Shantanu Sen Gupta

Songpa-gu, Seoul, South Korea
+82-10-9195-3257 shantanukuet2k12@gmail.com shantanusen.github.io
shantanu-sen-gupta ShantanuSen Shantanu Sen Gupta

Research Interest

Embedded system, Computer Architecture, Processing In Memory, Machine learning on Edge

Education

Kookmin University **Mar. 2019 – Feb. 2021**
Master of Science in Electronics Engineering *Seoul, South Korea*
CGPA: 4.44/4.50

Khulna University of Engineering & Technology (KUET) **Mar. 2013 – Sep. 2017**
Bachelor of Science in Electrical & Electronic Engineering *Khulna, Bangladesh*
CGPA: 3.01/4.00

Relevant Coursework

- Analog electronics
- Digital electronics and logic design
- Control system engineering
- VLSI design and technology
- Electrical & electronics circuit simulation
- Microprocessors, microcontrollers, and peripherals
- Digital signal processing
- Data structure and algorithms
- Enery intelligence system
- Advanced topics in mobile communication

Experience

Korea I.T.S. Co. Ltd. **Mar. 2021 – Present**
Research Manager *Seoul, South Korea*

- Developed F/W and algorithm for ESP-32 based wearable wristband watch (IFWatch)
  1. Involved in developing F/W for analog front end (AFE) of Analog Device and Maxim Integrated for PPG measurement
  2. Developed graphical user interface (GUI) application for heart rate (HR), respiratory rate (RR), blood oxygenation (SpO2), glycated hemoglobin (hbA1c) calculation with LVGL
  3. Developed F/W algorithm for HR, RR, SpO2, and HbA1c calculation
- Developed PC software using C# language for PPG data collection through WIFI
  1. Developed the F/W in IFWatch for sending PPG data to server through UDP protocol
  2. Developed PC software for receiving PPG data from client, plotting, and saving in CSV format
  3. Implemented cpp dynamic link library (.dll) in order to calculate HR, RR, SpO2, and HbA1c
  4. Implemented real time peak and valley detection of PPG signal
- Future version of wrist watch (IFWatch) based on ARM cortex M4 processor
  1. Ambiq Apollo 4 Blue Plus MCU
     (a) Assisted in developing PSRAM, external flash, MIPI DSI display driver for custom made board
  2. STM-32 MCU
     (a) Developed demo GUI application using TouchGFX
- Analyzed collected PPG signal using Python

Kookmin University **Mar. 2019 – Feb. 2021**
Graduate Research Assistant *Seoul, South Korea*

- Innovative research idea generation, implementation, and publication on several funded projects
  1. High dynamic range imaging (HDR) from low dynamic range image (LDR) and low light image
  2. Oxide film detection based on OpenCV
  3. Blood glucose measurement from PPG signal
  4. Environmental sound classification using deep learning
- Collaboration with research team to accomplish the project goal

BSRM Steel Mills Ltd. **May. 2018 – Feb. 2019**
Team Member Electrical *Chittagong, Bangladesh*

- Electrical maintenance of induction furnaces (IF), vibro chargers (VC), transfer trolleys (TT)
- Troubleshooting automated control system (software and hardware)

M.I. Cement Factory Ltd. (Crown Cement) **Jan. 2018 – Apr. 2018**
Assistant Engineer *Dhaka, Bangladesh*

- Electrical maintenance of vertical roller mil (VRM), induced draft fan (IDF), coal mill, and classifier fan
- Troubleshooting automated control system (software and hardware)

Publications

Journals

1. **S. Sen Gupta**, S. Hossain, and K.-D. Kim, "Recognize the surrounding: Development and evaluation of convolutional deep networks using gammatone spectrograms and raw audio signals," Expert Systems with Applications, vol. 200, p. 116998, Aug. 2022, doi: 10.1016/j.eswa.2022.116998.

2. **S. Sen Gupta**, T.-H. Kwon, S. Hossain, and K.-D. Kim, "Towards non-invasive blood glucose measurement using machine learning: An all-purpose PPG system design," Biomedical Signal Processing and Control, vol. 68, p. 102706, Jul. 2021.

3. S. Hossain, **S. Sen Gupta**, T.-H. Kwon, and K.-D. Kim, "Derivation and validation of gray-box models to estimate noninvasive in-vivo percentage glycated hemoglobin using digital volume pulse waveform," Scientific Reports, vol. 11, no. 1, p. 12169, Jun. 2021.

4. **S. Sen Gupta**, S. Hossain, and K.-D. Kim, "HDR-Like Image from Pseudo-Exposure Image Fusion: A Genetic Algorithm Approach," IEEE Transactions on Consumer Electronics, vol. 67, no. 2, pp. 119–128, May 2021.

5. R. Saha, P. Pratim Banik, **S. Sen Gupta**, and K.-D. Kim, "Combining highlight removal and low-light image enhancement technique for HDR-like image generation," IET Image Processing, vol. 14, no. 9, pp. 1851–1861, 2020.

Conference Proceedings

1. **S. Sen Gupta**, S. Hossain, C. A. Haque, and K.-D. Kim, "In-Vivo Estimation of Glucose Level Using PPG Signal," in 2020 International Conference on Information and Communication Technology Convergence (ICTC), Oct. 2020, pp. 733–736.

2. **S. Sen Gupta**, T.-H. Kwon, and K.-D. Kim, "Color Based Image Processing Techniques to Detect Oxide Film during Welding," in 2020 International Conference on Electronics, Information, and Communication (ICEIC), Jan. 2020, pp. 1–4.

3. **S. Sen Gupta**, P. P. Banik, and K.-D. Kim, "Study on the Log-encoding System for a Camera Image Sensor," in 2019 International Conference on Information and Communication Technology Convergence (ICTC), Oct. 2019, pp. 1047–1049.

4. Md. K. Hasan, S. M. Hasnat Ullah, **S. Sen Gupta**, and M. Ahmad, "Drowsiness detection for the perfection of brain computer interface using Viola-jones algorithm," in 2016 3rd International Conference on Electrical Engineering and Information Communication Technology (ICEEICT), Sep. 2016, pp. 1–5.

Patent

- Ki Doo Kim and **Shantanu Sen Gupta**, "Deep Learning-Based Environmental Sound Classification Method and Device," KR20220133552A, Oct. 05, 2022. [Online]. Available: Google Patent

Dissertations

Masters

- Deep Learning Based Environmental Sound Classification [Link]

Bachelor

- Implementation of Compressed Sampling in Voice Signal and Image [Link]

Projects

PID Controlled Line Follower Robot | *Arduino, C++* **2016**

- Developed an automatic bot using Python and Google Cloud Console to register myself for a timeslot at my school gym.
- Implemented Selenium to create an instance of Chrome in order to interact with the correct elements of the web page.
- Created a Linux virtual machine to run on Google Cloud so that the program is able to run everyday from the cloud.
- Used Cron to schedule the program to execute automatically at 11 AM every morning so a reservation is made for me.

Electrical Wiring | *Electrical Drawing*2015

- Developed an automatic bot using Python and Google Cloud Console to register myself for a timeslot at my school gym.
- Implemented Selenium to create an instance of Chrome in order to interact with the correct elements of the web page.
- Created a Linux virtual machine to run on Google Cloud so that the program is able to run everyday from the cloud.
- Used Cron to schedule the program to execute automatically at 11 AM every morning so a reservation is made for me.

Driver's drowsiness detection system using image processing | *Arduino, C++, MatLab* **2015**

- Created an Android application using Java and Android Studio to calculate ticket prices for trips to museums in NYC.
- Processed user inputted information in the back-end of the app to return a subtotal price based on the tickets selected.
- Utilized the layout editor to create a UI for the application in order to allow different scenes to interact with each other.

Technical Skills

Languages: C, C++, Python, MATLAB, C#
Hardware: Arduino, ESP-32, STM32
Design Tools: KiCad
Developer Tools: Visual studio, Visual studio Code, Eclipse
Technologies/Frameworks: Linux, GitHub, QT, LVGL, Touchgfx .NET

Affiliation

- IEEE graduate student member (M'14, M'19)
- Cisco Certified Network Associate (CCNA) training (2016 2017)

References

Dr. Ki Doo Kim
Professor
Kookmin University, Seoul, Korea
kdk@kookmin.ac.kr

Dr. Naruttam Kumar Roy
Professor
Khulna University of Engineering & Technology,
Khulna, Bangladesh
nkroy@eee.kuet.ac.bd