Vinayakumar R

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Research Interest
My research interest broadly is in Cybersecurity and specific focus on machine learning for use cases in Cybersecurity.

Education
PhD, Computational Engineering & Networking   Fall 2015-Present
Amrita Vishwa Vidyapeetham, Coimbatore

Masters of Computer Application, Computer Science   June 2011- May 2014
Amrita Vishwa Vidyapeetham, Mysore

Bachelor of Computer Application, Computer Science   June 2008- May 2011
JSS College, Mysore

Research Experience
- June 2015 - Present Research Associate, Supervisor: Prof Soman KP: Data mining, Machine learning, Deep learning, Cyber Security, Natural language processing
- Jun 2014 - Jul 2015 Research Assistant, Supervisor: Prof Soman KP: Block-based programming development for Indian K-12 Schools

Under-Review
- **Vinayakumar R**, Prabaharan Poornachandran, Soman Kp, Prem Sankar Au and Manu R Krishnan, "Deep-URL: A Deep Dive to Catch Malicious URLs using Deep learning with Character Embeddings", DLS 2018.
- **Vinayakumar R**, Prabaharan Poornachandran, Soman Kp, Prem Sankar Au and Manu R Krishnan, "Deep-DGA-Detect: Applying Deep Learning to DGA based Malware Detection at Scale", DLS 2018.
- Harikrishnan Nb, **Vinayakumar R** and Soman Kp, "Deep Learning based Phishing URL Detection", DLS 2018.
- Anu Vazhayil, **Vinayakumar R** and Soman Kp, "Comparative study of the detection of malicious URLs using Shallow and Deep Networks", DLS 2018.
- Vysakh S Mohan, **Vinayakumar R**, Soman Kp and Prabaharan Poornachandran, "S.P.O.O.F Net: Syntactic Patterns for identification of Ominous Online Factors", BioSTAR 2018.
- **Vinayakumar R**, Shaunak Sanjay Ganorkar, Vipin Pavithran, Pradeep Menon, K.K.Senthil Velan and Soman Kp, "Deep-Ransomware-Detect: Detecting Ransomware using Deep Neural Network", BioSTAR 2018.
- **Vinayakumar R**, Barathi Ganesh Hb, Prabaharan Poornachandran, Anand Kumar M and Soman Kp, "Deep-Net: Deep Neural Network for Cyber Security Use Cases", BioSTAR 2018.
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "Digital storytelling using Scratch: Engaging children towards digital storytelling", ICALT 2018.
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "CT-Blocks Analyser: Analysing CT-Blocks projects", ICALT 2018.
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "CT-Blocks: Learning Computational thinking by snapping blocks", ICALT 2018
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "Alg-Design: facilitates to learn Algorithmic thinking for beginners", ICALT 2018.
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "Map-Blocks: Playing with online data: infuse to think in a computational way", ICALT 2018.

- **Vinayakumar R**, Soman Kp and Pradeep Menon, "Enhancing Computational thinking with MIT Scratch: Fractals Geometry", ICALT 2018.
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "Building-Blocks: Generating 3D design by snapping blocks", ICALT 2018.
- **Vinayakumar R**, Soman Kp and Pradeep Menon, "DB-Learn: Studying Relational Algebra concepts by Snapping Blocks", ICALT 2018.
- Harikrishnan NB, **Vinayakumar R** and Soman KP, "Performance comparison of Deep learning and classical Machine learning in Network traffic intrusion detection system", ICCIDS 2018.
- Harikrishnan NB, **Vinayakumar R** and Soman KP, "Shallow and Deep Neural Network Intrusion Detection System", ICCIDS 2018.

Selected Publications

- **Vinayakumar R**, Prabaharan Poornachandran and Soman KP, "Scalable Framework for Cyber Threat Situational Awareness based on Domain Name Systems Data Analysis." Big data in Engineering Applications, Springer. [Book Chapter]
- **Vinayakumar R**, Soman KP, Prabaharan Poornachandran and Sachin Kumar S, "Detecting Android Malware using Long Short-term Memory-LSTM." Journal of Intelligent and Fuzzy Systems - IOS Press. [Journal]
- **Vinayakumar R**, Soman KP, Prabaharan Poornachandran and Sachin Kumar S, "Evaluating Deep Learning Approaches to Characterize and Classify the DGAs at Scale." Journal of Intelligent and Fuzzy Systems - IOS Press. [Journal]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Evaluating Deep learning Approaches to Characterize, Signalize and Classify malicious URLs." Journal of Intelligent and Fuzzy Systems - IOS Press. [Journal]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Detecting Malicious Domain Names using Deep Learning Approaches at Scale." Journal of Intelligent and Fuzzy Systems - IOS Press. [Journal]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Evaluating Shallow and Deep Networks for Secure Shell (SSH)Traffic Analysis." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Evaluating Effectiveness of Shallow and Deep Networks to Intrusion Detection System." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Deep Android Malware Detection and Classification." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Long Short-Term Memory based Operation Log Anomaly Detection." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Deep Encrypted Text Categorization." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Applying Convolutional Neural Network for Network Intrusion Detection." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Secure Shell (SSH) Traffic Analysis with Flow based Features Using Shallow and Deep networks." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP and Prabaharan Poornachandran, "Applying Deep Learning Approaches for Network Traffic Prediction." IEEE Xplore [Conference]
- **Vinayakumar R**, Soman KP, K.K.Senthil Velan and Shaunak Ganorkar, "Evaluating Shallow and Deep Networks for Ransomware Detection and Classification." IEEE Xplore [Conference]
- Rahul K. Pathinarupothi, **Vinaykumar R**, Ekanath Rangan, Gopalakrishnan E., and Soman K. P., "Instantaneous Heart Rate as a Robust Feature for Sleep Apnea Severity Detection using Deep Learning." IEEE Xplore [Conference]
- Rahul K. Pathinarupothi, Dhara Prathap J., Ekanath Rangan, Gopalakrishnan E., **Vinaykumar R**, and Soman K. P., "Single Sensor Techniques for Sleep Apnea Diagnosis using Deep Learning." IEEE Xplore [Conference]
- Sujadevi VG., Soman KP., and **Vinayakumar R** "Real-time Detection of Atrial Fibrillation from Short time single lead ECG traces using Recurrent neural networks.", Intelligent Systems Technologies and Applications (ISTA'17), Springer [Conference]

- Sujadevi VG., Soman KP., **Vinayakumar R** and Prem Sankar AU. "Anomaly detection in Phonocardiogram employing Deep learning.", 4th International Conference on Computational Intelligence in Data Mining (ICCIDM-2017), Springer [Conference]
- Sujadevi VG., Soman KP., **Vinayakumar R** and Prem Sankar AU. "Deep models for Phonocardiography (PCG) classification." IEEE Xplore [Conference]
- Sreelekshmy Selvin., **Vinayakumar R**, Gopalakrishnan E., Vijay Krishna Menon., Soman K.P., "Stock Price Prediction Using LSTM, RNN And CNN-Sliding Window Model.", 6th International Conference on Advances in Computing, Communications and Informatics (ICACCI2017), IEEE Xplore [Conference].
- Shriya Se, **Vinayakumar, R**, Anand Kumar M., and Soman K.P., AMRITA-CEN@SAIL2015: Sentiment analysis in Indian languages., MIKE 2015 Proceedings of the Third International Conference on Mining Intelligence and Knowledge Exploration, Springer [Conference].
- Shriya Se, **Vinayakumar, R**, Anand Kumar M., and Soman K.P., Predicting the Sentimental Reviews in Tamil Movie using Machine Learning Algorithms., Indian Journal of Science and Technology (IJST) [Conference].
- Neethu Mohan, Soman KP, and **Vinayakumar R** "Deep Power: Deep Learning Architectures for Power Quality Disturbances Classification.", TAP Energy 2017. [Conference]
- **Vinayakumar R.**, Sachin Kumar S., Premjith B., Prabaharan P., and Soman K P. "DEFT 2017 - Texts Search @ TALN / RECITAL 2017: Deep Analysis of Opinion and Figurative language on Tweets in French." Opinion analysis and figurative language in tweets in French, Orlans. [working note]
- **Vinayakumar R.**, Sachin Kumar S., Premjith B., Prabaharan P., and Soman K P. "Deep Stance and Gender Detection in Tweets on Catalan Independence@Ibereval 2017." 2nd Workshop on the Evaluation of Human Language Technologies for Iberian languages, at SEPLN 2017 at University of Murcia, Murcia, Spain.[working note]
- **Vinayakumar R.**, Premjith B., Sachin Kumar S., Soman K P. and Prabaharan P. "deepCybErNet at EmoInt-2017: Deep Emotion Intensities in Tweets." 8th Workshop on Computational Approaches to Subjectivity, Sentiment and Social Media Analysis (WASSA-2017), at EMNLP 2017. [working note]
- Barathi Ganesh HB, Abinaya N, Anand Kumar M, **Vinayakumar R** and Soman KP. "Amrita-CEN@NEEL : Identification and Linking of Twitter Entities." #Microposts2015 Making Sense of Microposts: Big things come in small packages. Florence, Italy. [working note]
- Barathi Ganesh HB, **Vinayakumar R**, Anand Kumar M, Soman KP. "Health Care Text Classification through Class Embedding." 2nd Social Media Mining for Health Applications Shared Task at AMIA 2017. [working note]
- **Vinayakumar R**, Barathi Ganesh HB, Anand Kumar M, Soman KP. "Deep Health Care Text Classification." [working note]

Talks
- Demo on LSTM based Android Malware classification in TEQIP II sponsored research workshop on deep learning, PSG Tech, Coimbatore, 7, October 2016.
- Deep learning for Cyber Security In Deep learning Workshop organized by Amrita University, Coimbatore.
- Deep Learning for Cyber Security use cases in AISec 2017 Workshop: Modern Artificial Intelligence (AI) and Natural Language Processing (NLP) Techniques for Cyber Security, Conducted by the Department of Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, 28, October 2017.
- Deep learning for Healthcare and financial data analytics in DeepSci 2017 Workshop: Deep Learning for Healthcare and Financial Data Analytics, Conducted by the Department of Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Saturday, 16, December 2017.
- Deep Learning for Chemistry in DeepChem 2017: Deep Learning & NLP for Computational Chemistry, Biology & Nano-materials, Conducted by the Department of Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, 22-24, December 2017.
- Deep Learning for Cyber Security use cases in Bharathiar University at the University conference hall on 21, November 2017.

- Deep Learning for Bio-medical Applications in TEQUIP sponsored Faculty Development Program (FDP) at TKM College of Engineering, Kollam, 14, December 2017.
- Deep Learning for Bio-medical Applications in ICMR sponsored Faculty Development Program (FDP) at Mepco Schlenk Engineering College, Sivakasi, 17, January 2018.

Course Work
- MA607 - Linear Algebra
- CN613 - Computational optimization theory- linear and non-linear methods
- CY603 - Pattern Recognition and Machine Learning
- CN624 - Scientific Computing
- CN703 - Computational Methods for Cryptography
- CN733 - Neural network & Deep learning
- CY800 - Research Methodology
- Foundation Mathematics
- Computational Thinking

Online Coursework
- Neural Networks and Deep Learning, Coursera, Aug. 2017
- Deep Learning with Tensorflow, Big Data University, Dec. 2016
- Deep Learning Prerequisites: The Numpy Stack in Python
- Big Data, Big Data University, Jul. 2016
- Big Data Foundations, IBM, Jul. 2016
- Functional Programming Principles in Scala, Coursera, Jul. 2016
- Hadoop, Big Data University, Jul. 2016
- Spark Fundamentals, Big Data University, Jul. 2016
- HTML and CSS, Udemy, Jan. 2015

Co-organized events
- October 28, 2017 - AISec 2017: Modern Artificial Intelligence (AI) and Natural Language Processing (NLP) Techniques for Cyber Security
- December 16, 2017 - Blockchain 2017: Blockchain and Machine Learning
- November 11, 2017 - DeepSci 2017: Deep Learning for Healthcare and Financial Data Analytics
- December 22-24, 2017 - DeepChem 2017: Deep Learning & NLP for Computational Chemistry, Biology & Nano-materials
- November 25-27, 2017 - A Refresher experiential course on linear algebra and Optimization for Most Modern Signal processing and pattern classification

Participation in NLP and Cyber Security Shared Tasks
- Named Entity rEcognition and Linking (#Micropost2015 NEEL): Named Entity Recognition and Linking.
- International Cybersecurity Data Mining Competition CDMC 2016.
- VarDial 2017 - Fourth Workshop on NLP for Similar Languages, Varieties, and Dialects.
- Stance and Gender Detection in Tweets on Catalan Independence@Ibereval 2017.
- WASSA-2017 Emotion Intensity Task.
- DEFT 2017 Text Search @ TALN / RECITAL 2017 Opinion analysis and figurative language in tweets in French.
- International Cybersecurity Data Mining Competition CDMC 2017.
- 2nd Social Media Mining for Health Applications Shared Task at AMIA 2017.

Technical Skills

- Languages: C, C++, Java, Scala, Python, R, Introduction to Julia, Weka, Matlab.
- Web development: Html, CSS, JavaScript, JSON, JQuery, Php, Bootstrap, XML, Jsp.
- Educational Platforms: MIT Scratch, Snap Berkley, BYOB, Scribble, Beetle Blocks.
- Machine Learning: Spark Mllib, Apache Mahout, XG-boost, Scikit-learn, Dato, Hpelm, Gurls, LibSVM.
- Big data Platforms: Hadoop, Apache Spark.
- Database: MySQL, Introduction to Oracle, Apache Cassandra.
- Deep Learning platforms: TensorFlow, Theano, Keras, Deeplearning4j, Torch, Basics of Caffe, DeepChem and DragoNN
- Comfortable with Windows and Linux OS.
- Documentation Tool: LibreOffice, Microsoft Office, and Latex.