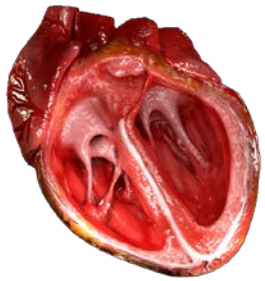
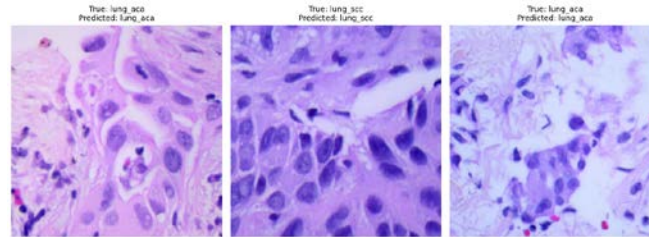


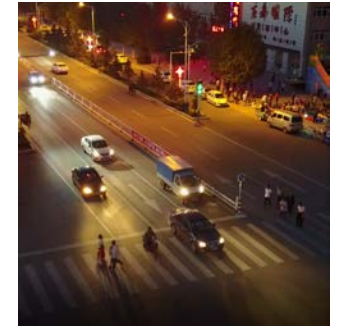
KSU-OSC Partnership in Preparing Masters and PhDs at Kent State University for Artificial Intelligence Markets



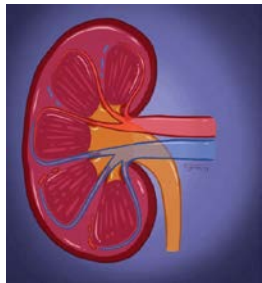
Skin cancer



Lung cancer



Traffic congestion analysis



Arvind Bansal (Full Professor)
Department of Computer Science
Kent State University, Kent, OH, USA
akbansal@kent.edu



Pedestrian detection

Outline

- Modern day AI requirement in Market Place
- Kent State Masters in Artificial Intelligence Program
- Role of OSC in Preparing AI Workforce
- KSU and OSC Educational Partnership in MSAI
- MSAI Projects Educational Partnerships
- PhD Research Projects
- Contributions from Spring 2023 – Spring 2026
- Conclusion

Modern Day AI Requirement in Market Place

- Ohio and national Market are quickly adapting AI based Automation
 - analytics, medical diagnostics, defense, surveillance, manufacturing, information visualization, automated coding, education, smart homes, LLMs, cybersecurity, homeland security, transportation, energy distribution
- There is severe shortage of AI professionals in market-place
 - AI is impacting market-place which requires critical thinking using LLMs (ChatGPT, BERT, Deep learning)
- **AI techniques have significance computation resource requirement**
 - thousands of hours of training using massive parallel processors
 - **huge amount of memory requirement**



KSU Masters in Artificial Intelligence Program

- Started in Spring 2021 to keep up with 30-40% growth in AI Sector
 - second program in Ohio and ranked sixth out of 29 national programs
 - <https://www.kent.edu/cs/ms-degree-artificial-intelligence-ai>
- Mandate was to prepare future Knowledge processing AI work-force for Ohio
- Three major theme areas: analytics, smart society and automation, robotics
 - analytics prepares them for big data processing, medical diagnostics and automated image processing for cancer, defense sector, environmental calamity prediction and logistics; application of large language models for natural language-based information processing
 - smart society and automation prepares them for futuristic society for smart homes, resource optimization, social planning and distribution
 - robotics prepares them for futuristic manufacturing, automated repair, calamity control, defense and homeland security

Role of OSC in Preparing AI Workforce

- There is a significant need for computing resources in modern day AI
- Kent State is an R1 university heavily invested in AI growth
- Kent State has a State of Ohio mandate to invest in AI labor force
 - CAPSTONE projects in MSAI to prepare graduates for modern knowledge-based society
 - preparing research and academic leaders of AI based society through Computer Science PhD program
- Kent State AI and OSC educational partnerships
 - graduated 35 MSAI students and three PhD students using OSC resources

KSU and OSC Educational Partnership

- MSAI program uses OSC to teach AI languages and projects
 - TensorFlow, PyTorch, Keras programming
 - Final projects involving cancer diagnostics, satellite image analysis, automated disaster detection, large language model applications, traffic management and trajectory analysis, Knowledge transfer using LLMs
- Automated medical diagnostics in cardiac structural abnormalities
- Automated renal cancer detection
- Understanding mRNA and miRNA interaction in human diseases including cancer and other genetic diseases

MSAI Projects Educational Partnership

- OSC provides educational accounts to students in Advanced AI course
 - students learn to program in TensorFlow, PyTorch and Keras
 - students apply learned AI techniques develop industrial scale projects
 - Techniques used : computer vision analysis, semantic segmentation, LLM
 - Extensive use of OSC AI libraries and national public image databases
- Examples of industrial quality projects
 - brain tumor analysis, liver cancer analysis, lung cancer analysis
 - LLM based medical advice, LLM based knowledge transfer
 - battlefield object detection, natural disaster such as flood and earthquakes
- Graduated more than 35 students since program started in Spring 2021

PhD Research Projects

- Automated cardiac abnormalities – graduated one PhD student (Fall 2025)
 - new advanced deep learning models for artery and valve abnormalities
 - automated localization myopathy, ventricular abnormalities, blood ejection rate
 - significant clinical level accuracy improvement ranging 95% - 99%
- Automated kidney cancer diagnosis: graduate one PhD student (Sp 2026)
 - new advanced deep learning models for early stage cancer detection and classification using radiology images
- miRNA – MRNA interaction – graduated one PhD student (Sp 2026)
 - miRNA are small molecules regulating protein translating mRNAs
 - Protein imbalance in human pathways causes many diseases including cancer

Conclusion

- Kent State is playing a major role in developing AI workforce for 21st century industrial workforce leadership
 - MSAI program for industrial leadership
 - PhD research for automated clinical level diagnostics and new knowledge
- OSC is providing crucial partnership needed for large industrial scale resources needed to prepare the AI workforce
- Ohio is better prepared for the large scale application of AI in
 - analytics, smart future society and robotics
 - Clinical data analysis and automated diagnosis through KSU and OSC educational partnership

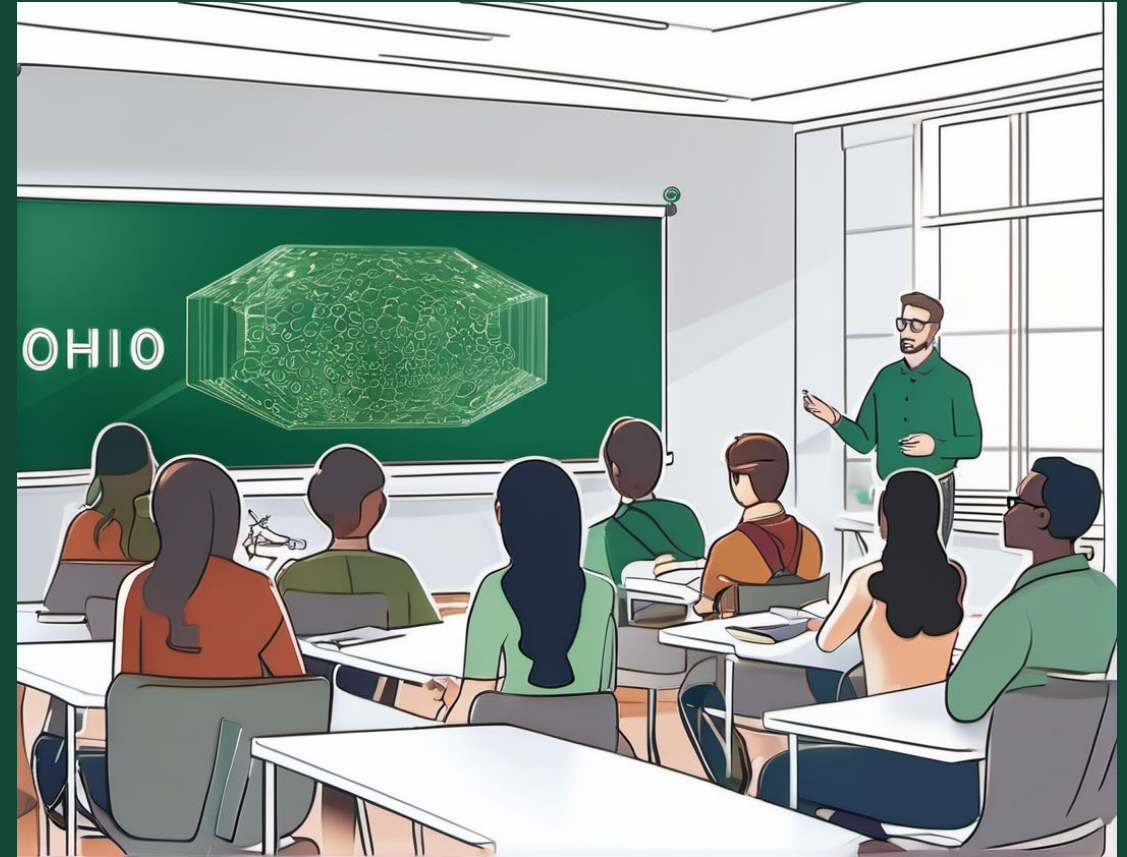
Acknowledgements

- **Philip Thomas** for guidance with **Ohio Supercomputing Center (OSC)** resources
- My PhD students: Brad Bellomo (miRNA-mRNA interactions); Racheal Mukisa (Cardiac abnormalities); Neha (Kidney cancer)
- My MS students in Advanced AI Class
- Professor Javed Khan for introducing to OSC in 2022
- Professor Steve Gordon for the opportunity to present in 2026

Ethical GenAI Challenges in Education: Using Open-Source Open-weight Models on HPC as a Solution

Basil Masri Zada, Ph.D.

Assistant Professor of Instruction, Digital Art + Technology
Ohio University



A university faculty, teaching, many students, learning about generative AI, classroom, 3D illustrations, Ohio University, normal face
Negative prompt: disfigured face, disfigured arms,

Steps: 69, Sampler: DPM++ 3M SDE, Schedule type: Exponential, CFG scale: 7, Size: 1080x840, Model hash: 31e35c80fc, Model: sd_xl_base_1.0, Version: 1.10.1

GenAI and ethical issues in Education

- Ethicality vs Legality
- Are GenAI uses in education new?
- How GenAI is trained. what happened to my generations after I generate?
 - The origin of data
 - Privacy and risks from the data it is gathering
- Paid vs Free + Terms of Service + Copyrights
- Who is the Author?
- Can we detect it or do we need to stop it?
 - Are AI detectors any good?

Three Requirements of Copyright

- 1. *Fixation*
 - 2. *Originality* =
 - *Independent Creation*
 - *Degree of Creativity* “possess some creative spark,”
 - 3. *(Human) Authorship*
-
- Thus, most "AI-generated art is considered in the public domain"*
 - <https://houstonlawreview.org/article/92132-what-is-an-author-copyright->

AI Ethics in Art + Design

- Environmental, energy concerns
- Electronic parts impacts
- The text, images, etc. created by AI could be built on the works of people
- Exploitation of human trainers
- Price Tag



<https://today.tamu.edu/2023/02/16/a-way-to-govern-ethical-use-of-artificial-intelligence-without-hindering-advancement/>

AI Use: Cost–Benefit in Practice

JL DeForest, March 2026. Ohio University

Better prompts are more efficient → lower environmental impact

GenAI Ethical consideration and the Environment

“...No enough water in the world to allow GenAI to run based on these calculations...”

Common Use	Intent (Why AI?)	Relative cost (Energy & Water)	Costly Prompt Example	Lower-Cost Alternative
Targeted question (specific text)	General orientation / starting point	Low (~1x, drops)	“Explain everything about forest ecology”	“5 bullets: drought effects on carbon in temperate forests”
Writing feedback & editing	Improve & polish work	Low–Moderate (~1–3x, drops)	“Rewrite this paragraph better” (repeated)	“Give 3 clarity edits in ≤ 100 words”
Concept clarification & learning	Understand differences	Moderate (~2–5x, drops → ~1 tbsp.)	“Teach me everything about maple trees”	“5 bullets: red vs sugar maple winter buds”
Iterative refinement loops	Trying to dial in tone	Moderate–High (~3–10x, tsp – Tbsp)	“Shorter → simpler → rewrite → again”	“Explain in 5 bullets, intro level in ≤ 150 words”
Data analysis (small / targeted)	Offload calculations	High (~5–20x, tsp – Tbsp)	“Analyze this dataset and tell me everything”	“Calculate mean and variance for these columns”
Image generation	Image for understanding	High–Very High (~10–50x, Tbsp)	“Generate an image of a red maple terminal bud”	“List 5 key ID features for sketching”
Video / media generation	Communication / presentation	Very High (~50–100x+, a few seconds ~2 Tbsp)	“Create a video explaining photosynthesis”	“Summarize in 5 bullets + simple diagram idea”

Jared L. DeForest, Professor

he/him/his

Chair, Dept. of Environmental & Plant Biology

Editor, [Soil Biology & Biochemistry](#)

Ohio University, Athens, Ohio 45701 USA

Using GPT-5.3 “instant” chatbot (17 targeted prompts) used ~1 teaspoon of water to generate the information on this slide

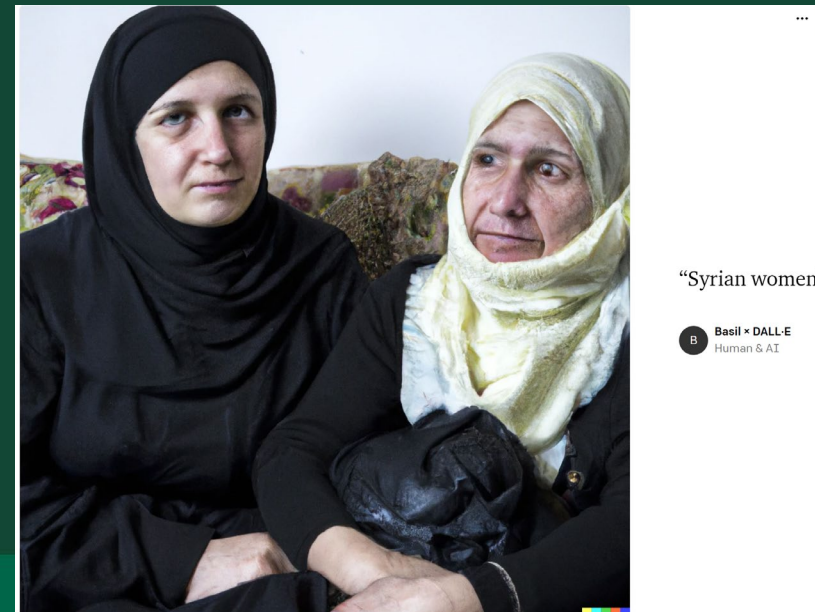
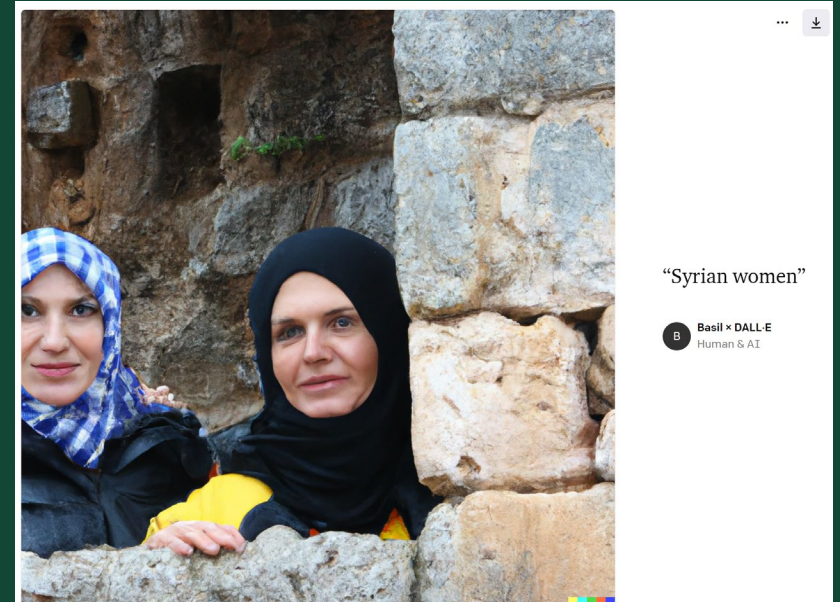
Digital Art + Technology Case Study

Art Education and Ethics

Basil Masri Zada, Ph.D. Assistant Professor of Instruction, Digital Art + Technology

Dangers of GenAI on Art

- Extending existing biases and harmful stereotypes
- Can create false information: Fake, misleading information (hallucinations)
- Potential to create deceptive content & Fake misleading Art
- Homogenization of creativity
- Unpredictability and Inconsistency
- The ethical question of ownership
- Other risks and challenges:
 - Lack of conceptual or emotional depth
 - Authenticity and credibility



Copyrights and Authorship



Digital Art + Technology Syllabus Statement

In this course, as a studio art focused, we will utilize different and unique creative AI tools for image, sound, or chat generative that are private, open source, have protected and clear copyrights, and have ethical databases such as Stable Diffusion, ChatGPT, Copilot, DALL-E, SUNO, and Midjourney, etc. However, the use of Generative AI resources must maintain the highest standards of academic integrity and adhere to the OU Code of Student Conduct.

The use of Generative AI should be seen as a tool to enhance academic research, not as a replacement for critical thinking and originality in assignments:

- Students are not permitted to submit assignments that have been fully or partially generated by AI unless explicitly stated in the assignment instructions that it allows or requires AI use.
- All work submitted must be the original work of the student.
- Any ideas garnered from Generative AI research must be cited and acknowledged with proper in-text citation and reference:
 - AI tool name
 - Your prompt that was used for the generation
 - What kind of AI, subscription, or copyrights are associated with the AI terms of service?
 - Seeds, if any.
 - Other information that would outline the AI contribution to yours.

Digital Art + Technology Syllabus Statement

- Students may be asked to save the AI chat as a PDF file for verification.
- Remember, AI is a tool not the purpose.
- Make sure to read the copyright agreement and the other information about any AI tool you use.
- At this time, I do not recommend using Free AI tools without considering the copyright and data privacy agreements with the AI company so as not to compromise your creative ideas and work.
- In short, we will use AI tools but with strict control and ethical considerations.

For that, starting from week 3, we will have special access using Ohio Supercomputer to access our own DAT AI generative technology project that is independent, private, and open source that we will use to create images, videos, train AI, text-based, and other related highly demanding computing tasks. We will also have Blender access through it with high computing power. You can also access this on many devices.

The instructor has the right to verify and ask about the source, rights of use, and citations of any image, sound, or concept. The instructor might use AI detection tools if needed.

If you have questions or are seeking guidance about the proper and ethical use of AI tools in our class, please raise those concerns in class and/or speak with me individually.”

In each project, students are required to submit any AI utilization supporting documentation, screenshots, and citations.

Masri Zada, DAT, Ohio Supercomputer GenAI projects and solutions

- Image-Image, Text - Image, Image - text, Sequencing, LLM, Sound Based, sketch to 3D, video, and others
- Remote access that allows students to access selected GenAI applications used for curriculum or research needs.
- Lower computing power/energy consumption?
- Ethical/Legal
- Authentic
- Copyrightable
- Trainable ?!
- Custom models
- Original contribution
- Open Source/Open weight
- More control/full control
- Private, Local, Secure



127.0.0.1:7860

Customer Portal Red Hat Red Hat Products D... Red Hat Enterprise ... Red Hat Developer ... Red Hat Container ... Red Hat Hybrid Clo...

stable Diffusion checkpoint
stable-diffusion-xl-base-1.0/sd_xl_base_1.0

txt2img img2img Extras PNG Info Checkpoint Merger Train Settings Extensions

a deer made out of bricks, realistic forest background, masterpiece, fall, rural, autumn, four legs, antlers, bricks

25/75

Generate

three antlers, brick background

5/75

Generation Textual Inversion Hypernetworks Checkpoints Lora

Sampling method: DPM++ 3M SDE Schedule type: Automatic Sampling steps: 31

Hires. fix Refiner


Width: 1920 Batch count: 1

Height: 1080 Batch size: 1

CFG Scale: 7

Seed: 2528233346 Extra

Script: None



The image shows a detailed digital artwork of a deer standing in a forest. The deer's body is constructed from numerous small, brown, rectangular blocks, resembling bricks or LEGO pieces, giving it a textured, architectural appearance. The deer is positioned in the center-right of the frame, facing left. The background is a soft-focus forest with tall, thin trees and a ground covered in fallen autumn leaves. The lighting is warm and golden, suggesting a late afternoon or early morning setting. The overall composition is balanced and visually appealing.

Open WebUI

New Chat

Search

Notes

Workspace

Folders

Chats

Today

are you good in math? ...

what is your current version?

November

Life Reflection 🌟

October

Python Coding Options

Moving Circle with Keyboard

New Chat

New Chat

New Chat

September

Roman Empire Facts

Click Counter 🎮

AI Capabilities

what is the latest data you are t...

Basil Masri Zada

phi4-reasoning:14b ▾ +

- It is the inverse operation of exponentiation, meaning that if $b^x = y$, then $\log_b(y) = x$.

give me more examples to understand

phi4-reasoning:14b

Thought for 21 seconds ▾

Below are some additional examples to help you understand logarithms better. A logarithm tells you the power or exponent needed for a given base to reach a certain number. In other words, if $b^x = y$, then $\log_b(y)$ equals x .

For instance:

- $\log_2(16) = 4$ because $2^4 = 16$.
- $\log_{10}(1000) = 3$ because $10^3 = 1000$.
- $\ln(e^2)$ (where "ln" is the natural logarithm with base e) equals 2 because $e^2 \approx 7.389$.

Below is a Python code snippet that demonstrates these examples using the math module:

Analyzing... ▾

Analysis:

- In Example 1, since 2 raised to the power 4 equals 16, the logarithm base 2 returns 4.
- In Example 2, as 10^3 equals 1000, the log base 10 gives 3.
- For Example 3, because e^2 is approximately 7.389, its natural logarithm (base e) is 2.

These examples show how logarithms allow you to determine the exponent needed to reach a number from a given base. If you have any further questions or need more examples, feel free to ask!



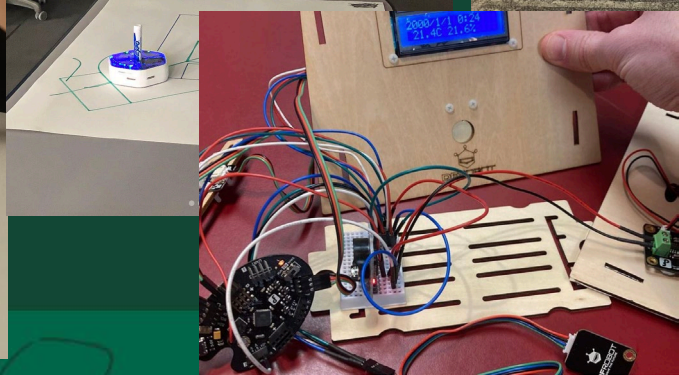
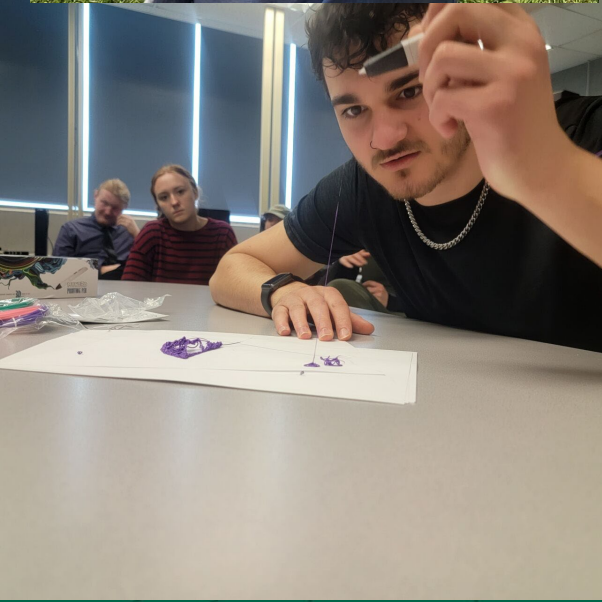
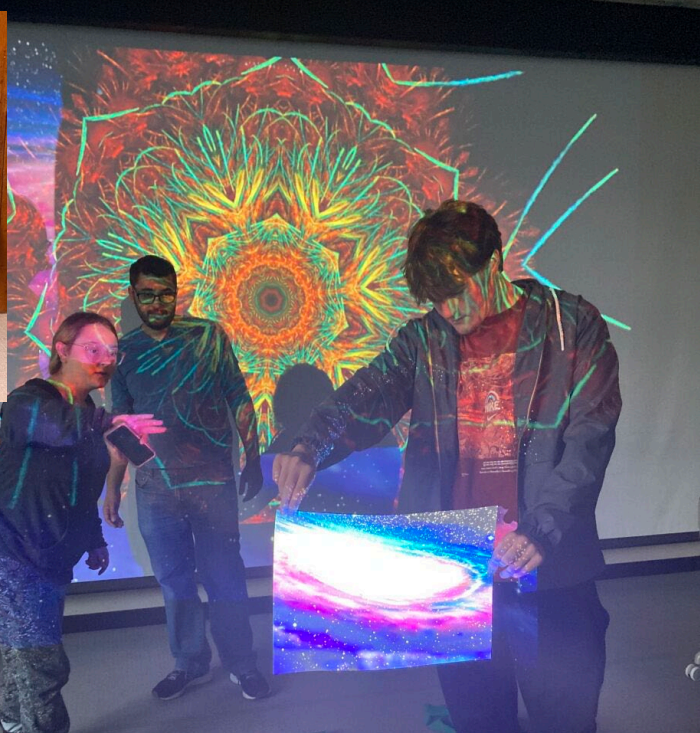
Send a Message

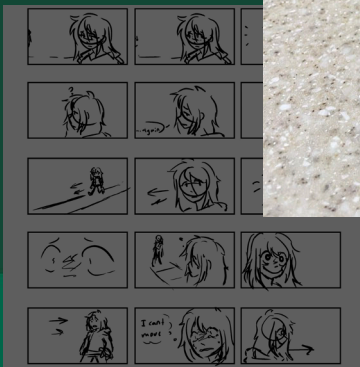
+ ✨ 📧 🔊 🔇

The screenshot displays a complex workflow in a Stable Diffusion web interface, organized into several main sections:

- Load input:** Contains nodes for loading a Diffusion Model, VAE, ControlNet, and Image. It includes a 'DualCLIPLoader' and a 'Load Image' node with a photo of Donald Trump. Below are 'Width' and 'Height' nodes set to 1280, and an 'Empty Latent Image' node.
- CLIP Text Encode (Prompt):** A central node with a text input field containing a detailed prompt: "A hyper-realistic and highly detailed portrait of a beautiful woman. The photo is in 4k 8K quality with soft effects. The image is high quality, high resolution, masterpiece, sharp and detailed. A girl is pointing with a finger at viewer." Below the input is a 'CLIP Text Encode (Prompt)' node.
- Zoe Depth:** A 'Zoe Depth Map' node that processes the input image into a depth map, visualized as a white silhouette on a black background. It includes a 'Sampler Select Helper' and an 'Image Comparer (rgthree)' node.
- DWDPose:** A 'DWDPose Estimator' node that processes the depth map. It includes a 'Sampler Select Helper' and an 'Image Comparer (rgthree)' node. The 'DWDPose Estimator' node has several sub-nodes for detection and estimation.
- VAE Decode:** A 'VAE Decode' node that takes the processed image and applies various parameters like 'strength', 'start_percent', and 'end_percent'. It includes a 'Scheduler Select Helper' and an 'Image Comparer (rgthree)' node.
- Preview Image:** A 'Preview Image' node that displays a grid of generated images. The grid shows a woman in various poses, some of which are similar to the input image of Donald Trump. The 'Preview Image' node includes a 'Plot Sampler Parameters' node.











Teaching HPC in the Age of GenAI



Connor Kenyon
Research Computing Facilitator @ UMass Dartmouth
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The Class

High Performance Scientific Computing

- Covers an assortment of HPC topics at instructor's discretion
- Cross listed in the following degree programs
 - Data Science (graduate)
 - Engineering and Applied Science (graduate)
 - Mathematics (graduate)
 - Mathematics (undergraduate)
- Recommended Prerequisite Knowledge:
 - Moderate python experience
 - Familiarity with one or more compiled languages
 - Familiarity with Linux and/or shell environments

My Class

- Demographics
 - Majority graduate Data Science students
 - Few undergraduate Math students

- No consistent academic/computational background
 - Most were familiar with python
 - Some had python experience
 - Very few familiar with compiled languages
 - Mixed bag of undergraduate degrees
 - Few had advanced math experience

My Course Content

- Bash
 - Basic navigation in a terminal
 - Text editing with vi
 - Running a pre-compiled binary
 - Simple I/O
 - Shell scripting
 - Compiling code
- Python
 - Notebook environment
 - Plots
- C
 - Control flows
 - Data types
 - Math operations
 - I/O
- Convergence Tests
- General HPC
 - History of HPC
 - Terminology
 - Architectures
- Slurm
 - Interactive jobs
 - Batch jobs
- Parallel Computing
 - Multi-Threading (OpenMP)
 - Multi-Processing (MPI)
 - Data models
 - Race Conditions
- GPU Computing concepts
- Debugging
- Profiling

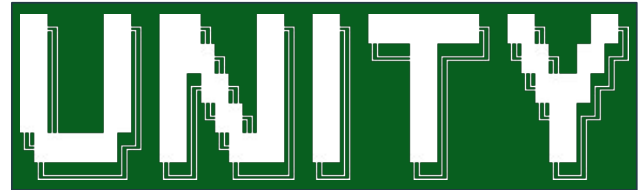
My Approach

- Access to cluster on day 1
- Focus on Core HPC concepts rather than code
- Attempt to avoid AI dependence
- *Provide boilerplate codes
- *Pen and paper exams

* Modified during the semester

Early Cluster Access

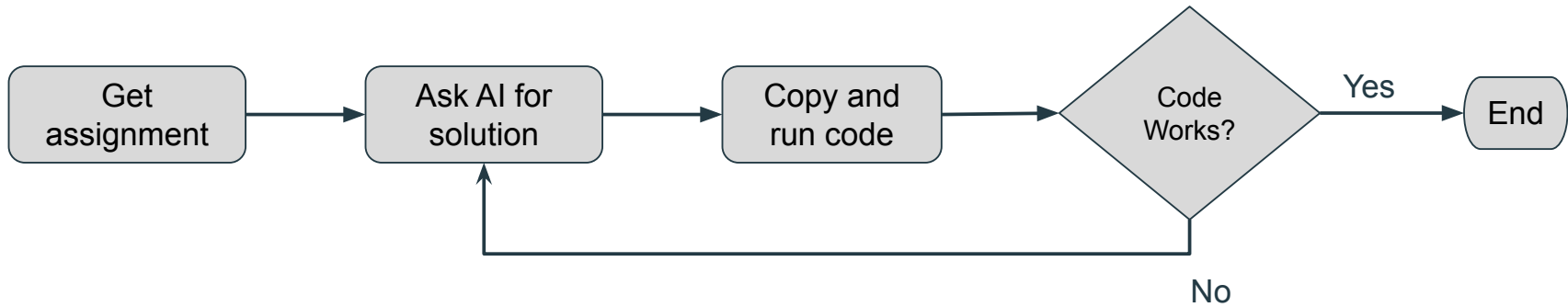
- Course ran on Unity cluster
- Students used Open OnDemand interface
- Linux learning through immersion
- Consistent platform available



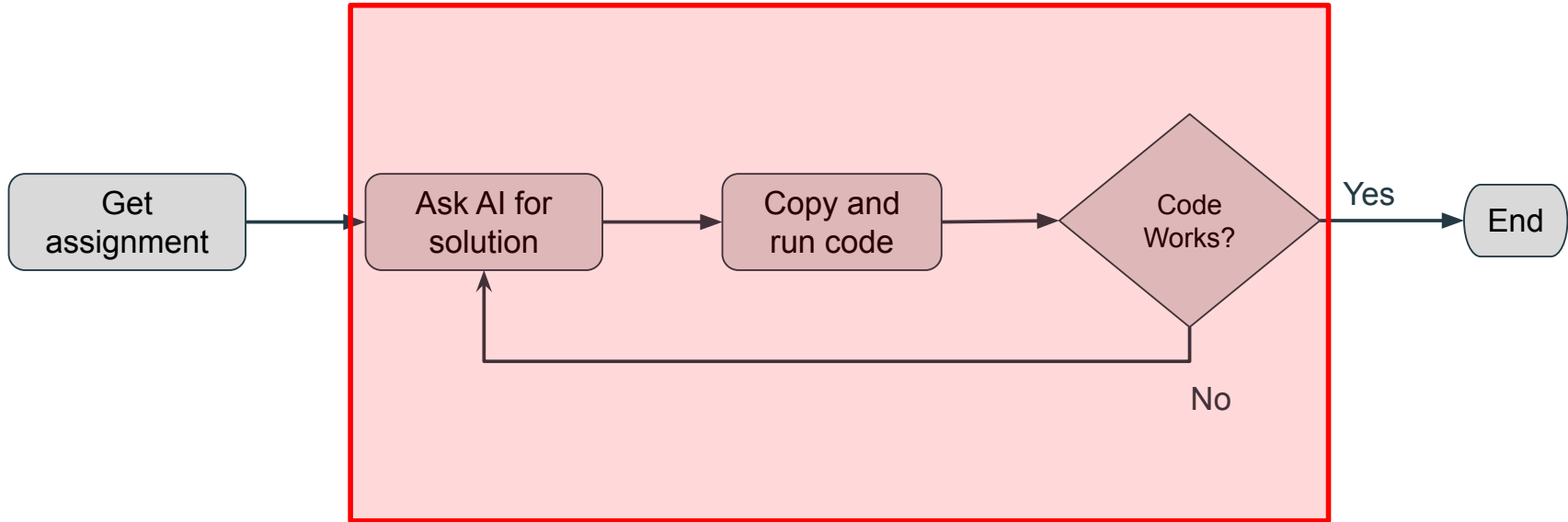
Core HPC concepts

- Command line navigation
- HPC Pipelines
- Compiling code
- Using Slurm
- Managing environment modules
- Installing dependencies
- Parallel computing concepts
- Measuring performance
- Data management
- Data visualization

Dependence on AI



Dependence on AI



Student is **not** learning key concepts

GenAI Gotchas

No students had experience in bash, yet many of these appeared throughout the semester...

- ``set -euo pipefail``
- ``gcc -wextra -Wall -O2 -std=c11 || { echo "failed" ; exit 1}``
- ``: > filename.txt``
- ``#!/usr/bin/env bash``

Providing Code to students

Why I provided code

- Teaching C takes time
- Students will use AI anyways
- Focus on **modifying** existing code and **adding functionality**
- Most HPC is not writing code from scratch

What code I provided

- Tested and validated C code
 - Solves intended problem
 - Easy enough to read
 - Typically just boilerplate

What worked and what didn't

Good

- Avoiding C development time
- Having them on a cluster day 1
- Including text editing and navigation
- Restricting the number of different algorithms used

Bad

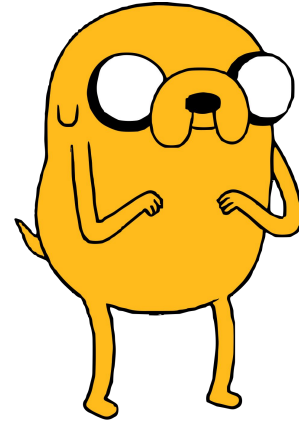
- Algorithms were out of touch with students
- Too many students overly dependent on AI
- Need more data-science focused topics
- Would like to return a project to the course
- Exam content felt lackluster
- Heavily weighted exams encouraged memorization/cheating

What I would do differently

- **Adjust Content**
 - More time on containers
 - Poll class interests/backgrounds at start for future examples
 - Incorporate class project again (maybe?)
- **Adjust student evaluation**
 - Include more frequent, small quizzes
 - Avoid heavily weighted/high pressure exams
 - Consider grading attendance/participation

Final Takeaways

- The course is always a work in progress
- Reducing code development but increasing immersion seems useful
- GenAI is preventing students from progressing naturally, but is an essential tool professionally



“Sucking at something is the first step towards being kinda good at something”

– Jake the Dog

ACM Education Advisory Committee Task Force Members



Steven Gordon Chair
The Ohio State University



Paul Denny
University of Auckland



Hieke Keuning
Utrecht University



Natalie Kiesler
Nuremberg Tech



Amruth Kumar
Ramapo College



Viraj Kumar
Indian Institute of Science



Juho Leinonen
Aalto University



James Prather
Abilene Christian University

The ACM Education Advisory Committee's Task Force on Generative AI (GenAI) and Programming Assessment: established to **understand how GenAI and GenAI coding tools are reshaping programming instruction and assessment** and to **guide the computing education community through this transition**.

Four Connected Goals

- (1) a global survey of over 700 educators on policies, concerns, perceived impacts on students' skills, and changes to teaching and assessment
- (2) an analysis of concrete course-level adaptations, including shifts toward code comprehension, in-person and oral assessment, and explicit AI literacy
- (3) a curated collection of instructor-contributed approaches and tools, made available via a public website
- (4) a hands-on special session at SIGCSE 2026 showcasing exemplar tools and practices.

Survey on Impacts of GenAI on Programming Instruction

- Approximately 500 complete responses
- 55% from North America, 26% from Europe, 14% Asia, remainder from other continents
- Responses by institution type
 - 240 from graduate degree granting institutions
 - 62 from bachelor's degree granting institutions
 - 23 from associate degree granting institutions
 - 15 from other

Barriers to Integrating GenAI

Table 3: Barriers that instructors (n=514) have faced with integrating GenAI in their courses. Instructors could select multiple options.

Barrier	Count
Lack of examples of best practices	249 (48%)
Lack of expertise in GenAI	146 (28%)
Have not faced any barriers	123 (24%)
Do not believe there is a need to integrate GenAI	101 (20%)
Curricular requirements	88 (17%)
Limitations based on GenAI departmental or institutional policies	53 (10%)
<i>Other</i>	<i>103 (20%)</i>

Need for Professional Development

- 74% indicated need for training on best practices to integrate GenAI into instruction
- 66% training on how to revise assessment when using GenAI
- 39% training on how GenAI works
- 12% don't want to adapt my courses

Changing Skills

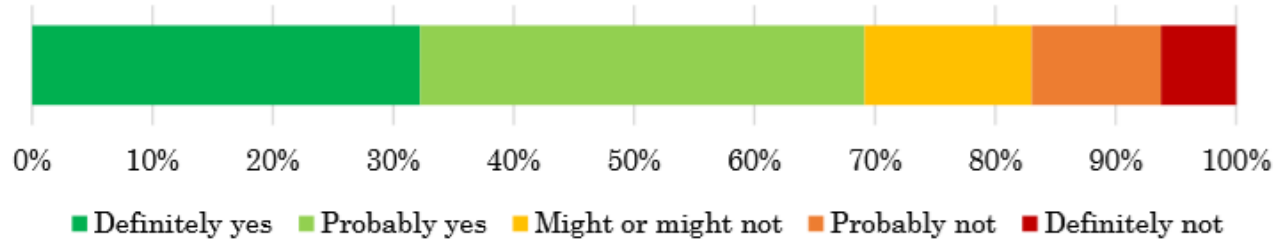


Figure 1: The extent to which instructors believe the skills to create software have changed because of GenAI.

Focus on code comprehension

Critical evaluation of AI output

Instructors' Concerns

Concern	Count
Increased dependency on technology to complete coursework	444 (87%)
Increased cases of cheating or plagiarism	367 (72%)
Misinformation	269 (53%)
Privacy concerns	142 (28%)
Other	126 (25%)

Changes to Instruction and Assessment

- Reduced weight of homework assignments
- Increase in class activities
- Redesigned projects
 - Open-ended
 - More complex (AI resistant)
 - Integrates AI explicitly
- Focus on code comprehension rather than syntax
- Emphasis on debugging and testing
- Emphasis on problem-solving skills
- Increase in oral exams, paper and pencil
- Discussion of ethics issues

Full report and Contribution Website

<https://acm-education-genai-task-force.github.io>