

STAR Summer Camp: Artificial Intelligence and Machine Learning

Machine Learning-Based Auto Feedback System for Cybersecurity Tool

Professor: Dr. Husnu Narman, Computer Science

Aim: Create an Auto Feedback System to improve STEM education using Machine Learning algorithms.

Grade: 9 – 12 (Enthusiasm to learn)

Faculty Profile:

Dr. Husnu Narman will lead the research project: "**Machine Learning-Based Auto Feedback System for Cybersecurity Tool.**"



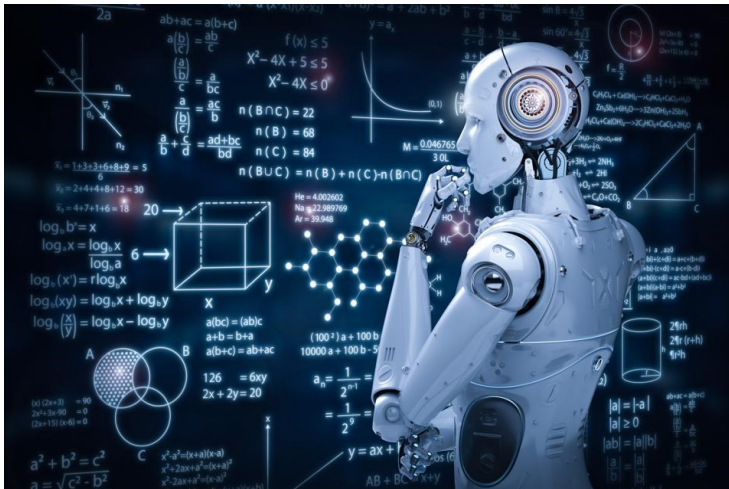
Dr. Husnu S. Narman is an Assistant Professor of the Department of Computer Sciences and Electrical Engineering at Marshall University. Prior to joining Marshall University, Dr. Narman was a post-doctorate fellow at Clemson University. His research interest focuses on Distributed computing, including cloud and edge computing, the Internet of things, Cyber-physical systems, Machine learning applications, Social networks, and Content delivery networks. He has over 45 peer-reviewed publications and more than seven years of teaching experience in K-12 and higher education. He has extensive experience with teaching computer science-themed summer camps in the past. He organized Computer Science Adventure Zone K-12 and Teacher Summer Camp to

increase Computer Science and Cybersecurity awareness in WV in the last several years. He is the recipient of the 2020-2021 College of Engineering and Computer Sciences Weisberg Academy of Distinguished Teachers Award and the 2020-2021 Marshall University Distinguished Artists and Scholars Junior Category Award. Please visit <https://www.marshall.edu/cecs/profile/dr-husnu-narman/> for more information.

Project Description:

Feedback is an essential part of education to help students understand and learn from their mistakes at any age. However, while students learn new content, there is no live person to provide feedback,

especially in a virtual environment. Therefore, there are many software for automated code reviews to provide feedback to programming language learners in terms of code issues, design issues, metrics, duplication, stability, robustness, security, and maintainability. Although there is no extensive coding in the cybersecurity tools, using commands in security tools is common and more convenient. However, there are no available auto command review tools for security tools except each tool itself and



operating system suggestions. There is also no feedback tool that constructively provides feedback according to learners' experiences in security subjects while learners practice with commands. Providing auto constructive feedback according to learners' levels with the commands of cybersecurity tools will be novel and an essential part of our virtual environment.

In this 4-week summer research camp, students will have an opportunity to learn about computer programming and various tools in machine learning to create a feedback mechanism that builds upon three factors; collecting users' commands in a log file, evaluating each user according to their success for each tool, and identifying similarities of previous commands for auto feedback.

Week 1:	Objectives: <ul style="list-style-type: none">- Learn Basic Python Programming and implement a simple program with UI- Learn Python Libraries and their usages
Week 2:	Objectives: <ul style="list-style-type: none">- Learn Machine Learning Models- Learn Python Libraries for Machine Learning
Week 3:	Objective: <ul style="list-style-type: none">- Learn Nmap command- Integrate nmap to the existing Feedback Model
Week 4:	Objective: <ul style="list-style-type: none">- Do Testing and debug for the implementation