THE MATHEMATICS BEHIND CNN'S
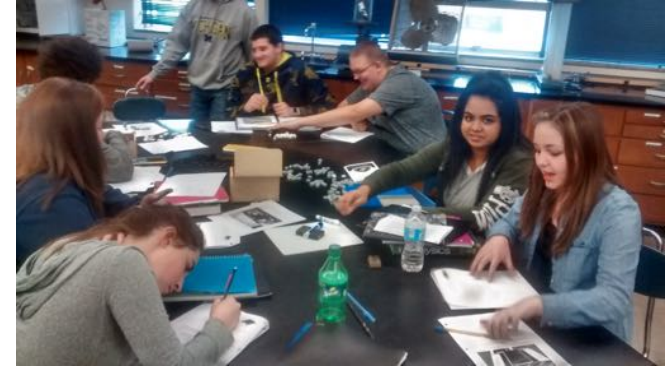
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COURSES

- Previously Taught
  - Advanced Algebra 2 – Built Module on Scaling of Computer Chips/Exponential Trends
  - Algebra 1
  - Geometry

- Teaching this Coming Year
  - Pre-Calculus – *New Module on CNNs and Matrices*
  - AP Calculus – Built Module on Energy Measurements for CPU/GPU and Reimann Sums
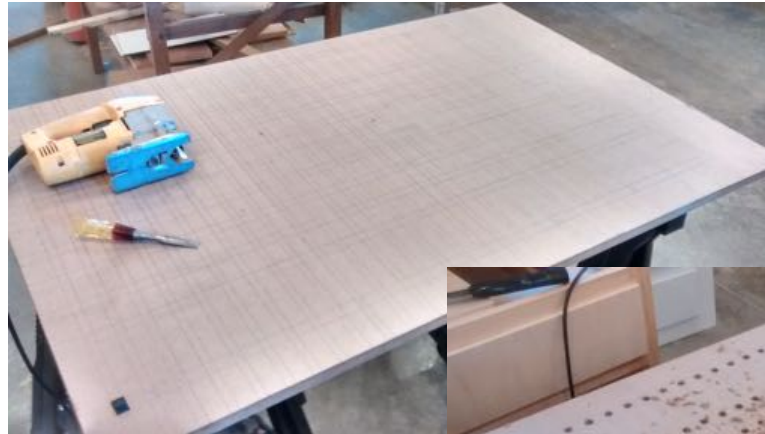 - Physics – Have Module on Thermodynamics and CPU Cooling
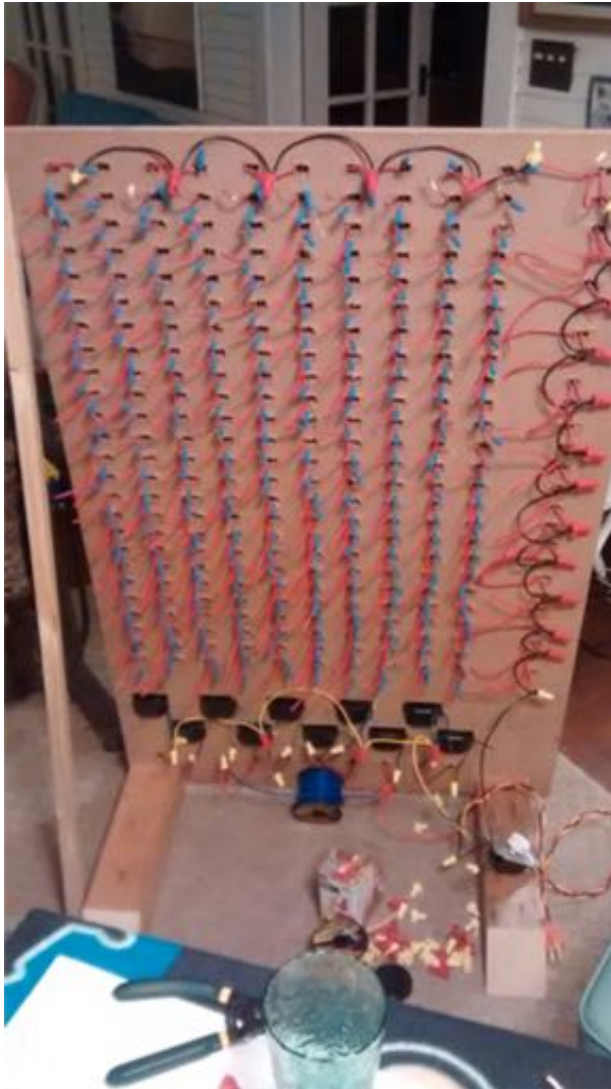
CNN MODULE

- CNN discovery day
  - Google AIY Vision Kits explorations

- Matrix Instructional Days
  - What is a matrix
  - Addition, Subtraction, Multiplication

- CNN instructional day

CNN MODULE

- "Building" our own CNN…
  - Hardware vs. Software
  - Breaking down pictures into pixels
  - Creating Input Strings (1 x 25 matrix)
  - Creating and Testing Basic Filters
  - Creating and Testing Numerical Filters

- Allows up to 10 "filters" to be programmed in and "calculated"
- Digital – Each connection is either 1 or 0
- Dimmers allow for individual filter adjustments to be made
- Future improvement, and not difficult to implement, would be using ammeter/voltmeter as measurement instead of lightbulbs

PURCHASES

- Google AIY Vision Kits and Accessories

- Materials for building the Crossbar CNN Board
  - Without these purchases, students would have *no ability* to work hands on with CNNs.

THANK YOU!

- John Gensic – Vision Kit Help

- Michael Niemier – Overall Guidance/Making RET Happen

- Bruce Jepkema – Use of Shop and Tools

- Notre Dame – Facilities and Staff for RET

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