Subhash **Nerella**

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Engineer, Researcher in Deep/Machine Learning
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Education_____

Ph. D in Biomedical Engineering	Aug 2018 -
University of Florida, Gainesville, FL	GPA: 3.75/4.0
Master's degree in Mechanical Engineering	Aug 2016 – May 2018
University of Florida, Gainesville, FL	GPA: 3.8/4.0
Bachelor of Technology in Mechanical Engineering	Aug 2009 – May 2013
National Institute of Technology, Rourkela	GPA: 7.8/10

Research Experience_____

Graduate Research Assistant   Aug 2018 –

Intelligent Health Systems Lab, Gainesville, FL

- **Facial action unit detection in critically ill patients:** Feasibility of pain assessment based on patient facial behavior. Trained a Swin-Transformer model on patient facial images obtained from ICUs to detect facial action units. Achieved an average 0.77 F1- score on all the action units. A linear mixed effects model is used to identify the association between action units against the patient's reported pain score.
- **Human Activity Recognition on Depth images collected in ICU:** Patient mobility assessment in ICU using computer vison algorithms. Trained a Faster-RCNN based model to perform patient posture detection in depth images collected in ICU. Used a YOLO v5 model to detect the number of people in each frame.
- **Intelligent ICU system architecture:** Lead a team of four people to develop data handling pipelines to manage and store confidential patient data and annotations. The pipelines automate the data transfer to a secure server, data curation, and data quality checks for multiple modalities of data collected in ICUs.
- **Physical activity recognition using accelerometry data:** Trained a hybrid CNN-LSTM on raw accelerometer data collected from 145 participants to recognize physical activity type. The model achieved an average F1-score of 0.86 on sedentary, locomotion, and lifestyle activities.
- **Ecological momentary assessment of pain with GPS data:** Strategized features and developed feature extraction code for a statistical temporal association between ecological momentary assessments of pain and GPS metrics in older adults. Integrated Google maps API into KNN algorithm to compute distance-based features from travel patterns of study participants.
- **Ultrasound image segmentation for guided anesthesia:** Developed a hybrid U-net architecture with residual connections to perform medical image segmentation on Ultrasound images of Brachial Plexus nerve for ultrasound-guided anesthesia application.

Work Experience_____

Software Development Engineer   July 2013 – July 2016

Dassault Systemes, Pune, India

- Implemented functionalities to coexist the data on multiple releases of the Software and to migrate the customer data to the latest releases.
- Achieved >80% code coverage on production code by implementing code functionality test cases.
- Developed data visualization dashboard for data migration summary, progress, and errors occurred.

Skills_____

- **Data Science**: data collection, extraction, processing, data visualization, analysis, and result interpretation
- **Programming:** Python, R, C++, C, MATLAB, Bash Script, SQL, MongoDB
- **Machine learning frameworks:** Pytorch, Keras, Chainer, TensorFlow, Scikit learn
- **Tools & OS**: Linux, Windows, Git, Docker, Jupyter, VScode, windows
- **Languages:** English, Telugu, Hindi

Teaching _____

Student Science Training Program - High School level, Instructor – Summer 2022
Introduction to machine learning, Convolutional networks, and scikit-learn
Artificial Intelligence/Machine learning Bootcamp – Master level, Instructor – Summer 2022
Introduction to python, machine learning, and data science
Computer Applications for Biomedical Engineering – Undergraduate level, Teaching Assistant – Fall 2020
Machine learning, Image processing, and Signal processing with MATLAB
Biomedical Data Science – Master level, Teaching Assistant – Fall 2019
Machine/Deep learning, Python, Pytorch, TensorFlow

Academic Services_____

IEEE Connected Health Applications, Systems and Engineering Technologies -Reviewer 2022
IEEE Computers, Software & Applications in an Uncertain World -Reviewer 2022
IEEE Journal of Biomedical Health and Informatics – Reviewer 2021

Publications_____

Nerella, S., Cupka, J., Ruppert, M., Tighe, P., Bihorac, A., & Rashidi, P. (2021, July). Pain Action Unit Detection in Critically Ill Patients. In *2021 IEEE 45th Annual Computers, Software, and Applications Conference (COMPSAC)* (pp. 645-651). IEEE.

Subhash Nerella, Kevin Vega Gonzalez, Julie Cupka, Matthew Ruppert, Tyler Loftus, Azra Bihorac, Parisa Rashidi. Sensors in Hospitals. Elsevier 2022, ISBN 9780128012383, https://doi.org/10.1016/B978-0-12-822548-6.00123-0.

Mardini, M. T., Nerella, S., Kheirkhahan, M., Ranka, S., Fillingim, R. B., Hu, Y., ... & Manini, T. M. (2021). The temporal relationship between ecological pain and life-space mobility in older adults with knee osteoarthritis: a smartwatch-based demonstration study. *JMIR mHealth and uHealth*, *9*(1), e19609.

Mardini, M. T., Nerella, S., Wanigatunga, A. A., Saldana, S., Casanova, R., & Manini, T. M. (2020). Deep CHORES: estimating hallmark measures of physical activity using deep learning. In *AMIA Annual Symposium Proceedings* (Vol. 2020, p. 803). American Medical Informatics Association.

Laborde, C. R., Cenko, E., Mardini, M. T., Nerella, S., Kheirkhahan, M., Ranka, S., ... & Manini, T. (2021). Satisfaction, Usability, and Compliance With the Use of Smartwatches for Ecological Momentary Assessment of Knee Osteoarthritis Symptoms in Older Adults: Usability Study. *JMIR aging*, *4*(3), e24553.