

Expert Lecture (Session: - 2021-22)

Topic: - “Neural Architecture Search: - A Hardware Perspective”

Date: - 05-02-2022(09:00 am - 11:30 am)

Resource Person: - **Prof. (Dr.) Arun K. Somani**, Associate Dean for Research, College of Engineering, Iowa State University, Ames, USA.

Prof. (Dr.) Arun K. Somani, Associate Dean for Research, gave his presentation on “Neural Architecture Search: - A Hardware Perspective”. His main discussion points were:

- He started the session with the basics of Hardware Perspective of Neural Architecture Search.
- He explained the neural network processing hardware.
- He also talked about Image and weight reuse without layer fusion.
- He also discussed various case studies on this like ASIC: Accelerator Aware NAS. .

At the end a very healthy question answer session also took place. Different questions were asked by the participants related to various applications of Deep learning in Image Processing.

The top screenshot shows a Google Meet window with the title "Neural Architecture Search: A Hardware Perspective*" and the presenter "Arun K. Somani". The slide content includes his name, title "Distinguished Professor of Electrical and Computer Engineering", and affiliation "Associate Dean for Research, College of Engineering, Philip and Virginia Sproul Professor, Iowa State University, Ames, IA, USA". It also mentions a PhD dissertation by Mr. Krishna Teja Chitty-Venkata and a copyright notice.

The bottom screenshot shows a slide titled "Hardware Metrics - Look-up-table (LUT) vs Prediction-based". The slide contains two bullet points: "Look-up Table (LUT)" and "Prediction-based". The "Look-up Table (LUT)" bullet point states that LUT consists of pre-collected cost of each operator in the search space on the target hardware, and that TDSNet and SPNAS methods construct an LUT to hold runtime latencies. The "Prediction-based" bullet point states that a few ML-based regression models have been used to predict a model's performance, that ChamNet incorporates energy, accuracy and latency predictors in the search process, and that BRP-NAS predicts the hardware performance using a Graph Convolutional Network (GCN). A graph shows a linear relationship between "Latency (ms)" and "Performance (FPS)". A diagram shows a "Super Network" with four cells (Cell1, Cell2, Cell3, Cell4) and a "Latency Estimator" block.

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Arun Somani Shalini Singhal Manish Suyal

Dolly Mittal Mehul Mahrishi Dr. Pankaj Dadheech

Kamal Hiran 16 others You

9:36 AM | pes-gkhg-esu

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A Arun Somani is presenting

Top 10 IEEE Explorer's Hottest Topics (Source IEEE Spectrum Dec 2021)

1. Image Processing
2. Antenna
3. Artificial Intelligence
4. Machine Learning
5. Data Mining
6. Cloud Computing
7. VLSI
8. Deep Learning
9. Big Data
10. Internet of Things

Arun Somani Prof. Anil Chau... 14 others You

9:01 AM | pes-gkhg-esu

People

D	Deepa Modi	/	...
P	Diwakar Sharma	/	...
D	Dolly Mittal Meeting host	/	...
D	Dolly Mittal Meeting host	/	...
D	Dr. C. M. Choudhary	/	...
	Dr. Pankaj Dadheech	/	...
	Geetika Singh	/	...
K	Kailash Soni	/	...
L	Lakshman Singh Dhaked	/	...

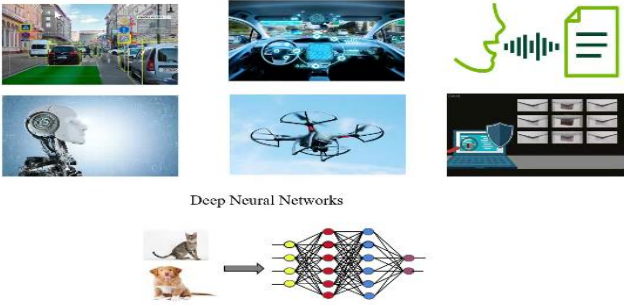
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AI and Deep Learning is Everywhere



Deep Neural Networks

9:03 AM | pes-gkhg-esu

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Hardware Aware Neural Architecture Search (HW-NAS)

- HW-NAS automates the design process to find models with good trade-off between accuracy and performance
- Metrics include latency, FLOPS, power consumption, energy, and memory usage, etc.
- HW-NAS algorithm takes the model search space and hardware characteristics as inputs
- The final output is an hardware adapted efficient architecture



9:18 AM | pes-gkhg-esu

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