Satish Palaniappan

Curriculum Vitae

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Interests

Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, and Algorithm Design.

Educational Background

2018-Present **Johns Hopkins University (JHU)**, *Whiting School of Engineering (WSE)*, *Masters in Computer Science.*

2012-2016 **Anna University**, *Sri Sivasubramaniya Nadar College of Engineering (SSN CE)*, *Bachelors in Computer Science and Engineering*, **CGPA**: 8.56/10.

Academic Research Experience

Dec,2015 - Present **Research Assistant**, INSTITUTE OF MATHEMATICAL SCIENCES, CHENNAI.
Optical Character Recognition on Indus Scripts [link] [paper]
under Prof. Ronojoy Adhikari, Department of Physics
- Recognize Indus script symbols from scans and photographs of ancient Harappan civilization artifacts.
- **Techniques:** Convolutional Neural Networks (CNN), GoogLeNet, Transfer Learning, and Selective Search.
- **Media Coverage:** *The Hindu*, *The Verge* (small piece), *Times of India*, and *SBS Radio - Australia*.

Dec,2014 **Research Intern**, CARNEGIE MELLON UNIVERSITY (IPTSE WINTER SCHOOL).
Text Based Emotion Recognition System [link]
under Prof. Bhiksha Raj and Prof. Rita Singh, Department of Computer Science
- Classify any textual data, using histograms built based on word2vec word/phrase clusters, into one of the 7 chosen basic emotions.
- **Techniques:** Word2Vec, Latent Dirichlet Allocation (LDA), K-means, Support Vector Machines (SVM), Probabilistic N-Gram models, Multinomial Naive Bayes.

Industry Research Experience

Jun,2016 - Present **Software Engineer**, QUBE CINEMA TECHNOLOGIES, INDIA.
under Rajesh Ramachandran, Chief Technology Officer & President
- **Projects:**
  - Scalable **viewer-demographics mining engine**, that can extract information such as count, age, gender, and emotions of the movie watchers, from low-light images of a theatre's auditorium.
  - Real-time, adaptive, **resource allocation and optimization algorithm**, for making business decisions intelligently and maximizing profits.
  - **Smart-bot for automatically syncing theatre databases** across the globe, into one unified format.
- **Techniques and Tools:** CNNs with feedback-based learning, Semantic similarity models built over digital-cinema domain data, Camera Calibration, Amazon Web Services, Flask+uWSGI+Nginx servers.
- **Algorithms:** Knapsack Problem, Minimum Cost Flow (Transportation) Problem, Pruned Search Trees, Recursive and Linked Interval Trees.

May,2015 - Jul,2015 **Data Scientist - Intern**, SERENDIO INC., INDIA.
under Ravi Condamoor, Chief Executive Officer
- **Projects:**
  - Universal multi-domain **sentiment scorer** for text [link].
  - **Topic composition modeling** using hierarchical K-Means and semantic word clusters [link].
  - **Internet slang text parser** [link].
- **Techniques and Tools:** Gensim, Tf-idf features, Bagging and Boosting, CMU ARK's Twokenize, Rake - Keyword Extractor, Web Crawlers, etc.
- Serendio Inc.'s **campus ambassador** at SSN CE.

Research Papers, Patents and Theses

Feb,2017 Paper titled, "**Deep Learning the Indus Script**", PLoS ONE (submitted), arXiv:1702.00523v1.

Apr,2016 Undergraduate thesis titled, "**Automated Scenario Description for Images**", Anna University. [link]

Apr,2015 Paper titled, "**Home Automation Systems - A Study**", International Journal of Computer Applications (IJCA), Vol. 116 - No.11, Reference ID: pxc3902601. [link]
- **Best paper award**, SSN UG paper presentation event. 13 Citations [google scholar].

Oct,2015 Patent filed, titled, "**Universally Compatible and Accessible, Software Controlled, Expandable Home Automation System, for Energy Conservation and the Differently-Abled**", Reference ID: 5729/CHE/2015. [video report], [patent search link].

Apr,2015 Paper titled, "**Automated Meter Reading System - A Study**", International Journal of Computer Applications (IJCA), Vol. 116 - No.18, Reference ID: pxc3902783. [link]

Dec,2014 Poster presented, titled, "**Text Based Emotion Recognition System**", CMU-IPTSE Winter School, at NITK Surathkal. [link]

Projects

Jun,2015 - Apr,2016 **Automated Scenario Description for Images**, *Undergraduate thesis*, Anna University.
under Prof. Milton R.S., Department of Computer Science and Engg., SSN CE, [link], [thesis].
- Harnessed object identification and scene classification techniques to automatically generate natural language descriptions of images.

Mar,2018 **Distributed Panorama Construction of High Resolution UAV Imagery Using Public Compute Nodes**, *Department of Space (Indian Space Research Organization)*, Smart India Hackathon 2018 (Software Edition), [video], [link].
- The solution devised for this problem was based on an amalgamation of concepts from Cloud Computing, Parallel Computing, Mobile Computing and Computer Vision.
- Our team secured the first place in this nation-wide hackathon along with a cash award of Rs.1,00,000.
- **Media Coverage:** *The Hindu*, *Times of India*, *Gujarat Technological University*, and *SSN CE*

Sep,2014 - Jun,2015 **Software Controlled Appliances for Energy Conservation and Differently Abled people**, *Funded research project*, SSN Innovation Center, [link].
- Built a Raspberry Pi powered, adaptive and modular system, to provide planet-wide access to electronic appliances using software interfaces (mobile apps) via the Internet cloud. (Internet of Things)

Mar,2015 **Intelligent Food Resources Monitoring & Management system (PingMyFood - The Food Network)**, *Startup venture*, SSN Entrepreneurship Development Cell, [link].
- Built a social network for food sharing. It collaboratively mitigates food resource wastage by routing the surplus food to food deficit regions and also allows everyone to share food with each other.
- Powered by an intelligent, cuisine, food, and chef based topic modeling and quality rating system.

Feb,2015 - Dec,2015 **Automated Scoring of YouTube videos from Pairwise Comparisons and Metadata based on Degree of Funniness**, *Side project*, [link].
- Built a regression model, that scores YouTube videos based on their degree of funniness with just the non-video metadata such as the title, description, and comments.
- Developed a heuristic for converting the pairwise comparisons into unified overall rankings across videos.

Sep,2015 **Market Segmentation based on Customer Activity**, *Business Analytics Hackathon*, SSN School of Advanced Career Education, [link].
- Developed a market segmentation algorithm by clustering human activity patterns tracked and predicted using smartphone data such as accelerometer & gyroscope readings.

Mar,2017 **Barcode based Hardware Inventory Management**, *Department of Posts*, Smart India Hackathon 2017, [link].
- Our team secured the 2nd Runner-up position in this nation-wide hackathon along with a cash award of Rs.50,000.

Dec,2013 **Regional Transport Office (RTO) Management System**, *Software Development Engineer - Internship*, Ramco Systems, India, [link].
- Worked on building and managing fail-safe redundant database systems.
- Learned about Enterprise Resource Management (ERP) on cloud.

Awards and Achievements

- **Merit Scholarship (Full)** for Excellence in Academics, 1st Year, worth Rs.105,000, SSN CE.
- **Microsoft Research** certified, for proficiency in "Design and Analysis of Algorithms".
- **Top 4** in the state and **Top 100** across the country, **Aspirations 2020** programming contest, **Infosys**.
- **Industry Mentor** for two consecutive years at the **Smart India Hackathon** (world's largest hackathon), organized by the **Government of India**.
- **Outstanding Student Organizer Award**, SSN ACM Student Chapter.
- **Young Achiever Award** for Excellence in Academics, Tractors And Farm Equipments Ltd., India.
- All India Rank of 456 in the 14th **National Science Olympiad**.
- Rated as an **excellent programmer in "C"** by NIIT.

Talks

- Deep learning based OCR engine for the Indus script.
- **Venues:** Indian Deep Learning Initiative (IDLI) [slide deck] [video] [link], ThoughtWorks Geek Night [slide deck] [video] [link], ChennaiPy [link], Anthill Inside 2017 [proposal].

- Pokemon World and The Indus Valley Civilisation - The Analogy.
- **Venues:** Faculty Development Program, AICTE - SSN CE [slide deck], Qube Cinema Technologies - Offsite 2017 slide deck [V1, V2]

- ML from a CV and NLP perspective, *at Qube Cinema Technologies - Offsite 2016 [slide deck].*

- Python Hands-on, *Two-day workshop, at ACM Student Chapter, SSN CE [link].*

Open Source Contributions

Diskoveror **Text analytics package**.
- Developed the Topic Modeling and Sentiment Analysis modules in Python. [link]
- Interfaced the Python and existing Java code bases via Facebook's Thrift API. [link]

RealImage **Algorithm for territorial restriction of film distribution rights**, *Challenge 2016.*
- Implemented using hash maps, trees, and bit indexes with constant time lookup. [link]

Keras **Deep Learning library for Python**.
- Implemented random shear data augmentation technique as a part of the CNN's training pipeline. [link]

Gensim **Topic modeling library for Python**.
- Ported the phrase vector representation technique of word2vec word vectors, from C to Python. [link]

Technical Skills

Languages	Python, Java, C, C++, VB.Net, R
Libraries	CAFFE, TENSORFLOW, KERAS, OPENCV, Scikit-Learn, NLTK
Others	Linux, Android SDK, Git, LaTeX, Docker, Adobe Photoshop

Leadership and Professional Affiliations

2018 - Present **Course Assistant**, *Object-Oriented Software Engineering (EN601.421/621)*, JHU.

2014 - 2016 **Association for Computing Machinery (ACM)**, *Student Chapter*, SSN CE.
- Roles: **Chairman** (2015 to 2016), **Treasurer and Tech Lead** (2014 to 2015)

2014 - 2015 **Google Student Club (GSC)**, *Tech Lead*, SSN CE.

2015 - 2016 **Placement Cell**, *Student Placement Coordinator, Computer Science Department*, SSN CE.

Coursework

Deep Learning	Probabilistic Models of the Visual Cortex	Neuro Data Design
Prof. Gregory Hager	Prof. Alan L. Yuille	Prof. Joshua Vogelstein
EN.601.682	AS.050.675	EN.580.697