HARSHVARDHAN TAKAWALE

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EDUCATION

Birla Institute of Technology and Science, Pilani *August 2016 - May 2020*
Bachelor of Engineering in Electrical and Electronics
Minor in Data Science

RESEARCH INTERESTS

Mobile computing, Sensing, Signal Processing, Security, Wireless networks, Acoustics, Applied Machine Learning

EXPERIENCE

Silence Laboratories @ SUTD, Singapore *Jul 2020 - Present*
Research Assistant | Founders : **Prof. Tony Q. S. Quek**, Dr. Jay Prakash, Andrei Bytes

- **Project 1: Proximity detection and verification of devices**
  Designed a robust system aimed at verifying co-presence of two or multi-party systems using acoustic information and pair them using shared secret key. Achieved accuracy of >92% across different scenarios when tested in noisy markets of India.
- **Project 2: Landmark extraction from infrastructure for seamless indoor mobility**
  Developed a human activity detection engine using mobile sensors data and WiFi AP to substantiate proof-of-attempt for multiple use-cases.
- **Project 3: Inertial sensor based authentication systems**
  Developed a human activity detection engine using mobile sensors data and WiFi AP to substantiate proof-of-attempt for multiple use-cases.
- **Project 4: Gesture Tracking**
  Developed a real-time system to track human gestures performed using a mobile device and verified them with minimal false-positive rates.

Cyber Security Research Centre @ NTU, Singapore *Jan 2020 - Jul 2020*
Security Research Intern | Supervisor : **Prof. Thambipillai Srikanthan**, Asst. Prof. Lam Siew Kei

- Title: Lightweight Malware Detection for Embedded Systems (Undergraduate Thesis)
- Created an malware detection model using hardware performance counters as features for advanced driver-assistance system (ADAS).
- Measured changes in 6 registers - cycles, instructions, cache-references, cache-misses, branches, branch-misses.
- Achieved an accuracy of 92% with an F1-score of 0.9149. Awarded the highest grade, 10/10, for the thesis.

Electrical Engineering & Computer Sciences @ UC Berkeley *Jun 2019 - Sep 2019*
Remote Researcher | Lab PI : **Prof. Dawn Song** | Project head : Dr. Min Du

- Title: Malware Detection on Highly Imbalanced Data through Sequence Modeling
- Performed dynamic analysis on mobile application activity sequences for the purpose of malware detection on highly imbalanced dataset.
- Used the state-of-the-art language representation model BERT, to create a sequential model and achieved an F1 score of 0.919 with just 0.5% of the examples being malware in the dataset.

School of Computer Science @ University of Windsor, Canada *May 2019 - Aug 2019*
Security Research Intern | Supervisor : **Assoc. Prof. Saeed Samet**

- Title: Integrating Continuous Authentication into the Personal Health Record Applications
- Developed a protocol to authenticate users based on their interaction with the phone using anomaly in inertial sensor data.
- Analysed across 6 different classification models and achieved 95–97% accuracy for each, when tested using tenfold cross validation. .

Indian Meteorological Department, Pune *May 2018 - Jul 2018*
Software Engineer Intern

- Created a low cost data logger and interfaced it with varios sensors present in automated weather station (AWS).
- Created a mobile application and RESTful API for receiving data from the station in real-time.
- Achieved 80% cost optimization and ensured high reliability over extensive periods of testing.

PATENT

- Second Factor Authentication for Mobility: Ways to identify frauds and mischarges.
  Jay Prakash, **Harshvardhan Takawale** and Tony Quek
  Singapore Patent (US Patent pending)

PUBLICATIONS

- Malware Detection on Highly Imbalanced Data through Sequence Modeling (*link*)
  Rajvardhan Oak, Min Du, David Yan, **Harshvardhan Takawale** and Idan Amit
  Proceedings of the 12th ACM Workshop on Artificial Intelligence and Security, Nov. 2019

- Fault-Tolerant Routing Algorithm for Mesh based NoC using Reinforcement Learning (*link*)
  Jagadheesh Samala, **Harshvardhan Takawale**, Yash Chokhani, P Veda Bhanu, J Soumya
  24th International Symposium on VLSI Design and Test (VDAT), July. 2020

- Talos App: On-Device Machine Learning Using TensorFlow to Detect Android Malware (*link*)
  Harshvardhan C Takawale and Abhishek Thakur
  5th International Conference on Internet of Things: Systems, Management & Security, Oct. 2018

RELEVANT COURSEWORK

Data Science & Misc.	Optimization, Applied statistical methods, Neural networks and fuzzy logic, Ethical hacking

TECHNICAL STRENGTHS

Programming Languages	Python, Java, C/C++, Kotlin, JavaScript, Matlab
Tools & Libraries	Tensorflow, Scikit-learn, Pandas, Numpy

ACHIEVEMENTS

- **Mitacs GRI Scholar** - Selected amongst 700 students in a pool of 200,000 applicants for a fully funded research internship in Canada for the Summer of 2019
- **Google certified Associate Android Developer**
- Awarded with **National Talent Search Examination Scholarship** by Indian govt. that is given to 1000 students out of the total 5,000,000+ participants in the entire country.
- National Winner of CBSE Heritage India Quiz by Indian govt., with 8000+ participating teams