



Machine Intelligence for Design Automation

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Rohit Sharma



MIDA: Opportunities

❑ MI and EDA are both growing

- ❑ AI/ML to add \$15.7 trillion in global economy by 2030. [Reference: [PwC report](#)]
- ❑ Design Automation Market to hit \$14 billion by 2024. [Reference: [GMI report](#)]

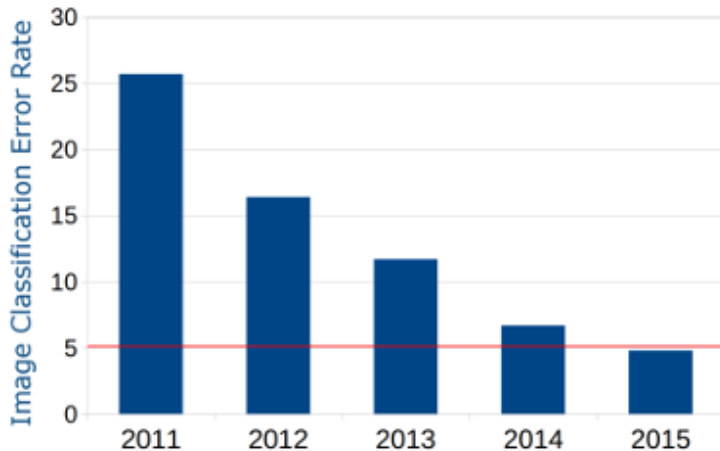


Can EDA capture exponential growth of MI?

MIDA: Opportunities

❑ AI/ML research rate is phenomenal

- ❑ Papers: well over 100k per year. [Reference: [ScienceDirect APIs](#)]
- ❑ Funding: AI/ML research is over 1% of total global research.



Can EDA make use
of ML research?

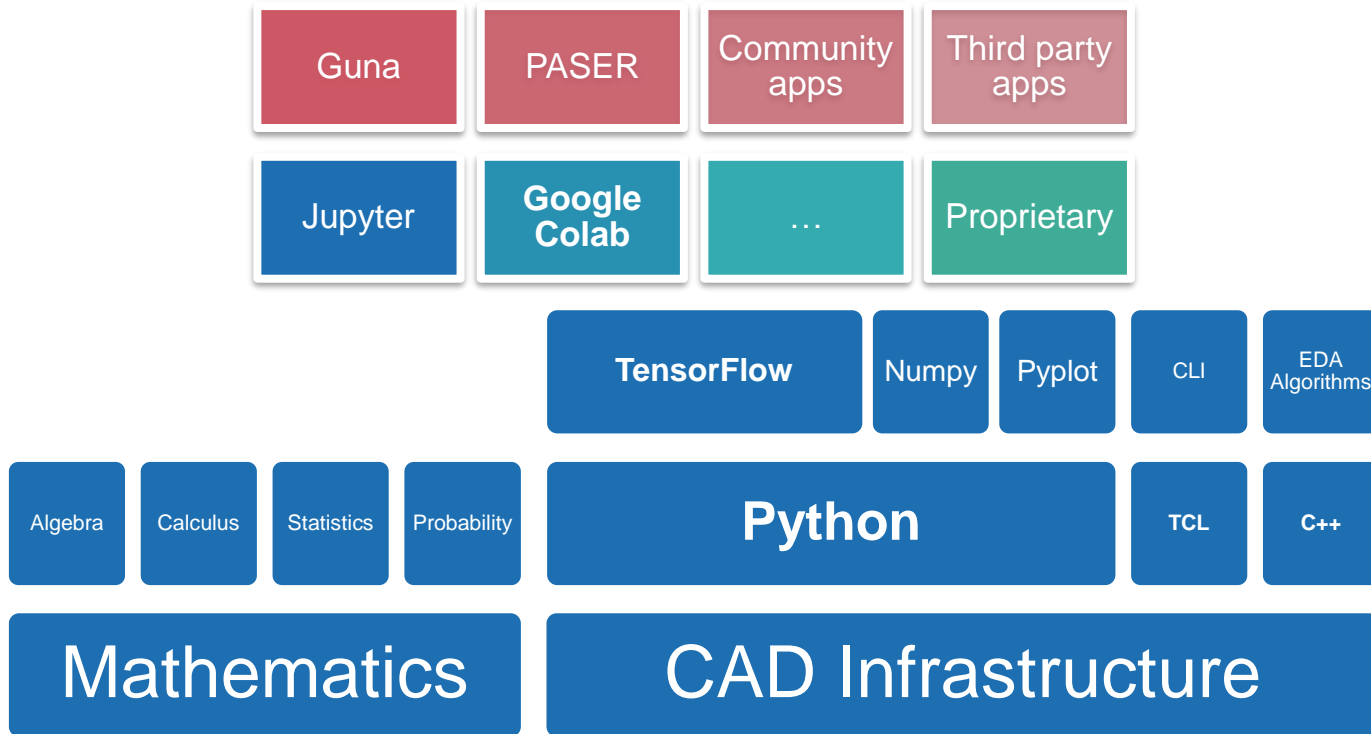
MIDA: Opportunities

Yes, EDA is ready to make use of AI research

- ❑ The change will likely come in the form of product features, not new products or flows.
- ❑ AI features will bring better usability, accuracy and performance.
- ❑ AI won't bring a disruptive change to EDA unlike other industries.



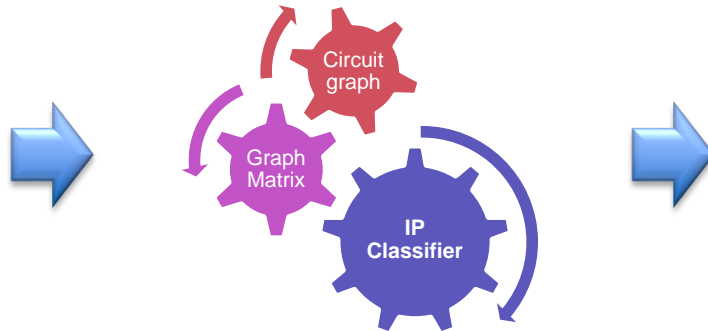
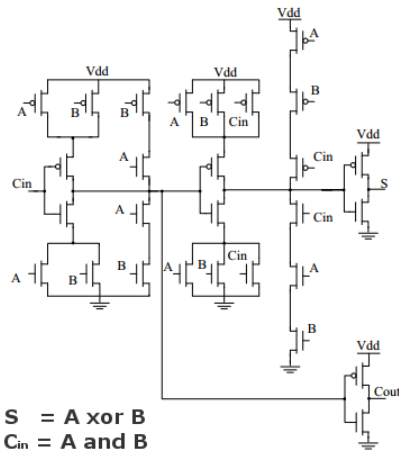
Paripath MI Platform



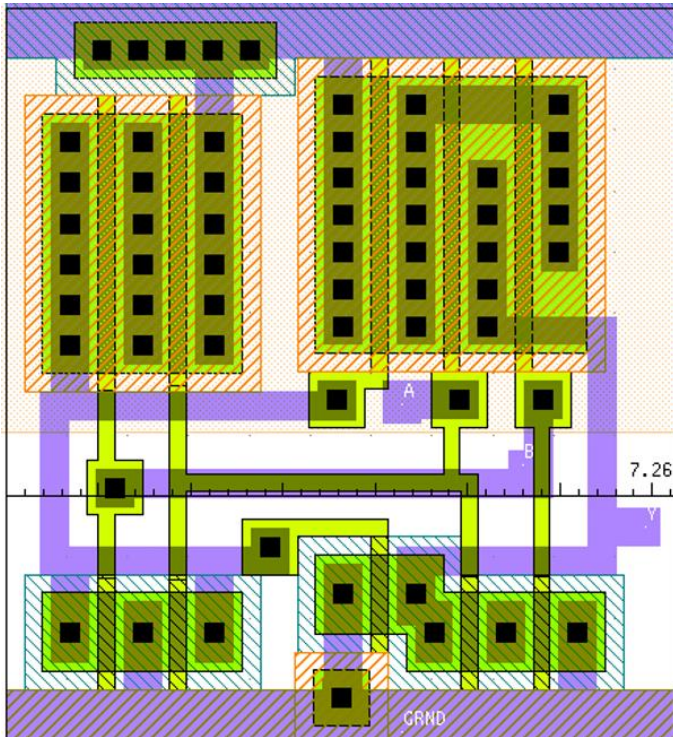
Char Case Study: VCC Classification

VLSI Cell Classification

Train a machine learning model to classify the type of IP with a fully extracted netlist.

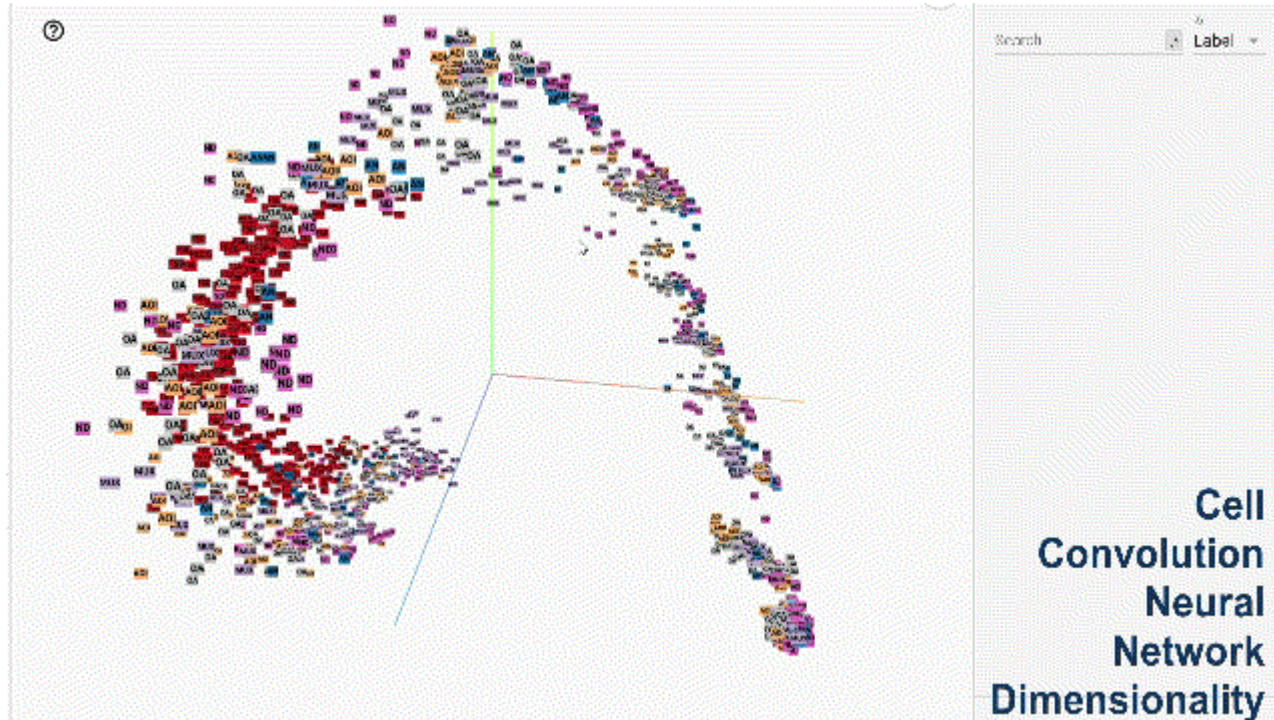


VCC Applications



- ❑ **VCC** is a common design automation problem used for detecting patterns in ASIC, AMS and Custom flows.
- ❑ It is a pattern detection algorithm in its generalized form and applicable to many other problems including DRC, Extraction, Circuit Simulation and others.

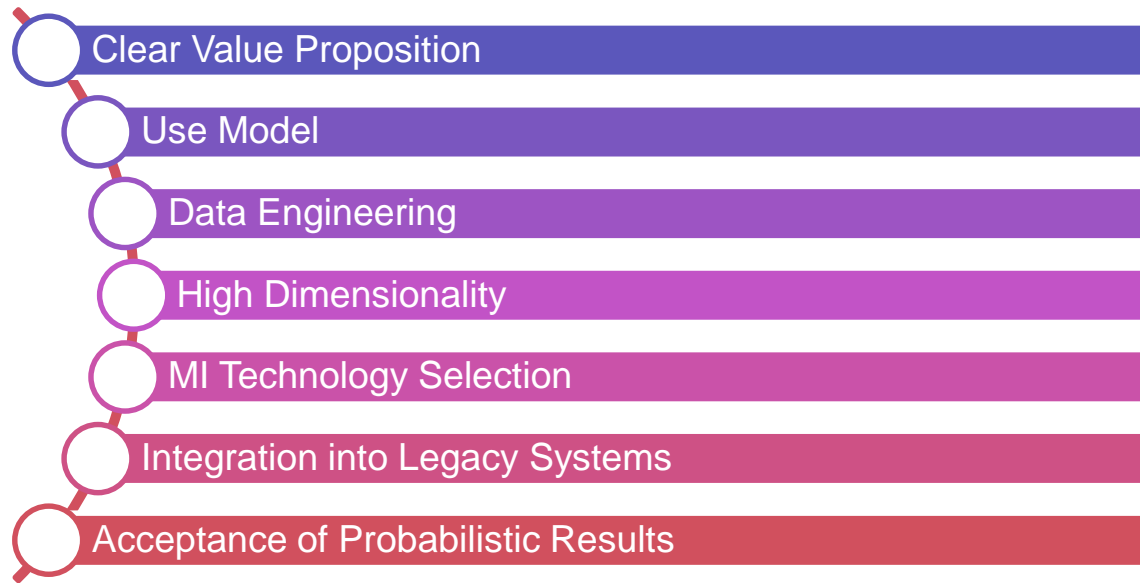
VCC Dimensionality



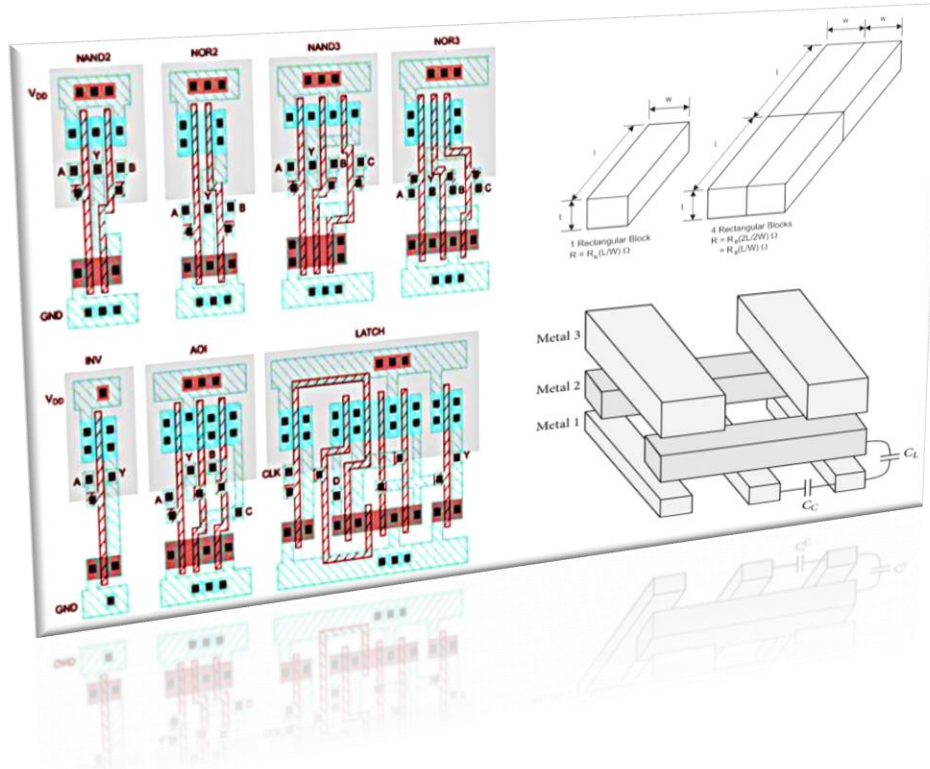
GUNA: MI enabled Char Platform

- ❑ Guna is built on Paripath's MI platform to offer machine learning in the cloud with VCC and other MI features.
- ❑ VCC repository dramatically improves ease of on pre-characterized cells.
 - ❑ Helps with setup for re-characterization, multiple corners new process nodes.
- ❑ VCC feature adds to QA confidence of models.

MIDA: Challenges



MIDA: Applications



- ❑ Capacitance estimation
- ❑ Wire load Models estimation
- ❑ RC-tree estimation
- ❑ Early timing analysis
- ❑ RTL power analysis
- ❑ Cell and IP classification
- ❑ Verification Coverage
- ❑ Fast extraction
- ❑ Speed up circuit simulation
- ❑ Design Segmentation

MIDA: Summary & QA

- ❑ Guna is a ML enabled characterization platform that integrates and adds value to simulation environments.
- ❑ Paripath offers community MIDA platform to quickly customize several well known MI techniques in design automation.
- ❑ MI will likely change the way EDA software is written.