



**NOVUMIND**  
*Making Things Think*

# I<sup>2</sup>O<sup>T</sup>- Embedded Vision and Embedded Intelligence

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# Dr. Ren Wu

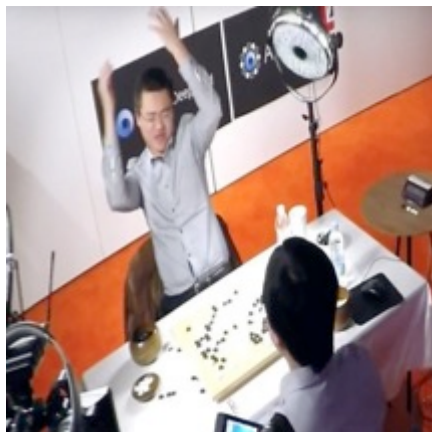


- **Founder and CEO, NovuMind Ltd.**
- Distinguished Scientist, Baidu
- HSA Chief Software Architect, AMD
- PI, HP Labs CUDA Research Center
- World Computer Xiangqi Champion
  
- **AI expert**
- **HPC expert**
- **Big Data Analytics expert**
- **Heterogeneous Computing expert**
- **Computational scientist**

I have no time to see a salesman, I've got a battle to fight.



# AlphaGo VS Human Master



## BUSINESS INSIDER

### DeepMind secretly unleashed its Go-playing AI online, and it beat some of the world's best players 50-0

DAVE SHREVE  
JAN. 4, 2017, 10:42 AM

The creator of a mysterious artificial intelligence (AI) that has beaten some of the world's best human players at the Chinese board game Go over the last few days has been revealed as Google DeepMind.

Dennis Huxtable, the cofounder and CEO of Google DeepMind, tweeted a screenshot of a DeepMind update that stated: "We've been hard at work improving AlphaGo, and over the past few days we've played some confidential online games at top tier events with our new prototype version, to check that it's working as well as we hoped."

"We think everyone who played our accounts Magister (7) and Master (7) on the Tigris and Fushan servers."

Huxtable's announcement came within hours of a



Google DeepMind CEO Dennis Huxtable



LATEST POPULAR QUARTZ

### Google's AlphaGo AI secretly won more than 50 straight games against the world's top Go players

When Google's artificial intelligence program AlphaGo made history by taking down Korea's Lee Sedol—one of the world's best Go players—in a landslide 4-1 victory in...

Written with Brian | DeepMind | January 14, 2017

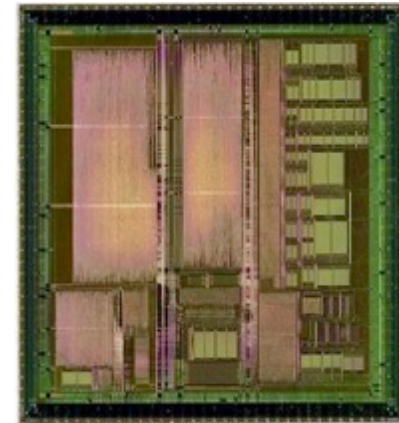


Computational power is the key



# Deep Blue VS Gary Kasparov





Computational power is the key

# **AI's future: from better to everywhere**



# Cloud Computing: What's Missing?



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## THE INTERNET OF THINGS

AN EXPLOSION OF CONNECTED POSSIBILITY

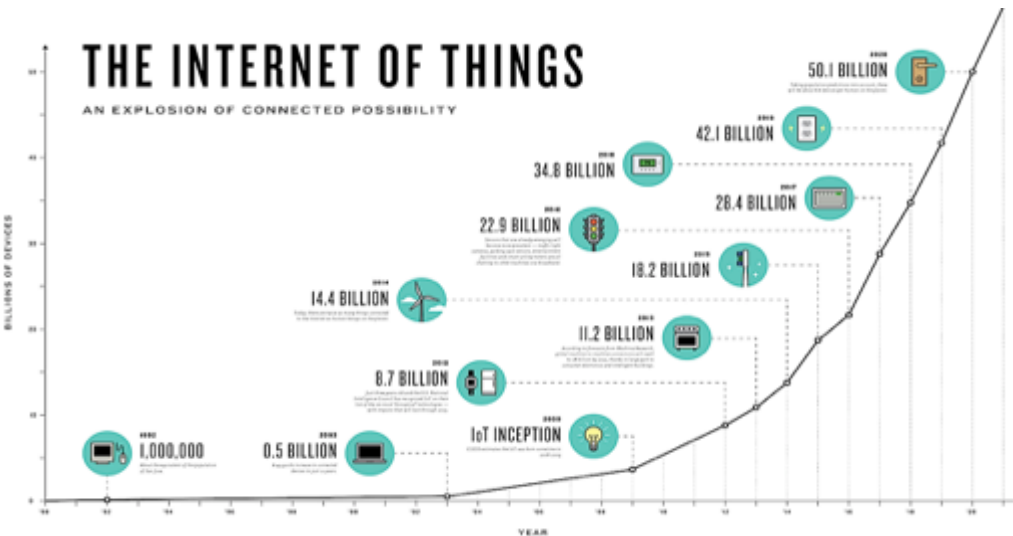


Image source: Cisco

# Cloud Computing: What's Missing?



**Bandwidth?**  
**Latency?**  
and  
**Power**  
**Consumption?**

Moving data around is expensive, **very expensive!**  
And how about no connection?

# Cloud Computing: What's Missing?

How about  
**privacy?**



"WHY DO I HAVE THE FEELING THAT YOUR PARENTS  
DON'T TRUST ME ?"

# Deep Learning: Two Steps



**Supercomputers used for training**

**And then deploy the trained models **everywhere!****

Datacenters



Tablets, smartphones



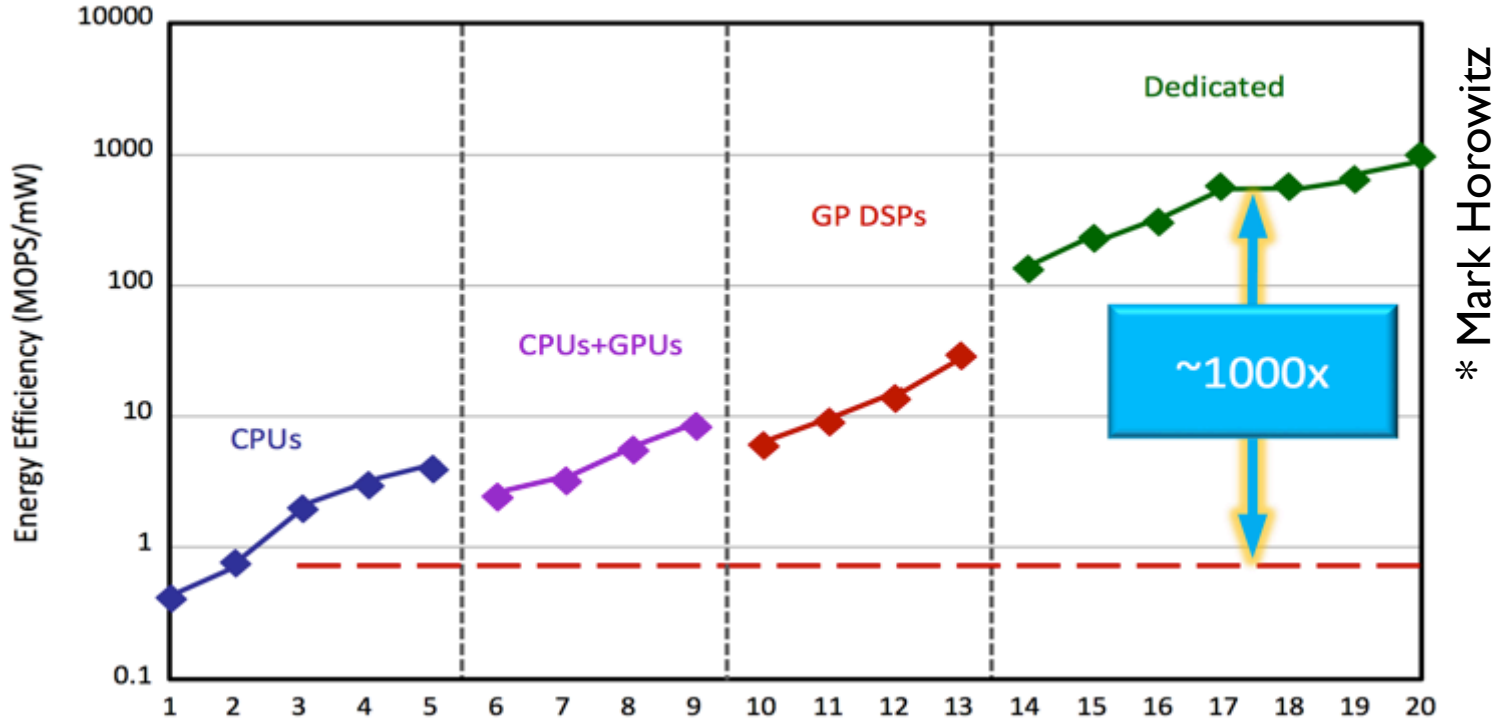
Wearable devices



IoT's



# What's Next?

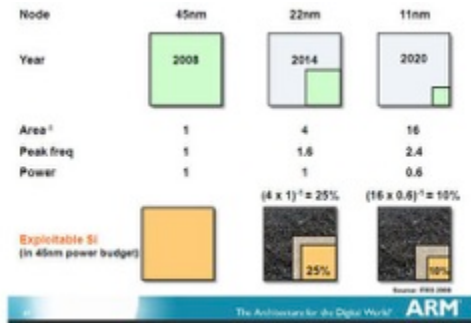


\* Mark Horowitz

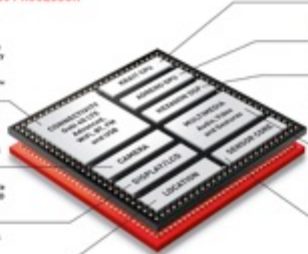
## Dedicated Hardware + Heterogeneous Computing



# Heterogeneous Computing



### SNAPDRAGON 805 PROCESSOR

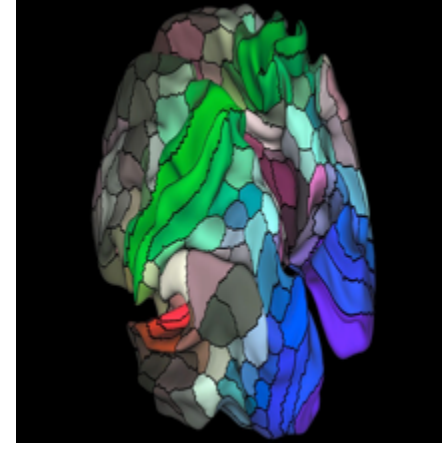
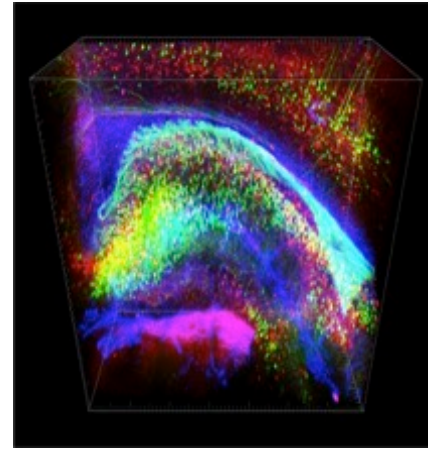
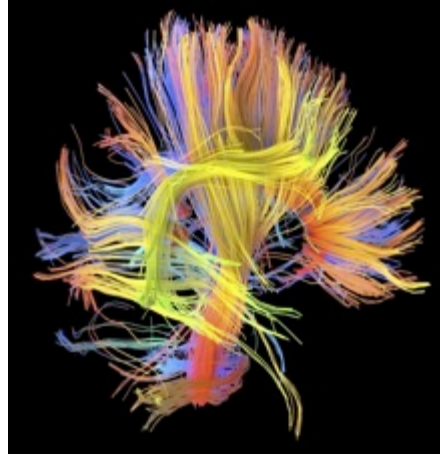
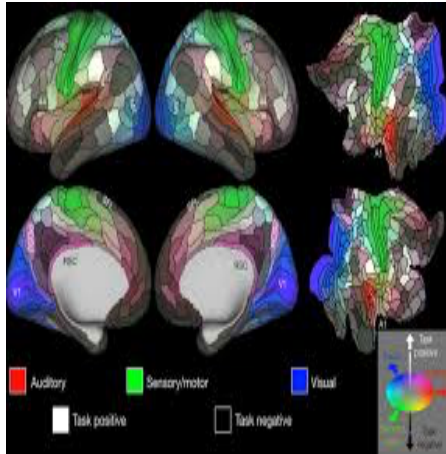


- Stay connected and stream large files fast with industry leading connectivity, including the world's most advanced LTE and IEEE 802.11ac (MIMO 4x4) Wi-Fi.
- Capture sharper photos, even in low light, with the mobile industry's first dual ISP.
- Enjoy Ultra HD resolution content on Ultra HD-capable mobile devices and Ultra HD TVs with the Snapdragon Display Processor.
- Find your way everywhere and indoors with the Snapdragon Location Engine.
- Get more use and greater accuracy from sensor-to-sensor apps with the dual-core Snapdragon Sensor Engine.
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**Key features and capabilities:**

- Fastest performance and more multitasking with dual-core CPUs at up to 2.3 GHz
- Console quality gaming with new generation Adreno 425 GPU
- More power-efficient apps and system processing with the Hexagon™ DSPs
- Capture and play back Ultra HD video and enjoy 7.1 surround sound on the go or at home with Bluetooth video and audio engines.

# Heterogeneous Computing



# Embedded Vision



*Intelligent  
Internet  
of  
Things*

**I<sup>2</sup>oT**

# Embedded Intelligence



*Intelligent  
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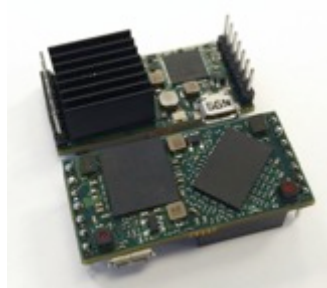
**I<sup>2</sup>oT**

# NovuTechnologies



## NovuStar

Supercomputer specially designed for AI, providing industry leading performance for AI training



## NovuFlow

Hardware accelerators offer best performance and power efficiency for AI applications



## NovuBrain

Little brain that senses, processes, reacts and adapts to its own environment and interacts with rest of the world - intelligently.



# Intelligent Internet of Things



Everything  
Connected



Big data era

**I<sup>2</sup>oT**  
Powered by  
**NovuMind**

Everything  
Intelligent



AI era



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