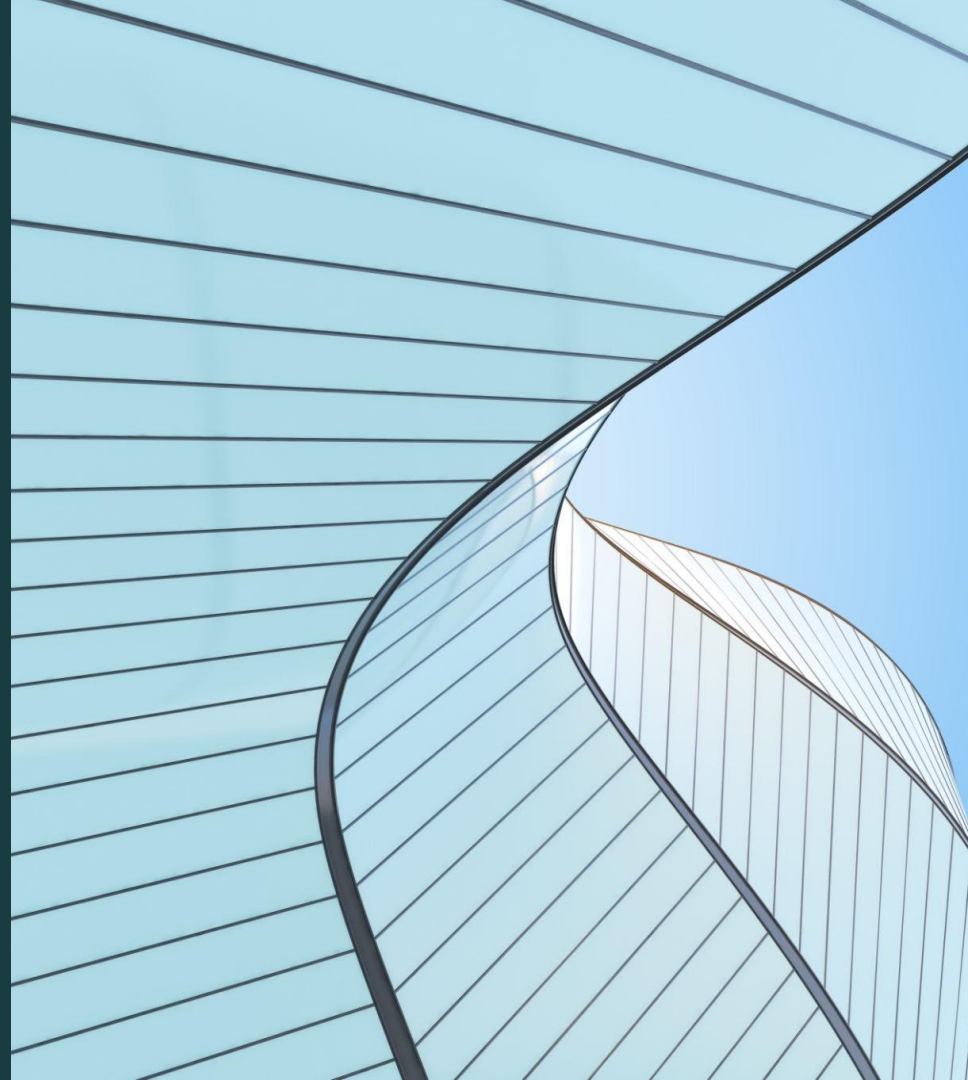


Intern/Mentor Presentation

Artificial Intelligence: Applications to Pedagogical Course Content

Esha Hegde



“The measure of intelligence is the
ability to change.”

– Albert Einstein

My Journey

Why:

- **Interest:** Took a few courses (online!) on Python, data structures, etc; found the AI field very intriguing.
- **Diving Deeper:** AI evidently can be applied to different fields such as healthcare, finance, government, etc.

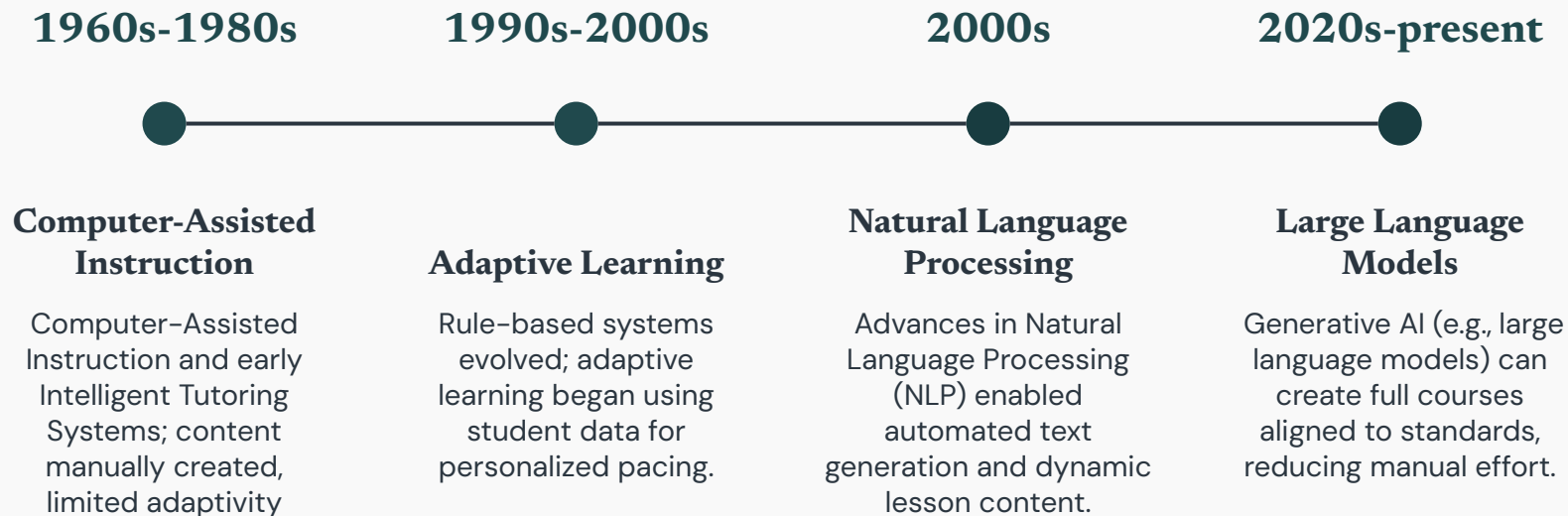
Why not use it to revolutionize education?

How:

- **Internship Focus:** Conduct market research, help develop product ideas and pitch strategies, test AI generated courses + contribute to software, and learn software concepts through reverse engineering existing code.
- **Goal:** Understand how AI-generated courses compare to human-designed curricula and optimize them.



Background History



Ongoing Challenges

Accuracy, bias, instructional quality, and integration with teacher-led strategies.

Research Question

1. How can artificial intelligence (AI) be leveraged to generate and optimize educational content that aligns with established academic standards?
2. How does the accuracy and quality of this content compare to that of human-designed curricula?

Hypothesis

If artificial intelligence is utilized to generate educational course content based on established educational standards, then the resulting materials will demonstrate comparable or higher accuracy and instructional quality than human-designed curricula, requiring less time and manual effort to produce.

Name ↑
AI Technology
Company Description
Executive Summary
Ideas to Come Back To
Learning Science Compliance Scoring Framework
Market Analysis
Operations
Product Offering

Business Plan

Repositories

Search repositories

Projects Privacy type Language Watching

Repository Description Size

coursino Zingy

potluck Zingy

diagogol Zingy

zingu Zingy

Bitbucket Your work Pull requests Repositories Projects People Packages More Create

Eckart Bindewald

Recent repositories

zingu

coursino

potluck

Python Packages - Bitbucket

Process

Idea → Working Program

Revising/Tweaking Code Structure

Installing Locally Through Terminal

```

~/courses/cells -- zsh
Last login: Tue Dec 16 13:11:58 on ttye016
(base) eshahegde@Eshas-MacBook-Air-2 ~ % cd python
(base) eshahegde@Eshas-MacBook-Air-2 python % git clone git@bitbucket.org:solace/diagogol.git

Cloning into 'diagogol'...
Receiving objects: 100% (263/263), 186.48 KiB | 8.19 MiB/s, done.
Resolving deltas: 100% (139/139), done.
(base) eshahegde@Eshas-MacBook-Air-2 python % ls
coursino  diagogol  potluck
(base) eshahegde@Eshas-MacBook-Air-2 python % cd coursino
(base) eshahegde@Eshas-MacBook-Air-2 coursino % ls
conf  examples  PLAN.md  ROADMAP.md  tests
config.yaml.example  ISSUES.md  pyproject.toml  scripts  SPECIFICATION.md
demos  NEWS.md  README.md  src
docs  notebooks  requirements.txt

(base) eshahegde@Eshas-MacBook-Air-2 coursino % cd
(base) eshahegde@Eshas-MacBook-Air-2 ~ % cd python
(base) eshahegde@Eshas-MacBook-Air-2 python % cd potluck
(base) eshahegde@Eshas-MacBook-Air-2 potluck % ls
conf  INSTALL.sh  pyproject.toml  src
data  NEWS.md  README.md  tests
docs  notebooks  requirements.txt

(base) eshahegde@Eshas-MacBook-Air-2 potluck % cd
(base) eshahegde@Eshas-MacBook-Air-2 ~ % cd python
(base) eshahegde@Eshas-MacBook-Air-2 python % cd diagogol
(base) eshahegde@Eshas-MacBook-Air-2 diagogol % ls
diagogol  examples  pyproject.toml  requirements.txt
docs  NEWS.md  README.md  SPECIFICATIONS.md
(base) eshahegde@Eshas-MacBook-Air-2 diagogol %

```

Previous 30 Days	Today
courses	diagogol
personal-laptop	
personal-laptop.pub	
python	
	coursino
	potluck

```

coursino / src / coursino / commands_pkg / demodeck.py
} -> pd.DataFrame:
for slide_dir in sorted(howto.fdeck.slides_dir.iterdir()):
    if slide_dir.is_dir() and slide_dir.name.isdigit():
        # Build AI prompt
        prompt = f"""You are analyzing a collection of working code demos to select a non-redundant subset for a pedagogical presentation.

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**OUTLINE TOPICS (pedagogical goals):**
{outline_df.to_string(index=False)}

**AVAILABLE DEMOS:**
"""

for slide in howto.slides:
    prompt += f"\n--- Slide [{slide['slide_num']}] ---\n"
    prompt += f"CONTENT: {slide['content']}\n"
    if slide['democode_narration']:
        prompt += f"PARARRATION: {slide['democode_narration']}\n"
    if slide['demo_terms']:
        terms = ', '.join([f'term' for t in slide['demo_terms']])
        prompt += f"PYTHON TERMS: {terms}\n"

prompt += """

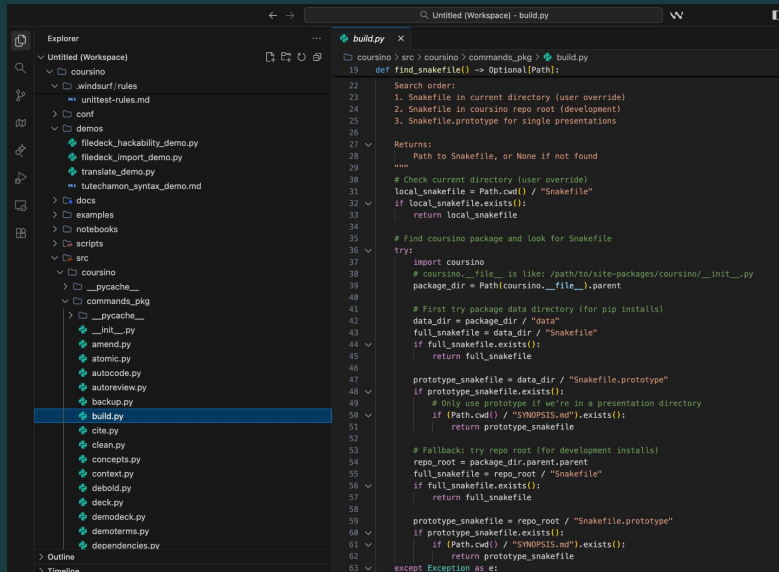
**TASK:**
Select a non-redundant subset of demos that:
1. Cover the key skills (Type S) and examples (Type E) from OUTLINE
2. Avoid redundancy (don't include multiple demos showing the same concept)

coursino / src / coursino / commands_pkg / amend.py
22 from __future__ import annotations
23
24 import argparse
25 import json
26 import os
27 from pathlib import Path
28 from typing import Dict, Any, List, Optional
29 from concurrent.futures import ThreadPoolExecutor, as_completed
30
31 from potluck.ai import ai_chat_response # type: ignore
32 from .config import MODEL, TEMPERATURE, CACHE_FILE, IGNORE_CACHE
33
34
35 def create_backup(slides_path: Path) -> Path:
36     """Create a backup of the slides file with incremental naming.
37
38     Args:
39         slides_path: Path to the original slides.md file
40
41     Returns:
42         Path to the created backup file
43     """
44     parent = slides_path.parent
45     stem = slides_path.stem
46     suffix = slides_path.suffix
47

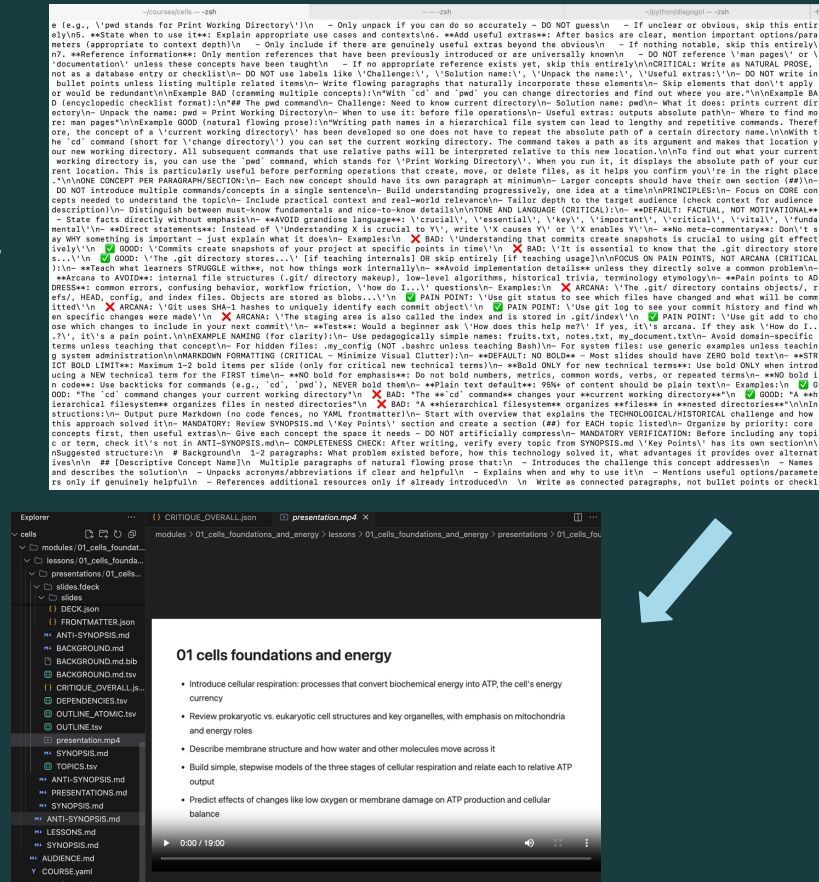
```


Process Running/Testing Program - Generation

Windsurf



Folder + Package Structure in Windsurf - IDE Editor



**Example Video
Course Generated**

Discoveries So Far

```
MODEL_BALANCED = params.get("model_balanced", "gpt-5-mini") # "cerebras:gpt-oss-120b" # "gpt-5-mini" # "gpt-5-mini" # "groq:qwen
params["model_balanced"] = MODEL_BALANCED
MODEL_HIGHEREND = params.get("model_highend", "gpt-5") # "cerebras:gpt-oss-120b" # "gpt-5-mini" # "gpt-5-mini" # "groq:qwen/qwen3-
params["model_highend"] = MODEL_HIGHEREND
MODEL_FASTCHEAP = params.get("model_fastcheap", "cerebras:gpt-oss-120b")
params["model_fastcheap"] = MODEL_FASTCHEAP
MODEL_VISION = params.get("model_vision", "gpt-5-mini") # AI model for vision tasks
params["model_vision"] = MODEL_VISION
MODEL_AUDIO = params.get("model_audio", "gpt-4o-mini-tts")
params["model_audio"] = MODEL_AUDIO
MODEL_NANO = params.get("model_nano", "gpt-5-nano") # "cerebras:gpt-oss-120b" # "gpt-5-nano" # minimal model, mostly for running
params["model_nano"] = MODEL_NANO
MODEL_WEBSEARCH = params.get("model_websearch", "perplexity:sonar")
params["model_websearch"] = MODEL_WEBSEARCH
MODEL_DIAGRAM = params.get("model_diagram", "gpt-5-mini") # "groq:qwen/qwen3-32b" # "gpt-5" # 4o-mini
params["model_diagram"] = MODEL_DIAGRAM
MODEL_REASON = params.get("model_reason", "gpt-5-mini")
params["model_reason"] = MODEL_REASON
MODEL_RESEARCH = params.get("model_research", "perplexity:sonar-deep-research") # "gpt-4o-mini"
params["model_research"] = MODEL_RESEARCH
MODEL_CODE = params.get("model_code", "groq:openai/gpt-oss-120b") # "gpt-4o-mini"
params["model_code"] = MODEL_CODE
CODE_ARCHETYPE = params.get("code_archetype", "aider") # aider or claude
params["code_archetype"] = CODE_ARCHETYPE
```

Model Configuration

Volume of Content Generated

9

Can produce full courses (lessons, quizzes, activities) in minutes/hours vs. days for humans.

Prompt Engineering

The AI program generates content based on user-provided prompts; more detailed and specific prompts result in more focused and high-quality course output.

Model Discrepancies

The AI program generates content based on user-provided prompts; more detailed and specific prompts result in more focused and high-quality course output.

Time & Effort Comparison

AI significantly reduces production effort, enabling faster iteration vs. human-designed content.

Next Steps

Software

- Finish programming in-house diagram generation package
- Revise and finalize course generation software for efficiency and accuracy
- Implement software to generate various courses

Business

- Bring courses to a user interface domain
- Learn more about the business aspect
- Test generated courses for instructional alignment and accuracy

Changing Directories with `cd`

- Use `cd` to move between directories in the Unix file system.
- Relative paths: `cd ..` moves up one level; `cd foldername` moves into a subdirectory.
- Absolute paths: `cd /home/user/documents` jumps directly to a specific location.
- Understanding relative vs. absolute paths is key for efficient navigation.
- Practice navigating nested directories to build command line confidence.

Figure: Directory tree from / to nested folders, illustrating absolute and relative cd navigation.

Current Diagram Example

Independent Research

- Earn GT credit
- Usually 10th grade -- open to all grades!
- Design and conduct **original research**
- Opportunity to **publish your work**

**Ideal if you enjoy
independence and exploring
your interests!**

Intern/Mentor

- Earn GT credit
- College- level research experience
- Grades 11 and 12 --
***transportation needed!**
- Work directly with
professional mentor
- Gain real-world **experience**
and build your professional network

Thank you!

Questions?