Research Statement

Atanu Shvuam Roy (atanuroy911@gmail.com)

My primary research interests are in the fields of Internet of Things, Computer Networking, Embedded Systems and its derivatives. My research focuses on the system design of individual projects that solves unique problems in a sector.

My research balances both theory and system, with an emphasis on developing elegant, scalable, real applications. I believe the key to success is through constant communication and collaboration with peers and superiors. As an undergraduate student, I have had the opportunity of working with students and teachers from diverse fields such as electrical engineering, software engineering, data science, embedded system design, mobile app development, robotics, image processing etc. Apart from the synergy created from the combination of these different perspectives, these collaborations have given me a broader viewpoint of the applicability of my work, and also shed light on new directions of research.

Thesis Research

My undergraduate thesis in the School of Information Engineering at Jiangxi University of Science and Technology has been focused on the further development of the project that won a competition. This was the first competition that won me and my teammates (Hong and Zhang) 2nd prize in Central China in 2020 which was a portable robust system that could effectively take in student attendance with the help of a mobile application. The project was using a Raspberry Pi to automatically attain attendance of students automatically with the use of Smartphone and QR Code technology. The Web Server was built with SpringBoot Framework and Hibernate, and the Application for mobile was built as an Android APP and a WeChat Mini Program.

Other Research

Outside my thesis, I have diverse research experiences that spanned many different fields.

Monitoring Systems My first job at my university lab was simply integrating a camera to a system that can be accessed on the internet from any device. From that it was sensors that I started to tinker with. Then slowly, from that I started to work on a SCADA (Supervisory Control and Data Acquisition) system based on the raspberry pi computer to showcase small portable monitoring systems that can be used in startup agricultural plants where high maintenance monitoring systems are a drag to install or equip. [1]

Automated Guided Vehicle The next work that I did was about AGV or Automated Guide Vehicles and that was when I learned about PID. The work was about reviewing different PID tuning techniques for industrial AGVs [2] and it was my first step in the field of robotics. In that paper, various PID Tuning controller such as Fuzzy Controller, i-PID Controller, Two Wheel Differential Controller, etc. and discusses and compares the difference between them.

Future Work

I am extremely thrilled by the potential of my research area. I plan to extend the scope of incremental pattern discovery framework in various directions.

In the near term, I plan to work on UAVs and other sensor systems to create some software application packages that may help enhance lifestyle. Currently I am working on an UAV system that helps prevent emergency situations by issuing warnings.

From the application perspective I plan to work on low-cost systems that serves as (1) Bio-surveillance Systems and (2) Industrial Monitoring systems. Further works will include AI or artificial intelligence to work and server as (3) Situation based Prediction Systems.

References

[1] A. J. Moshayedi, A. S. Roy, L. Liao and S. Li, "Raspberry Pi SCADA Zonal based System for Agricultural Plant Monitoring," 2019 6th International Conference on Information Science and Control Engineering (ICISCE), 2019, pp. 427-433, doi: 10.1109/ICISCE48695.2019.00092.

[2] Moshayedi, Ata Jahangir, Atanu Shuvam Roy, and Liefa Liao. "PID Tuning Method on AGV (automated guided vehicle) Industrial Robot." Journal of Simulation and Analysis of Novel Technologies in Mechanical Engineering 12.4 (2019): 53-66.