manikandan, D., Nandigana, V.V.R. Overlimiting current near a nanochannel a new insight using molecular dynamics simulations. Sci Rep 11, 15216 (2021).

Nandigana, V. V. R.; Heiranian, M.; Aluru, N. R.; Single Ion Transport with a Single-Layer Graphene Nanopore. Int. J. Mech. Mechatronics Eng. 2019, 13, 479– 483

Nandigana, V. V. R. & Aluru, N. R. 1/f pink chaos in nanopores. RSC Adv. 7, 46092–46100 (2017).

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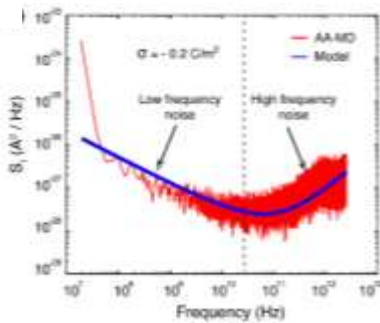
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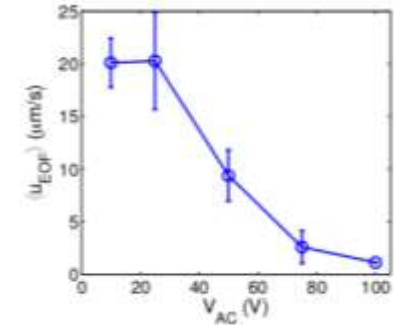
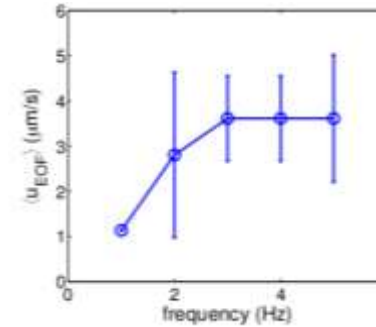


Controlling fluid right, left, rotation, phase movement with voltage switch in nm scale membrane and nm channel



salt use transport noise, water transport noise in nm scale membrane and nm scale channel with voltage switch tight theory is available

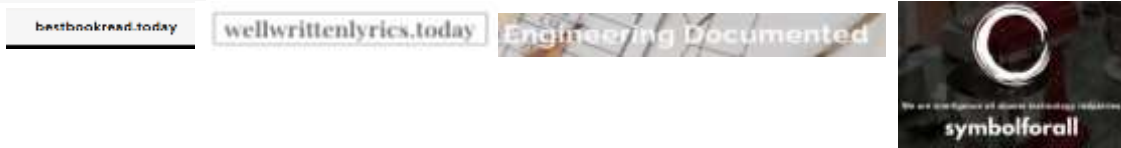
Precise water pumping with voltage switch in micro/nm scale membrane with nm scale holes



Onkar Patil, D. Manikandan & Vishal V. R. Nandigana (2020) A molecular dynamics simulation framework for predicting noise in solid-state nanopores, *Molecular Simulation*, 46:13, 1011-1016.

Vishal Nandigana, Sharad Kumar Yadav, Manikandan D., K. D. Jo, A. T. Timperman, N. R. Aluru (2021). AC nanopump design and manufacture. *International Journal of Advance Research, Ideas and Innovations in Technology*, 7(3)

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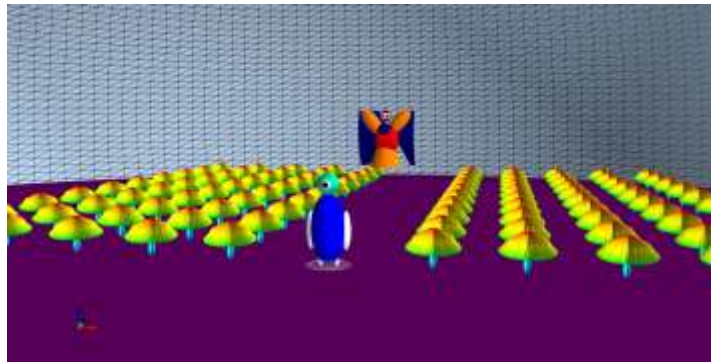


salt use transport, water transport in nm/micro/meso/mm/cm scale membrane with nm/micro/meso/mm scale holes with voltage switch, signal numbers in .csv converted to English language for fluid chip talk

Analogy data (read)	Word (read)	Analogy data (predicted)	Word (Predicted)
[0.0000000000000000]	Black hole	[0.0000000000000000]	Black hole
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	

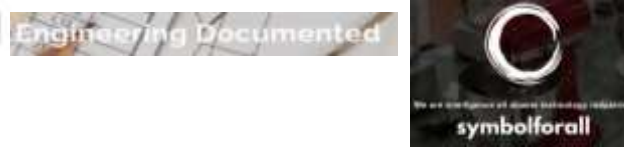
Signal numbers in .csv converted to .jpeg and .mp4 and .txt and English language and 3D physical manufacturing Product design cartoon/creatures/new species/new land/new space/new world/new moon/new star/new galaxies/touching the universe in scales of new manufacturing and Artificial Intelligence and Deep Learning software engineering and Technology

Analogy data (read)	Word (read)	Analogy data (predicted)	Word (Predicted)
[0.0000000000000000]	High white	[0.0000000000000000]	High white
[0.0000000000000000]	speaking	[0.0000000000000000]	speaking
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
[0.0000000000000000]		[0.0000000000000000]	
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[0.0000000000000000]		[0.0000000000000000]	



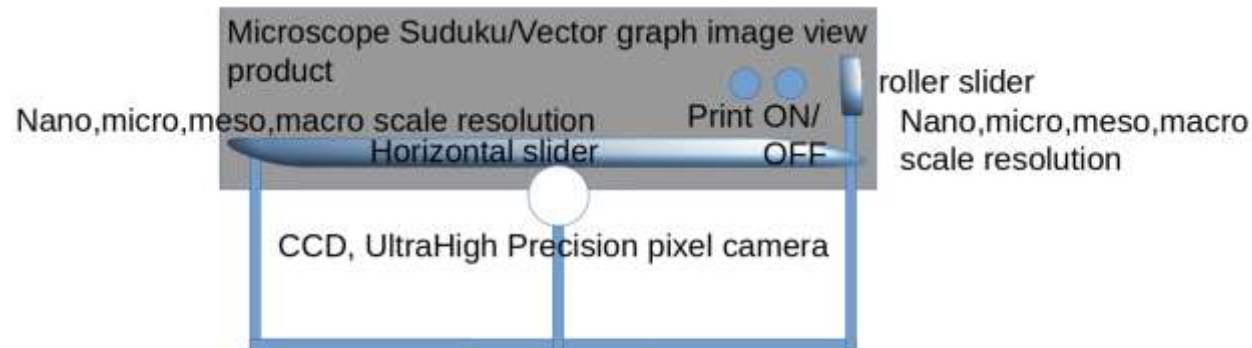
Sarthak Shreyas, Shriram Elangovan, Guru Viknesh, Shania Mitra, Huzaifa Mustafa Unjhawala, Naresh Kumar, Nilotpal Chakraborty, Vishal Venkata Raghavendra Nandigana, Product Design of Cartoon Characters for Software Feature Film, American Journal of Software Engineering and Applications. Vol. 10, No. 2, 2021, pp. 36-38.

Membrane Technology and Deep Learning Applications



3D computer/printer/computing hardware and software with AI Operating System, for Artificial life/sky/star/new stars/galaxies/Universe 3D printing in all scales to Universe scale

AI Software
 visualization view of
 CCD camera display



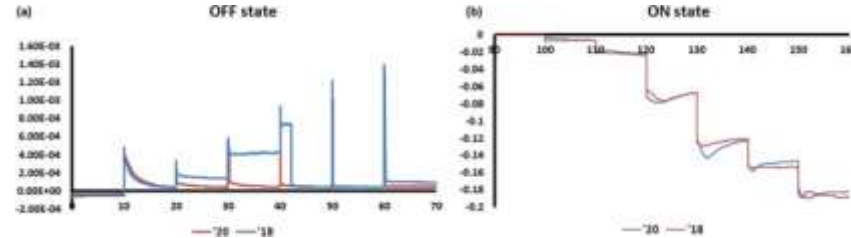
Membrane Technology and Deep Learning Applications



Fluidic Electronics

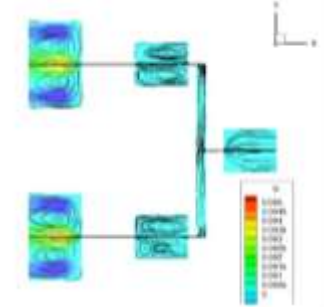


Fluidic Diode



Nandigana, V.V.R., Jo, K., Timperman, A. et al. Asymmetric-Fluidic-Reservoirs Induced High Rectification Nanofluidic Diode. *Sci Rep* 8, 13941 (2018)

Fluidic Logic Gate



Vishal V R Nandigana, "Fluidic Electronics: Logic Gates", *International Journal of Science and Research (IJSR)*, Volume 10 Issue 5, May 2021, 676 - 678



Fluidic Computer



Fluidic Calculator



Rapid Switching using



<https://www.technology.org/2021/08/01/making-a-water-computer-that-actually-works/>

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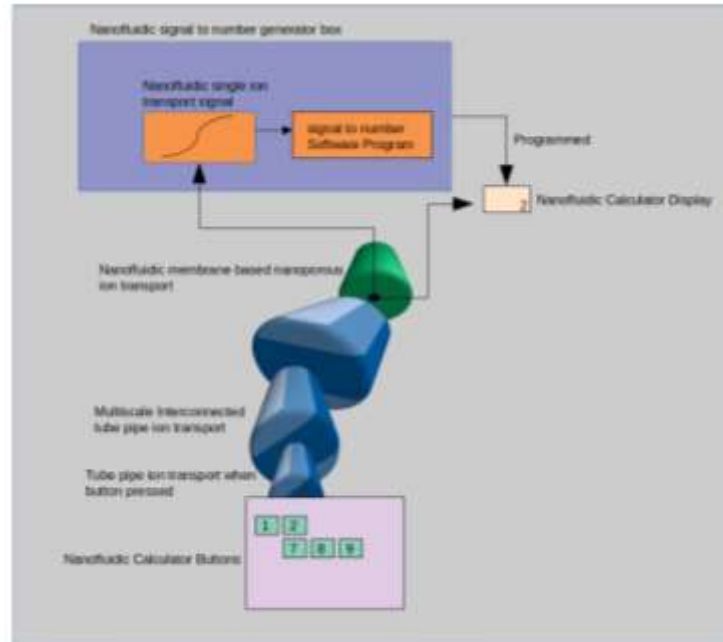
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Fluidic Electronics: Fluidic Calculator



Working Principle of Fluidic Calculator



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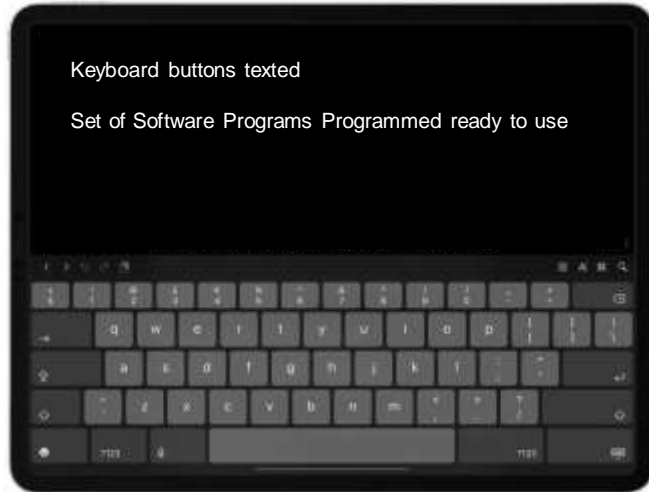
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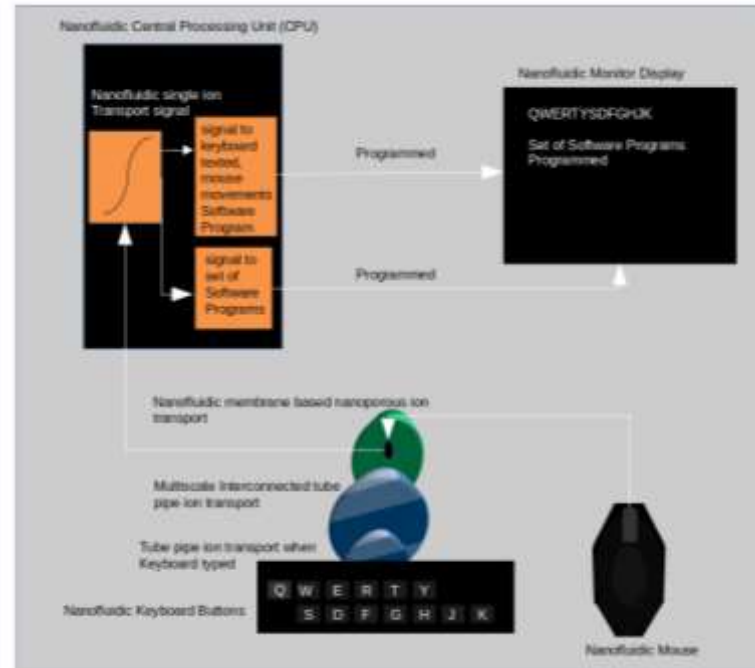
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Fluidic Electronics: Fluidic Computer



Working Principle of Fluidic Computer



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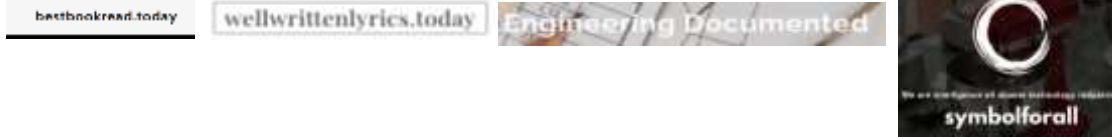


3D computer/printer/computing hardware and software with AI Operating System, for Artificial life/sky/star/new stars/galaxies/Universe 3D printing in all scales to Universe scale

Applications:

- (a) Lion King Animal World Artificial Life Park
- (b) Planetarium Artificial Life Sky/Stars/New Stars/Galaxies/Universe Life Material Science equal to Real Life Sky/Stars/New Stars/Galaxies/Universe
- (c) Artificial Life Material Science Products, Toys, Displays Museum

Membrane Technology and Deep Learning Applications



Visual (3D .jpeg, mp4), from Gadgets TV, Computer Monitors, Laptops, Tablets, Smart Phones, to Cinema Projector screens (70 mm screen and 35 mm screen) using ViewWireless.today wireless communications technology in a room facility with audio (.mp3) in the room facility.

Wireless communications technology

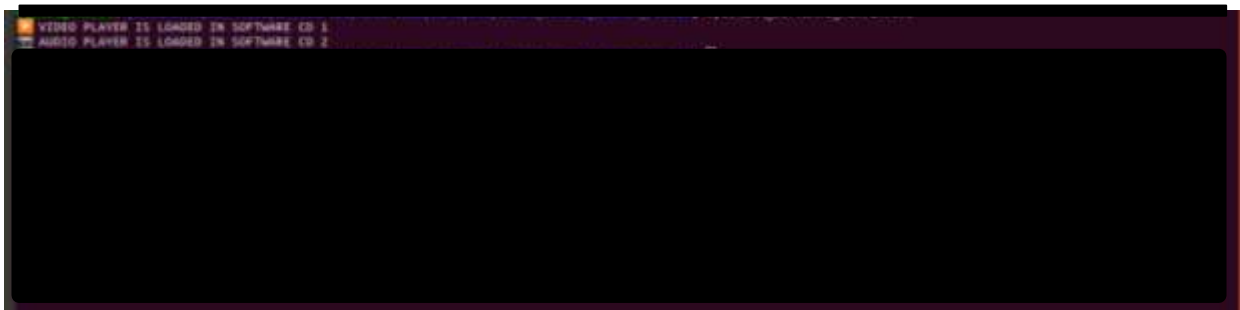
Uses no wires, communicates using (x, y ,z 3D coordinates and time coordinates that is not one dimensional, but time has power law scaling dimension) and is displayed from Gadgets TV, Computer Monitors, Laptops, Tablets, Smart Phones, to Cinema Projector screens (70 mm screen and 35 mm screen) in a room facility with audio (.mp3) in the room facility.

Membrane Technology and Deep Learning Applications

AI Operating System Software Cinema Player

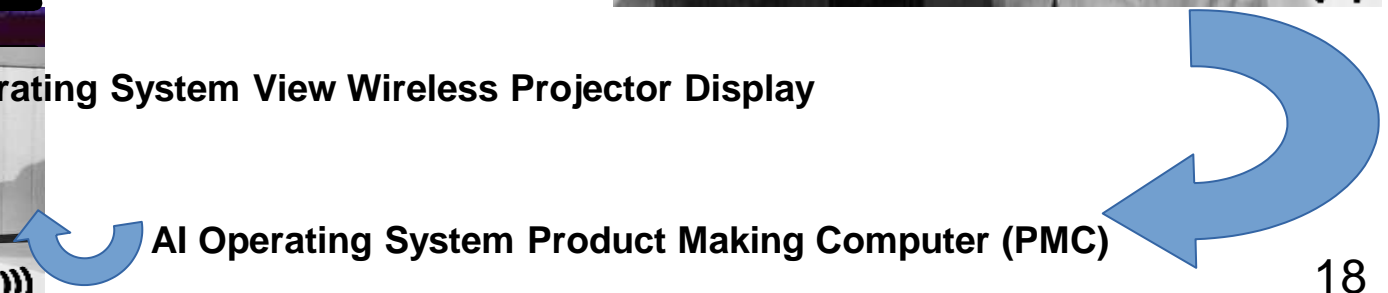
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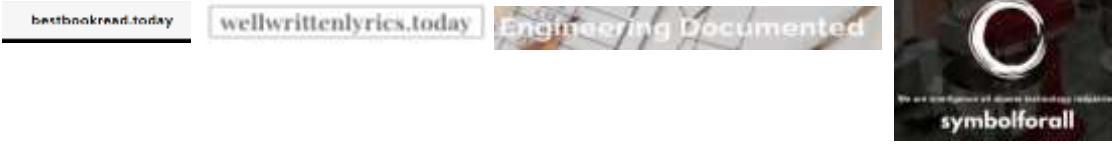


AI Operating System View Wireless Projector Display

AI Operating System Product Making Computer (PMC)



Membrane Technology and Deep Learning Applications



AI Operating System Fluidic Computer

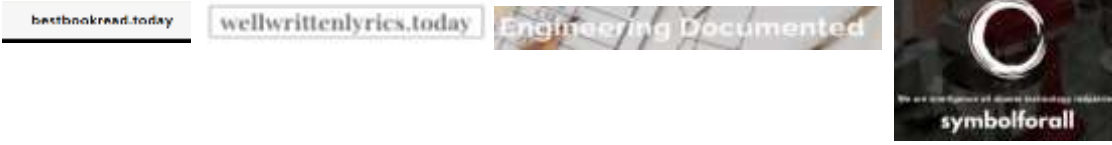


AI Operating System View Wireless Projector Display

AI Operating System **d design** Computer Engineering and Technology

AI Operating System Product Making Computer (PMC)

Membrane Technology and Deep Learning Applications



AI Operating System Fluidic Computer



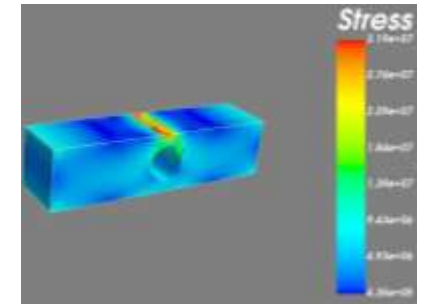
AI Operating System **design** Computer Engineering and Technology

design software



Evolution Data Science AI **design**
 Extrapolation from Origin till Date

Fracture Design & Engineering



Membrane Technology and Deep Learning Applications



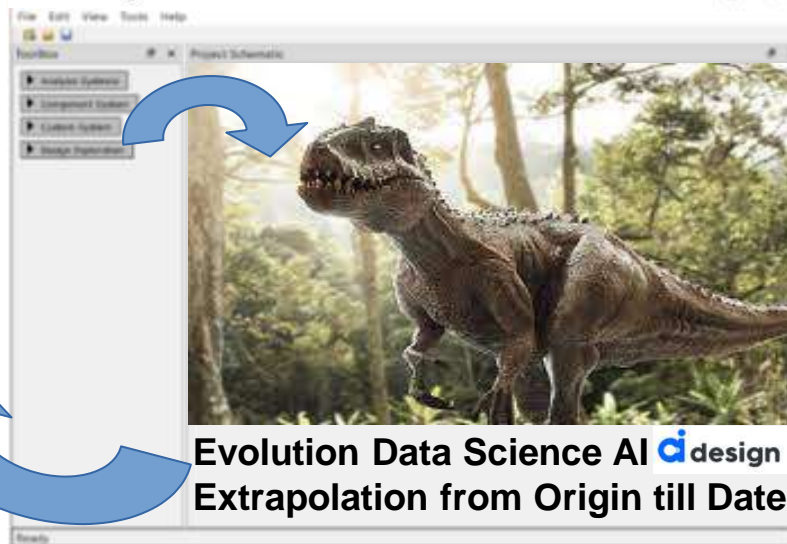
AI Operating System **ai design** Cloud Computing Room Facility

AI Operating System **ai design** Computer Engineering and Technology

1. Computers
2. Data HDDs
3. AC
4. Room
5. Calm Ambience with light music blues

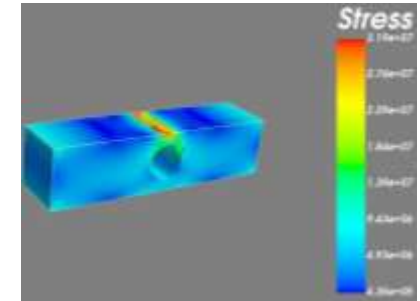
Nandigana, V. (2021). Multi-Scale Data Center Room for Computing and Storage. Indonesian Journal of Computer Science, 10(2).

ai design software



Evolution Data Science AI **ai design**
 Extrapolation from Origin till Date

Fracture Design & Engineering

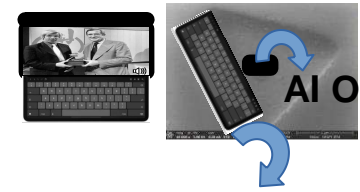


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AI Operating System Nanofluidic computer



AI Operating System

Atom keyboard

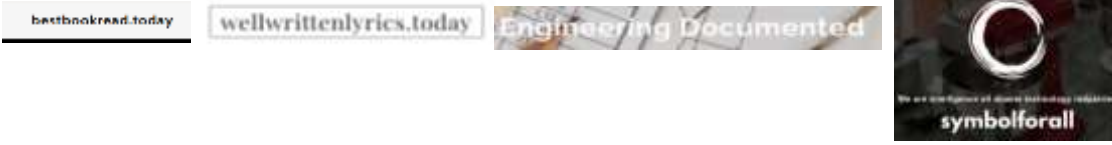
Human – Nanofluidic computer interaction

Objective/Agendas

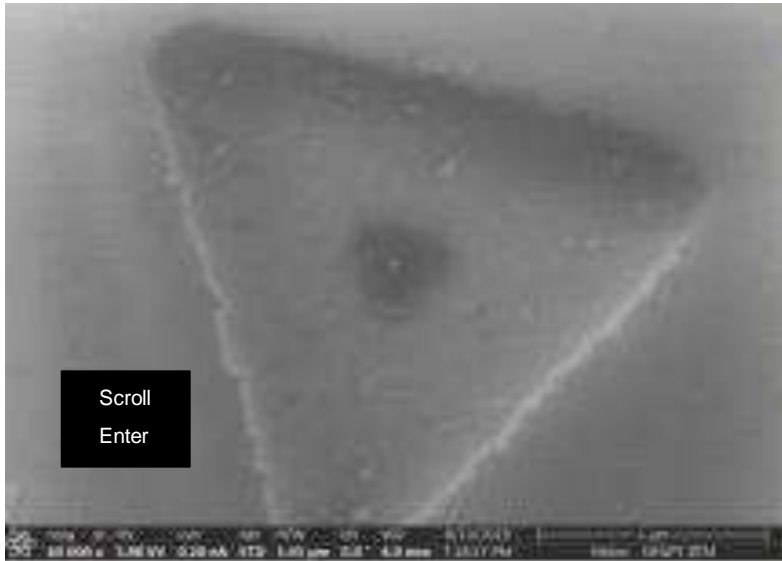
1. design Computer Engineering and Technology
2. Run Software Cinema Player
3. ViewWireless.today -> Run View Wireless Projector Display
4. Manufacture using Product Making Computer (PMC)

M Heiranian and N. R. Aluru Vishal Nandigana, Single layer Graphene nanopore as a nano computer, 19th International Conference on Microfluidics and Nanofluidics, Prague, Czech Republic, 2017

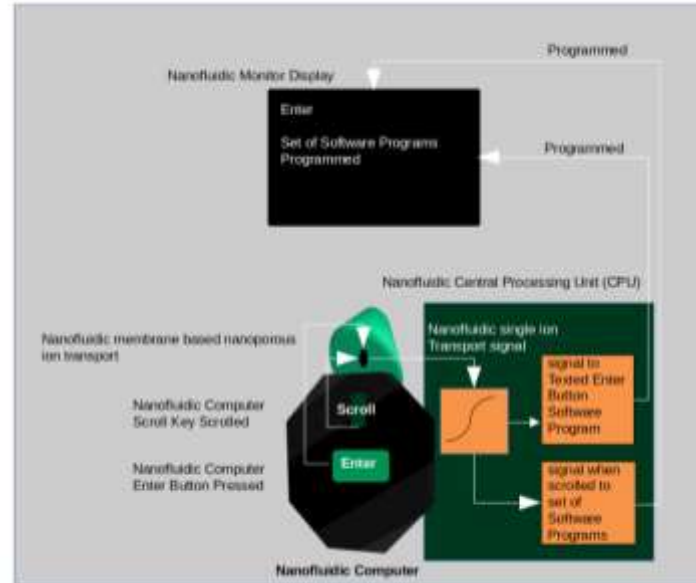
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Fluidic Electronics: Nanofluidic Computer



Working Principle of Nanofluidic Computer



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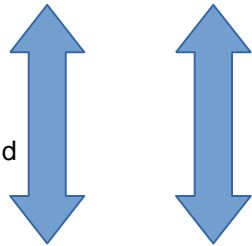


AI Operating System **a design** Computer Engineering and Technology

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Samples of Open Source CFD software in-house solved will be extrapolated, verified with literature, experiments and practical world applications using AIDESIGN commercial AI software



Open Source CFD software elaborate Computer Engineering and Technology solutions will be in-house solved and made available in GitHub

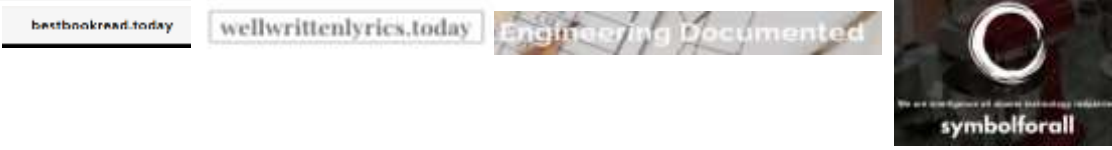
<https://github.com/>

Windows/Unix Operating System Open **FOAM**® Computer Engineering and Technology

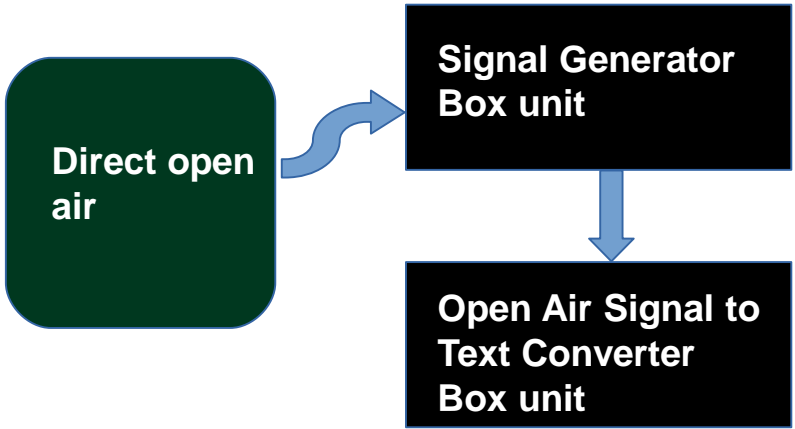
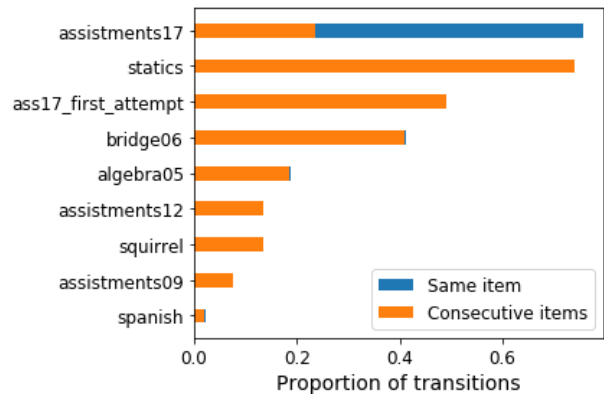
OpenFOAM is the free, open source CFD software developed primarily by OpenCFD Ltd since 2004.

<https://www.openfoam.com/>

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Signals from the Direct open air measurements to exact text using SignalAI.today technology

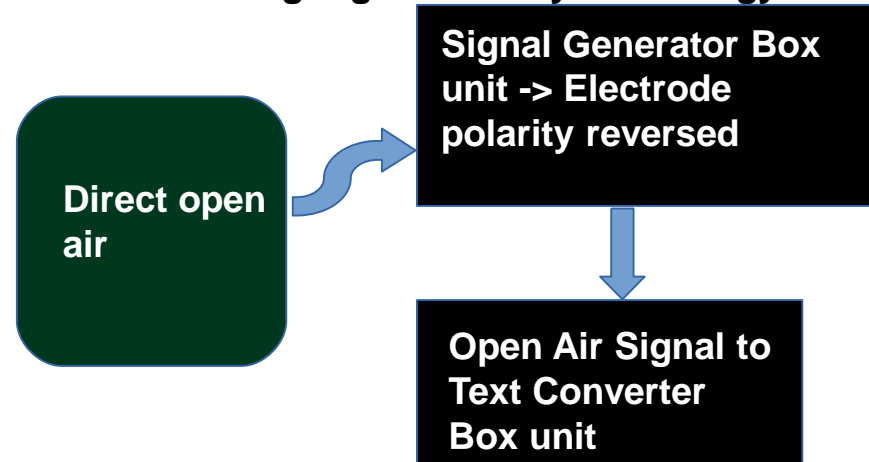
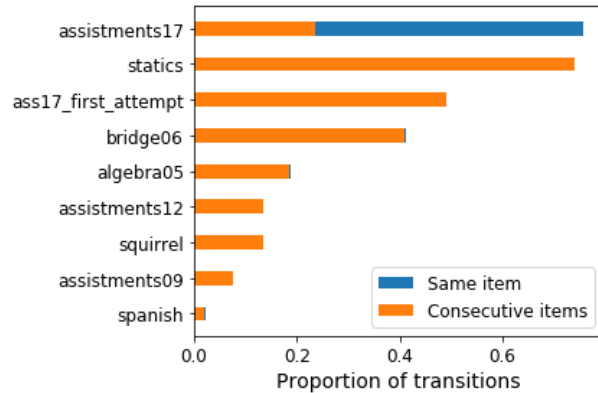


When is Deep Learning the Best Approach to Knowledge Tracing?
 Theophile Gervet, Ken Koedinger, Jeff Schneider, Tom Mitchell, Journal of Educational Data Mining, Volume 12, No 3, 2020

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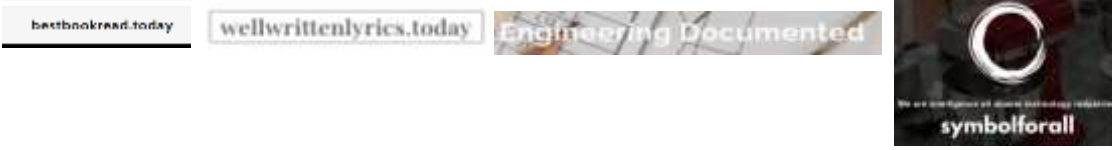
Signals from the Direct open air measurements to exact text using SignalAI.today technology



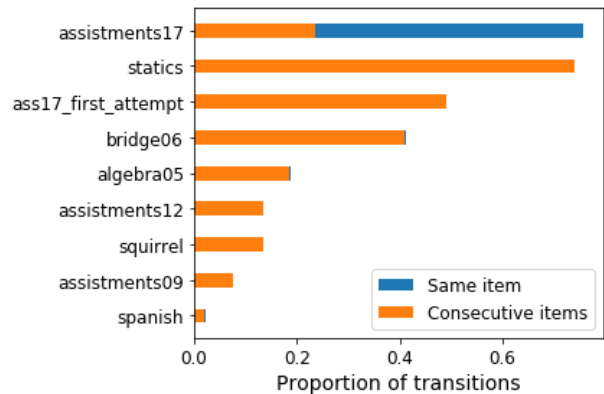
When is Deep Learning the Best Approach to Knowledge Tracing?

Theophile Gervet, Ken Koedinger, Jeff Schneider, Tom Mitchell, Journal of Educational Data Mining, Volume 12, No 3, 2020

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Signals from the Direct open air measurements to exact text using SignalAI.today technology



Direct open air



Length in time of direct open air measurements to file size of signals to exact text comparison

When is Deep Learning the Best Approach to Knowledge Tracing?
 Theophile Gervet, Ken Koedinger, Jeff Schneider, Tom Mitchell, Journal of Educational Data Mining, Volume 12, No 3, 2020

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External bond dynamics of world algorithm using SignalAI.today technology

Printing for topology make geometries -> Photography for imaging confirmation -> Multiscale and time experiments, theory of topology made geometry -> New evolution in printing of writing of all details in text of any product including human species, animal species, bird species, living life species and non living products -> New next evolution in validating theory, experiments with exact match of writing of any product including human species, animal species, bird species, living life species and non living products including text and talk to complete external bond dynamics of world