ARTIFICIAL INTELLIGENCE CLUB AT MSU

Newsletter Volume 4

MARCH 2023

Preface

Dear members, donors, partners, and community,

Understanding and utilizing AI has become a critical skill that individuals and organizations must possess to stay competitive in the ever-evolving global landscape. Our club is committed to empowering our community with the knowledge and practical experience required to thrive in the world of AI.

Over the last two years, we have worked tirelessly to facilitate cutting-edge and innovative projects, while also hosting a wide range of workshops on diverse AI-related topics. We are proud of the impact we have had on our members and the broader community at MSU. In our quest to have an even greater impact, we have decided to share our original educational material of the highest quality with the world, making it available publicly on our website in a self-guided format.

Our passion for teaching AI remains unwavering, and we are more motivated than ever to continue providing the best possible resources to our members. As the hub of AI for undergraduate students at MSU, we will continue to strive for excellence, both in terms of our educational material and the practical projects we undertake.

— GABRIEL SOTELO

WORKSHOP RECAP

Spring 2023

As we have gained many new members in the past year, we wanted to cover some fundamentals of AI during our workshops this semester. We also adopted a new workshop structure to encourage collaboration and development of new skills.

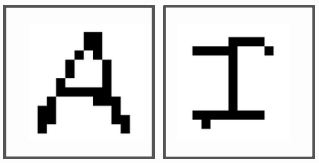
Each workshop was split into two meetings:

1. Presentation of the topic and guided learning
2. Application of the topic in a collaborative environment, with supervision as needed

Convolutional Neural Networks

February 13th, 2022

In this workshop, members learned about Convolutional Neural Networks (CNNs). Like the MLP, these are another kind of supervised machine learning model, but use a mathematical trick to make them better suited to image and other spatial data that comes in a grid. CNNs are an excellent tool to classify images, locate objects in a scene, and answer all kinds of questions you can ask a computer about an image.



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Members worked together to train a neural network that could look at a photograph of a single handwritten digit (0-9) and classify it into its corresponding number.

For this workshop, students learned about the Python library PyTorch, a deep learning library that lets you custom-build machine learning models and is also used by professionals and researchers.

Multi-Layer Perceptrons

January 23rd, 2023 - Januray 30th, 2023

In the first workshop of the semester, students learned to create their first neural network: the Multi-layer Perceptron (MLP). This is one of the basic kinds of neural networks, and is great for performing prediction, classification, and regression on any dataset that comes in a tabular form or spreadsheet.

Each one of our workshops were structured in two consecutive weekly meetings. In the first week, as a group, everyone worked together to train an MLP that could predict a penguin's species based on its bill and flipper measurements. Then, during the next week, members worked in groups to find their own datasets and solve their own unique modeling problems using MLPs.

This workshop familiarized students with many of the foundational themes of supervised machine learning that we would build upon throughout the semester's workshops. For instance, we learned that you could think of supervised machine learning as way to fit a very fancy function to data, which might come in many forms, and that a goal is to represent the data efficiently with numbers.

Recurrent Neural Networks

March 13th - March 20th, 2023

In the third workshop of the semester, we focused on Recurrent Neural Networks, or RNNs. These neural networks are used for processing sequences of data. A sequence could be any kind of list, such as a list of daily weather reports captured over two weeks, or—more common—a list of words (or “tokens”) making up a sentence, paragraph, or even an entire book. RNNs are the simplest way to do text processing, and in this workshop, members worked together to train a model that can read an Amazon product review and determine whether it is a positive review (4 or 5 stars) or a negative review (1 or 2 stars).

In the second part of this workshop, members learned about the concept of an "embedding", that is, a way to encode words in numbers such that their meaning and the relationship between their meanings has a mathematical significance. With the recent announcement of GPT-4 and other major milestones, this workshop happened during one of the biggest weeks in AI, and we took some time to contextualize what we learned in the rapidly developing world of natural language processing.

Guest Speaker: Dr. Dirk Colbry

February 6th, 2023

The Institute for Cyber-Enabled Research (ICER) is the home of the Michigan State University High-Performance Computing Center (HPCC). Dr. Dirk Colby is the Director of User Support at ICER and an advisor to the AI Club at MSU. He led a discussion about how the HPCC was built and is used by researchers from across campus.

Dr. Colbry’s talk introduced the world of large-scale computing to the AI Club. We discussed how to gain access to HPCC resources, the common types of problems that can be solved using these resources, and training programs specifically designed to help new researchers leverage these technologies and use them effectively in their own research. Of particular interest to the AI club were the large numbers of GPUs that are available on the HPCC that are the standard for speeding up the training of deep learning models.

PROJECT RECAP FALL 2022

PROJECT CHECKPOINT AT THE HATCH Nov 14th, 2023

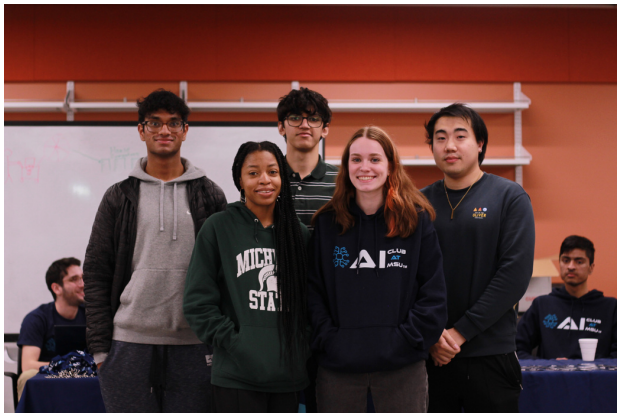
CLOSING CEREMONY Nov 28th, 2023

AI Discord Moderator
Best Implementation Award

AI Monopoly Player
Best Team Lead: Mateja Milicevic

Fetal State Predictor
Code Green: First Prize

Intra-Building Navigator
PEOPLE'S CHOICE AWARD



PROJECT UPDATE SPRING 2023

Every semester, the AI Club host projects for our more experienced members to participate in. These projects allow its members to delve deep into the field of artificial intelligence while tackling more complex topics within a small group. Keep an eye out for our final showcase where each project team will present their final product!

Transcript Editor

The transcript web application is a video editing service that utilizes a transcript to allow users to edit their videos easily. The application employs a user-friendly interface that makes it possible to interact with the transcript and perform various video editing tasks. The transcript is generated using the open AI whisper model, which is an AI model that uses machine learning to generate human-like text. The front end of the application is built using HTML, JavaScript, and CSS, while the back end is built using Django Python. The use of these technologies ensures that the application is scalable and efficient, providing users with a seamless experience while editing their videos.

Safety Cam

This project is an AI solution that uses advanced computer vision and sound detection algorithms to detect potential dangers from real-time video and audio streams. Our team has adopted the Single-Shot Multibox Detection (SSD) MobileNetV1 architecture for object detection, which enables fast and accurate detection capabilities. Additionally, we have integrated the DeepFace and SpeechRecognition libraries to analyze facial expressions and sounds for potential danger detection. We are dedicated to making Safety Cam accessible and user-friendly for anyone looking to enhance their safety measures. With our deployment plans to the Streamlit Cloud, we aim to provide a seamless experience for users to access the app from anywhere.

Short Form

ShortForm is a web app based project that aims to summarize videos and identify key moments with the goal of helping people extract shorts from longer videos. This project utilizes several different natural language processing approaches including GPT word embeddings, extractive summarization, and state-of-the-art models like Whisper.

Astrological Stock Trading

The Astrological Stock Trading project is a novel approach to stock trading that utilizes deep learning techniques to predict market movements based on planetary positions and zodiac signs. Ryan Moss and his team, consisting of Zane, Vashcar, Ankan, Mateja, Matt, and Alexander, hypothesize that astrological factors can impact investor behavior and stock performance. To test their theory, they are leveraging historical data and astrological calculations to create a predictive model that identifies optimal times to buy or sell stocks based on their astrological compatibility.

While the concept of using astrology to inform financial decisions may seem unconventional, the team is optimistic that their approach will yield positive results. By blending cutting-edge technology with ancient practices, they hope to gain a deeper understanding of the market and potentially even uncover new investment opportunities. Only time will tell if their predictions hold true, but the Astrological Stock Trading project is an intriguing exploration into the intersection of technology and spirituality.

PROJECT LEADS SPRING 2023

Ryan Moss

Team Finance
Finance, Senior

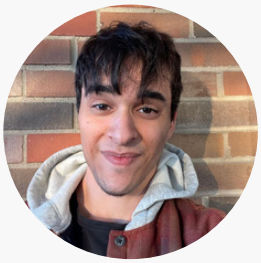
What advice would you give to someone interested in pursuing a similar project or getting involved in AI-related software development?

If you're like me and you're "dipping your toes" into the vast pool that is artificial intelligence, theres going to be a lot of things you don't understand right away. Your strengths and skills might not match exactly whats needed to finish a task and thats okay. Be prepared to find alternative and creative ways to contribute and make a positive impact.

What was the inspiration for this project?

Alternative way to look at the stock market with respect to astrology. Could potentially interest a new demographic in the field of markets.

Python



Mohammad Alshaikhusain

Transcript
Computer Science, Freshmen

What motivated you to lead this project, and what have you learned from the experience so far?

I was motivated to lead the project because I found myself lacking in the ability to communicate and distribute tasks equally amongst team members. However, by understanding each member's background, I found myself better able to assign them to tasks that they are more familiar with while also being adequately challenging for them to learn something new.

How have you collaborated with other members of your project team to achieve your goals?

I collaborated with my teammates by holding weekly meetings to discuss our progress. I also held group coding sessions where those who are working on features that relate to each other can work side by side to make sure everything is working properly.

Python, HTML, CSS Javascript, Django

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Safety Cam
Physics, PhD

What advice would you give to someone interested in pursuing a similar project or getting involved in AI-related software development?

In AI-related software development, the real magic happens when established technologies such as computer vision and speech recognition algorithms are combined in innovative ways to create a powerful product. This presents an exciting opportunity for individuals to bring their unique perspectives and expertise to the field. Furthermore, the democratization of AI technology means that even those with little to no AI knowledge can now build something amazing by combining different models into a single product.

Python, OpenCV, PyAV, SSD MobileNet, SpeechRecognition, NLTK, Streamlit

Koya Saito

ShortForm
Computational Data Science, Senior

What was the inspiration for this project?

There is an issue when content creating - generating highlights requires rewatching content which can be time consuming. Originally, I was fascinated by Archillect, a bit which finds “visually interesting content” and learns from social media response.

What motivated you to lead this project, and what have you learned from the experience so far?

I wanted to work with other students on this project. I spend a lot of time working on personal projects and thought the opportunity to lead would be both fun and help free up my time to focus on more complicated tasks.

GPT, BERT, React, Google App Engine, YouTube API, Whisper, Python, TensorFlow, Sklearn, Firebase

We're the AI Club E-Board!
And we're recruiting new members...

WANT TO JOIN US?

Keep your eye out for applications!
Follow us for more information coming soon

Check out our past workshops now available at MSUAICLUB.COM/WORKSHOPS

Josh Pullen
Jan 5 · 1 min

Compute the Newt (Hugging Face Transformers)

Transformers have taken the world by storm. This new type of model is the best at processing natural...

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MSU AI Club
Nov 17, 2022 · 1 min

The Mystery of the Sorting Hat

Machine learning might seem like an intimidating topic. But in the first workshop of the year, we introduc...

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AI CLUB AT MSU

Thank you all for your continued support and dedication to the AI Club at MSU. We hope you have all learned a lot about the ever expanding field of artificial intelligence and the many opportunities it has to offer.

If you made it this far, there is a secret QR code hidden somewhere in this newsletter! Scan it and fill out the form for the chance to win some free AI Club merch.

Make sure to follow all of our social medias for more updates on what we've been up to!