CREDIT Summer Camp 2021

Organized by the Center of Excellence in Research and Education for Big Military Data Intelligence (CREDIT Center), Prairie View A&M University (PVAMU)
http://credit.pvamu.edu/

Sponsored by the United States Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) and Roy G. Perry College of Engineering at PVAMU

The CREDIT summer engineering camp 2021 invites the incoming high school juniors and seniors to participate in this two-day online event via Zoom. The objective of the CREDIT summer engineering camp is to generate interest in high school students to pursue STEM careers, as well as to provide exposure to students about the exciting field of science and engineering such as the emerging technologies in artificial intelligence. Students will learn basic engineering principles and gain first-hand experience in research of their interest that is conducted under the guidance of faculty and teaching assistants from the college of engineering of Prairie View A&M University. Using online lectures and hands-on experiments, the students will be provided exposure necessary to help them learn about engineering, and develop the skills that will be useful to them in high school and in college.

The CREDIT Summer Engineering Camp Requires the Following

- Completed Application Form with all REQUIRED documents
- Official High School Transcript. (Due to COVID-19, an unofficial transcript will be accepted).

Program Dates: July 14-15, 2021
Ages: to be 11th & 12th Graders in Fall 2021
Cost: Free
Application Deadline: July 8th, 2021
Program Director: Dr. John Fuller
Program Coordinator: Ms. Carolyn Wedeking

For More Information: Please contact Ms. Carolyn Wedeking, cmwedeking@pvamu.edu or (936) 261-9788.

CREDIT Summer Camp

July 14-15, 2021 (online via Zoom)

Prairie View A&M University

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Agenda

<u>July 14, 2021 (Wednesday) (All times are Central Daylight Time (CDT))</u>
(Zoom link: will be provided after approval of application)

9:00– 9:10 AM	Opening of the CREDIT Summer Camp 2021 Dr. Lijun Qian, Professor in the Department of Electrical and Computer Engineering and Director of the CREDIT Center at Prairie View A&M University Dr. John Fuller, Professor in the Department of Electrical and Computer Engineering and Associate Director of the CREDIT Center at Prairie View A&M University
9:10 – 9:20 AM	Greetings from the Roy G. Perry College of Engineering at PVAMU Dr. Pamela Obiomon, Professor and Dean of Roy G. Perry College of Engineering at Prairie View A&M University
9:20 – 10:20 AM	Keynote Speech: "**Applying The Peter Parker Principle to AI**" Dr. Raj Krishnamurthy, Technical Leader - Cognitive/AI Stack Design and Performance at IBM
10:20 – 10:30 AM	Break
10:30 – 11:20 AM	Lecture I: "*What is Engineering and the Engineering Programs at Prairie View A&M University*" Dr. John Fuller, Professor in the Department of Electrical and Computer Engineering and Associate Director of the CREDIT Center
11:20 – 11:30 AM	Break
11:30 – 12:30 PM	Lecture II: "*Fundamental Engineering Principles: Examples in Logic Circuits*" Dr. John Fuller, Professor in the Department of Electrical and Computer Engineering and Associate Director of the CREDIT Center

12:30 – 1:30 PM	Lunch Break
1:30 – 2:30 PM	Lecture III: "*Introduction to Python and Machine Learning*" Dr. Xishuang Dong, Assistant Professor in the Department of Electrical and Computer Engineering at Prairie View A&M University
2:30 – 2:40 PM	Break
2:40 – 4:00 PM	Hands-on Experiments "*Introduction to Raspberry Pi* and *Object Detection on Edge Device via Deep Learning*" Dr. Xishuang Dong, Assistant Professor in the Department of Electrical and Computer Engineering at Prairie View A&M University
4:00 – 5:00 PM	Students hands-on experiment practice and Q&A session

July 15, 2021 (Thursday) (All times are Central Daylight Time (CDT))
(Zoom link: will be provided after approval of application)

9:00 – 10:30 AM	Lecture IV: "*NeuroMaker BCI (Brain Computer Interface) and NeuroMaker Hand Control*" Dr. Yonghui Wang, Assistant Professor in the Department of Computer Science at Prairie View A&M University
10:30 – 10:40 AM	Break
10:40 – 11:30 AM	Lecture V: "*Introduction to Robotics and Competition Resources*" Dr. Suxia Cui, Associate Professor in the Department of Electrical and Computer Engineering at Prairie View A&M University
11:30 – 11:40 AM	Break
11:40 – 12:30 PM	Preparation for Students Presentations/Showcase
12:30 – 1:30 PM	Lunch Break
1:30 – 4:30 PM	Students Presentations/Showcase The high school Student Teams
4:30 – 5:00 PM	Concluding Remarks and Feedback from Participants
5:00 PM	Adjourn

Keynote Speech: "**Applying The Peter Parker Principle to AI**"

Dr. Raj Krishnamurthy,
Technical Leader - Cognitive/AI Stack Design and Performance at IBM

Abstract:
The maxim from "Spiderman" – "With Great Power Comes Great Responsibility" is sometimes called the Peter Parker principle. As AIs begin to exceed human abilities for various skills like vision, speech recognition, question answering and reasoning, they are being explored and applied to all realms of society. While significant industry focus for AI has been in the development of systems, accelerators and SW frameworks for training and inferencing, challenges remain in operationalizing AI across the Business. Skills, lack of labeled data, lack of trust in models and decisions, robustness, transparency are often cited as challenges to widespread adoption of AI. AI solutions must preserve existing trust and reliability in mission-critical systems and cannot become the "weakest link". The potential for positive impact of AI on society is extremely high ("Great Power") but with this also "comes great responsibility" -- the need for diligence in applying the results from AI to societal problems in a trustworthy, transparent and robust manner.

Short Bio:
Raj Krishnamurthy is the AI Program Director and AI Technical Lead for IBM POWER systems. He is an IBM Master Inventor and a elected Member of the IBM Academy of Technology. He has been a Technical Staff in the Systems division at IBM since 2006. His work has impacted several platforms, software products, and roadmaps at IBM. Raj holds 180+ issued patents and has written a number of external peer-reviewed publications. He has received an IBM Cognitive Systems GM Transformational Leadership award, best paper awards, Best of IBM award, Outstanding Technical Achievement Awards and an IBM Corporate Award. Raj holds a PhD in Computer Science and an MS/BS degree in Electrical Engineering. Raj evangelizes the benefits of Enterprise AI at various conferences, meetups and on twitter using the hash-tag #AIMeansBusiness and #BornOnPower.

Sample Hands-on Experiments
"*Introduction to Raspberry Pi* and *Object Detection on Edge Device via Deep Learning*"

Internet of Things (IoT) refers to the billions of edge devices around the world connected to the internet for collecting and analyzing data. Data analytics on these edge devices is able to protect user privacy and reduce communication costs for various applications. Specifically, computer vision is a core technique to build these applications on these devices, where object detection as shown in Figure 1 is an imperative task that is to recognize the category of the object and label its location.

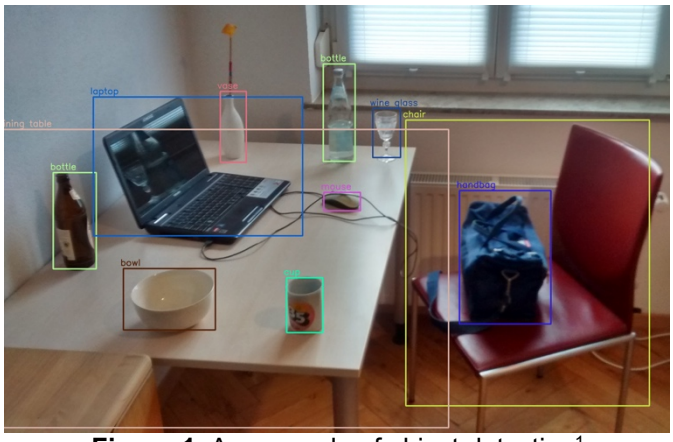

Figure 1. An example of object detection[1]

The goal of this hands-on project will introduce the comprehensive process on implementing object detection on Raspberry Pi 3 via deep learning models. This hands-on project will leverage the edge device including Raspberry Pi 3 Model B+ (Plus) Complete Starter Kit and camera, which is shown in Figure 2. **These devices will be provided to campers free of charge.**

Figure 2. Raspberry Pi 3 and camera

[1] https://en.wikipedia.org/wiki/Object_detection