

Harnessing the Power of AI: Enhancing Community AI/ML in Real Life

This course aims to empower students with the knowledge and skills needed to leverage Artificial Intelligence (AI) and Machine Learning (ML) for the benefit of diverse communities. It will offer students insights into the practical applications of AI in analyzing and addressing pivotal community issues such as crime, poverty, and social isolation, all while maintaining a respectful and sensitive approach to cultural nuances and values.

Students will explore how AI and ML can enhance the efficacy and accessibility of crucial public services, including healthcare, education, and transportation, fostering connectivity, communication, and collaboration within communities. The course places a substantial emphasis on the ethical and cultural considerations inherent in utilizing AI, ensuring the responsible deployment of technology in varied cultural landscapes.

A salient feature of this course is the opportunity for students to undertake a real-world project, applying acquired AI knowledge to conceive and implement solutions tailored to the unique challenges and cultural contexts of their communities. They will learn to apply machine learning tools and AI techniques with cultural intelligence, addressing

HIGHLIGHTS

- **Earn while you learn!** Learners receive stipend upon completion of the microcredential program
- **Live weekly office hours** with course facilitators and student success coaches
- **Insights** from renowned course facilitators and student success coaches
- Generalized **knowledge** of AI, its potential and limitations
- Topic-related **activities and assignments** reinforce understanding of concepts
- **Information** connected to existing knowledge and real-world tasks
- Personalized **feedback, support, and network development**

problems and proposing solutions that are culturally informed, ethical, and community-oriented.

By the end of this course, students will have developed the ability to deploy AI and ML solutions considerately and effectively, respecting the diversity and cultural richness of the communities they serve, and be well-equipped to drive innovations in their respective professional fields using AI.

WHO IS THE COURSE FOR?

Beginners: Those who are new to artificial intelligence and machine learning (AI/ML) who want to gain a technical understanding of fundamental concepts. Prior computer science experience is not required to learn about and engage with this technology. Using culturally relevant examples and real world applications, participants will discover how AI/ML can be adapted to their interests.

Practitioners: Those with some familiarity with AI/ML will extend their understanding and develop additional skills to develop culturally relevant, solution-oriented approaches to the technology. AI/ML's adaptability will be explored and applied to diverse scenarios based on participants' unique interests using industry standard tools and techniques.

Future Developers: Those who arrive with more in-depth knowledge, or obtain it through previous modules, will expand their knowledge, increase their programming skills, and create culturally relevant, practical applications based on their individual interests. Learn skills that will help to create the foundation for your career aspirations through the development and training of AI/ML models and associated applications in which they would be deployed.

WHAT WILL YOU LEARN?

In this course, students will learn about AI/ML systems in dynamic and relevant ways. AI/ML technology presents opportunities for students to examine:

- What it is and what it isn't
- How its used
- How its created
- How it impacts everyday life
- How it impacts our communities
- The importance of cultural relevance in technology development/deployment
- How to personalize it to your own interests
- Reflect on one's experience through reactions, feedback, and comments

OBJECTIVES

Foundational Knowledge: Students will acquire a foundational understanding of Machine Learning (ML) and its integral relationship to Artificial Intelligence (AI), grasping the core concepts, terminologies, and principles that govern these fields.

Application & Integration: Students will comprehend the intricate pipeline and the principal components of AI and will apply this knowledge by utilizing AI/ML tools to integrate technology solutions in practice, demonstrating the ability to correlate different AI/ML components and their practical applications.

Human Dimension & Learning How to Learn: Students will reflect on the extensive impact of AI/ML on themselves and society at large, gaining insights into the personal and interpersonal implications of AI/ML and developing strategies for continuous learning and adaptation in the ever-evolving field of AI.

Caring: Students will develop an appreciation for and value the transformative potential of AI and ML in enhancing communities. They will cultivate a sense of responsibility and commitment to leveraging AI/ML for the betterment of society, emphasizing ethical considerations and cultural sensitivity.

Integration & Application: Students will synthesize their knowledge of AI/ML to design and implement community-enhancing solutions, demonstrating their ability to connect theoretical knowledge with real-world applications and showcasing their proficiency in using AI/ML tools effectively and ethically.

OVERVIEW

PLEASE NOTE: This course requires a minimum of 2 - 4 hours per week of engagement with course learning activities, resulting in a maximum of 32 hours to successfully earn your course badge. **It is recommended not to take this course with any other Propel course.**

MODULE 1: Foundations of AI/ML: An Overview

In this module, we will demystify the concepts of Artificial Intelligence (AI) and Machine Learning (ML), which are the foundational cornerstones for understanding and utilizing intelligent technologies. The terms AI and ML are often used interchangeably, yet they hold distinct meanings and scopes. Participants will uncover these distinctions, delving into what experts in the field define as AI and how ML, a subset of AI, complements and enriches it.

Participants will explore diverse forms of human intelligence and investigate how AI endeavors to simulate these intelligences, offering insights into the mechanisms by which machines mimic cognitive functions such as learning, reasoning, and problem-solving. The module will traverse the fascinating history and evolution of AI, elucidating the developmental phases and breakthroughs that have led to the contemporary landscape of intelligent technologies. Special emphasis will be given to the role of ML, exploring how it empowers AI systems to learn from data and improve their performance, thus playing a pivotal role in the realization of intelligent systems.

This foundational exploration will provide participants with a solid understanding of AI and ML principles, preparing them for subsequent modules focused on practical applications, ethical considerations, and community enhancements through these transformative technologies. Whether one is new to the realm of AI or looking to solidify their understanding, this module serves as a gateway to grasping the intricate tapestry of AI and ML and their implications in the real world.

MODULE 2: Data Acquisition & Cleansing: Preparing for AI/ML

In the era of information, the exponential proliferation of data has been a driving force behind the remarkable advancements in AI/ML, unlocking unprecedented opportunities across various industries. However, the processes involved in data collection and preparation are not merely technical tasks; they are pivotal elements that determine the efficacy and ethical soundness of AI/ML solutions and impact the interactions and experiences of individuals with these technologies.

This module aims to enlighten participants on the intricacies of data acquisition and cleansing, crucial preparatory steps for developing responsible and effective AI/ML models. Participants will delve into the myriad sources of data, specifically in the key application domains of healthcare, education, criminal justice, and transportation. They will gain insights into methodologies employed to collect and refine data, ensuring its compatibility with AI/ML applications. They will scrutinize the principles and practices of ethical data collection, addressing concerns related to privacy, consent, and bias, and reflect on the implications of data processes on the reliability and fairness of AI/ML solutions.

This module will not only provide participants with the technical acumen needed to navigate the initial stages of AI/ML development but also instill a deep understanding and appreciation for the ethical dimensions of data processes, enabling them to contribute to the creation of AI/ML solutions that are both innovative and conscientious.

MODULE 3: Data Preprocessing: Setting the Stage for AI/ML

The journey of transforming raw data into a coherent form compatible with AI/ML models is intricate and crucial. Unrefined data often falls short of meeting the stringent prerequisites needed for effective AI/ML applications. This module is designed to provide participants with the essential knowledge and skills to maneuver through the complexities of data preprocessing effectively.

Participants will delve into the nuances of handling and rectifying prevalent data issues such as missing values, data misalignments, and inherent biases. The understanding and resolution of these issues are pivotal in fabricating AI/ML models that are of superior quality and reliability.

This module will offer hands-on experiences and insights on ethical and responsible data manipulation, enabling participants to address and mitigate biases and discrepancies in the data, thereby aligning the development process with principles of fairness and equality.

Participants will learn to sculpt and refine raw data meticulously, preparing it for AI/ML implementation. The acquired skills and knowledge will empower participants to set the stage effectively for the development of AI/ML models that are innovative, accurate, and ethically sound, thereby contributing to responsible advancements in the field of AI/ML.

**MODULE 4: AI/ML in Practice PT 1:
 Training and Evaluating Models**

In the realm of AI/ML, models undergo extensive training, a critical phase enabling them to become solutions to real-world challenges. A myriad of tools are available publicly, facilitating the crafting, training, and evaluation of these models. This module ventures deep into the practical aspects of AI/ML, introducing participants to a selection of these tools and guiding them in the creation of their own models tailored to address pressing issues in sectors like healthcare, education, and transportation.

Participants will garner hands-on experience in deploying various tools to train and assess the effectiveness and reliability of AI/ML models. The exploration will not be confined merely to the technical aspects; it will also embrace ethical considerations, prompting participants to reflect on the implications of AI/ML solutions on society and individuals.

Through in-depth learning and practical engagements in this module, participants will:

- Develop a comprehensive understanding of the model training and evaluation process.
- Acquire the proficiency to utilize advanced tools to train and evaluate AI/ML models effectively.
- Apply knowledge in real-world contexts, focusing on creating responsible and innovative solutions in vital sectors such as healthcare, education, criminal justice, and transportation.

**MODULE 5: AI/ML in Practice PT 2:
 Deployment to Production**

The journey of AI/ML models extends beyond creation and training; transitioning models into real-world applications is pivotal. Deployment to production is a substantial phase in the AI/ML pipeline, allowing models to manifest their potential in solving real-world challenges. This often demands robust computational and storage resources, ensuring models' scalability, especially when deployed in environments accessible to the wider public.

In this module, participants will explore the multifaceted process of deploying AI/ML models to production. They will delve into the significance of having a model in production, learning how it transforms theory into practical, impactful solutions. The module will introduce various publicly available tools and cloud services, guiding participants on leveraging these resources for effective deployment.

Participants will learn to:

- Navigate the complexities of transitioning models from development to production, focusing on scalability and resource optimization.
- Utilize advanced tools and cloud services to deploy AI/ML models effectively and efficiently.
- Consider the ethical and societal implications of deploying AI/ML models, ensuring responsible and equitable implementations.

This module is designed to empower participants with the technical acumen and ethical awareness to deploy AI/ML models responsibly, focusing on creating scalable, equitable, and socially impactful solutions. By the end of this module, participants will be well-equipped to bring AI/ML models to life, contributing to advancements in technology that are both innovative and conscientious.

**MODULE 6: AI/ML in Practice PT 3:
 Monitoring and Refining through Data Evaluation**

The deployment of AI/ML models in production heralds the beginning of a crucial phase of continuous oversight and enhancement. Monitoring is imperative to ensure that models function as designed and to swiftly identify and rectify any unintended behaviors or biases that may arise in real-world applications, preventing undesirable repercussions.

In this module, participants will explore the dynamic landscape of model monitoring and refinement in live environments. They will acquire insights into diverse methods and tools leveraged by the industry to keep a vigilant eye on and enhance the performance of AI/ML models post-deployment.

Participants will be guided to:

- Develop a comprehensive understanding of the importance of continuous monitoring and refinement of deployed models to maintain their integrity and reliability.
- Deploy advanced methods and tools to monitor the performance and outcomes of AI/ML models efficiently in real-world scenarios.
- Identify and rectify unintended behaviors and biases in models, ensuring responsible and equitable AI/ML applications.
- Reflect on the ethical and societal implications of model performance and refinement, promoting the development of socially responsible AI/ML solutions.

This module aims to equip participants with the knowledge and skills to sustain and improve the performance and reliability of AI/ML models in production, fostering a commitment to ethical, fair, and socially beneficial AI/ML practices.

MODULE 7: Cultivating Ethical and Community-Centric AI/ML

In an era where society is intertwined with Artificial Intelligence, the pervasive impact of AI/ML technologies accentuates the need for equitable and conscientious developments. The reliance on AI holds substantial potential to either ameliorate or exacerbate disparities, especially within marginalized communities. This module underscores the ethical cornerstone of AI development, emphasizing the developers' imperative role in creating responsible and equitable AI systems.

In this module, participants will delve into the principles and applications of socially responsible AI algorithms designed to counteract biases and indifference inherent in AI systems. The learning journey will involve profound discussions and reflections on how to harness these algorithms not just as technological tools but as instruments of societal well-being, contributing to protection, information dissemination, and risk prevention/mitigation.

Participants will be empowered to:

- Develop a deep understanding of the ethical dimensions and responsibilities in AI/ML development.
- Explore and implement socially responsible AI algorithms, aligning technology with values of fairness and equity.
- Engage in thoughtful discussions to ideate on leveraging AI/ML for societal benefits and community empowerment.
- Formulate strategies to incorporate ethical considerations and community-centric values in AI/ML development and deployment.

The module aspires to foster a culture of ethical awareness and community-centric approach in AI/ML development, preparing participants to be architects of AI technologies that are in harmony with societal values and needs, promoting equity, trust, and overall well-being.

REQUIREMENTS: WEB-ENABLED COMPUTER,
CURRENT INTERNET BROWSER

FACULTY



DR. KOFI NYARKO, Morgan State University, Center for Equitable AI & Machine Learning Systems:

Dr. Nyarko is the director of Morgan State University's Center for Equitable AI & Machine Learning Systems. He is also the director of Morgan's Data Engineering and Predictive Analytics research lab.



GABRIELLA WATERS, Morgan State University, Center for Equitable AI & Machine Learning Systems:

Gabriella is a AI/ML and cognitive science researcher at Morgan State University's Center for Equitable AI & Machine Learning Systems (CEAMLS). She is also a member of the Center's leadership team working to fulfill CEAMLS's mission.