Ramesh Kumar Sah

Contact Information

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Research Interests

Robust Machine Learning and Pervasive Computing

- Wearable computing, sensor systems, and mobile health
- Machine learning, adversarial examples, transfer learning, differential privacy, and secure ML
- Signal processing and machine learning for inertial and physiological sensors
- Time-series data analysis and embedded firmware and hardware design

Academic Preparation

PhD Student
Sep 2018-Present

Washington State University, *Pullman, WA*
School of Electrical Engineering & Computer Science
Major: **Computer Science** | Advisor: Dr. Hassan Ghasemzadeh

Bachelor of Engineering
2016

Kathmandu University, *Dhulikhel, Nepal*
Department of Electrical and Electronics Engineering
Major: **Electronics Engineering** | Advisor: Om Nath Acharya
Thesis: '*Comparative Analysis of Routing Protocols for Wireless Body Area Networks*'
Erasmus Intact student exchange to Fredrick University, *Nicosia, Cyprus*

Skills

- Programming Languages: Python, C++, C
- Deep Learning Framework: Keras, PyTorch, TensorFlow
- Machine Learning Libraries: scikit-learn, cleverhans
- Database: mysql
- Others: HTML, CSS, JavaScript, PHP

Academic Appointments

Graduate Research & Teaching Assistant
Sep 2018-Present

Washington State University, *Pullman, WA*
School of Electrical Engineering & Computer Science

Undergraduate Research Assistant
2012-2016

Kathmandu University, *Dhulikhel, Nepal*
Department of Electrical and Electronics Engineering
Kathmandu University Robotics Lab

Work Experience

Senior Firmware Design Engineer
Dec 2016-May 2018

Real Time Solutions Pvt. Ltd, *Lalitpur, Nepal*
Responsible for research and development of firmware and hardware design of embedded sensor systems.
Worked on various projects ranging from smart homes, Internet-of-things (IoT), queue management systems (QMS), and communication systems for remote sensing modules.

Firmware Designer
Internship, Aug 2016 - Dec 2019

Real Time Solutions Pvt. Ltd, *Lalitpur, Nepal*
Research work on the design and development of an earthquake detection system using MEMS sensors.
Promising preliminary results were obtained by using machine learning algorithms in conjunction with signal processing methods.

Honors and Awards

- Recipient of Graduate and Professional Student Association (GPSA) student travel grant, (2019)
- Awarded full-time RA/TA scholarship from *Washington State University*, (2018)
- Recipient of ERASMUS Mundus *INTACT* student exchange scholarship, (2015)
- Merit Prize for academic excellence for seven consecutive semesters at *Kathmandu University*, Nepal
- Winner of the 2012 Society of Electrical and Electronics Engineers (SEEE) Circuit Competition.

Publications

- Ramesh Kumar Sah, and Hassan Ghasemzadeh, Adar: Adversarial Activity Recognition in Wearables, The 38th IEEE/ACM International Conference On Computer Aided Design (ICCAD), November 4-7, 2019, Westminister, CO.

Projects

Feature Visualization of HAR Systems

In this project, I aimed to understand which features contribute the most towards the decision made by convolutional neural network (CNN) classifier trained for human activity recognition (HAR). To this end I used the class-activation map which is superimposed on the input segments to the CNN model to show the importance of each component of the input.
Website Link | Project Repository

HAR using RNN

In this project, I compared the performance of recurrent neural network (RNN) and convolutional neural network (CNN) on the problem of human activity recognition (HAR) with two regularization techniques: 1) Dropout, and 2) Batch Normalization. I found that the RNN performed better than CNN in most cases but suffers from larger training and inference time.
Project Repository

AntiTheft System

Used an accelerometer sensor to detect theft of physical properties based on movement data from the accelerometer. The project was aimed to detect and inform the theft of solar panels installed at remote weather stations.

Keypad-Teller for Queue Management Systems

Design and development of firmware for the keypad-teller used in the QMS system. This was a complete revamp of the keypad-teller with the shift from wired to wireless communications.

Temperature and Humidity Monitoring System

Wireless temperature and humidity sensor with smartphone notifications using MQTT protocol.

Mentoring Experience

Summer 2019

Alcohol Relapse Prevention Through Electrodermal Activity and Heart Rate Analysis (REU Program)
Students:
Marco Arceo, undergraduate researcher
Esteban Espino, visiting undergraduate student

Teaching Experience

School of EECS WSU

- CPTS 260: Computer Architecture (TA, Fall 2018)
- CPTS 487: Software Design and Architecture (TA, Spring 2018)
- CPTS 437: Introduction to Machine Learning (TA, Spring 2019)
- CPTS 223: Advanced Data Structures (Head of TAs, Fall 2019)

Interests and Hobbies

Technology, Open-Source, Programming
Photography, Soccer