Satish Kumar

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Professional Summary

A Deep Learning enthusiast. Currently working on applying Deep Learning to Spoken Language Processing.
Energetic Senior Software Engineer with 3+ years of experience having a diverse skill-set and creative drive to software application development. Proficient in writing code in various languages.
And having extensive experience in developing customized Deep learning/Machine Learning architectures from scratch with good mathematical understanding.
My goal is simple "A complete understanding of how the brain works".

Employment History

Senior Software Engineer (R&D), Reverie Language Technologies Pvt Ltd. Bengaluru, Karnataka
August. 2019 - Jul. 2022

Projects
1.Gender Classifier from speech
Description:
Environment / Technology used: Keras,Python,DNNs
Feature type: fBank feature after applying VAD (Voice Activity Detection)
Model: 2-layer DNN with Dropout
Duration: Minimum duration of speech 0.75 seconds

2.Language Classifier from monologue for Indian Languages (API)
Description:
Environment / Technology used:Python,Keras
Feature type: I-vector feature of 500 dimension
Model: 2-layer DNN with Dropout

Skills

- Python
- PyTorch
- Kaldi
- PyTorch-Kaldi
- Scikit Learn & Matlab
- Keras
- flask
- docker
- SpeechBrain
- Tensorflow

Languages

- Hindi
- English
- German

3.Voice activity detection system

Description:

Environment / Technology used:PyTorch,Python,DNNs
Feature type: fBank feature transformed as an images of 2-Dimensional to be fed to CNN model
Model: 3-layer CNN with Dropout

4.Speaker Diarization

Description:

Environment / Technology used:END-TO-END NEURAL SPEAKER DIARIZATION
Description:

- Prepared simulated data for training
- Multi-head self attention based model is used for training
- Analysed performance of model on diarization task on real dataset

5.Speech Separation

Description:

Environment / Technology used: ConvTasnet

- Prepared simulated data for training
- Model used in training is ConvTasnet
- Analysed performance of model on separation task on real dataset

6.ASR system for Marathi, Bengali & Punjabi languages

Description:

Environment / Technology used: Kaldi,Kenlm
Roles & Responsibilities:

- Developed,maintain and improve ASR system for Marathi, Bengali & Punjabi languages using open source framework Kaldi and Kenlm
- Domain specific data collection
- Pre-process speech data, using Kaldi toolkit
- Build test and trained data for ASR
- Training the ASR model
- Evaluate ASR output
- Provide linguistics knowledge on ASR output to improve accuracy

7.A Mixture of Expert system to Improve ASR

Description:

Environment / Technology used:PyTorch-Kaldi,Pytorch
Description:

- A 3-class phonetic classifier for Voiced,Unvoiced,Silence is introduced
- LSTM acoustic model is used

Project Associate, Learning and Extraction of Acoustic Patterns (LEAP) lab, Indian Institute of Science. Bengaluru, Karnataka
September. 2017 - July. 2018

Projects:
1.Participated in NIST LRE-17 challenge
Role Played:
Language Recognition model development based on i-vector features and Deep
Neural Network models.
Data collection for Indian languages.
Environment / Technology used: Tensorflow, Keras, Python, Scikit-Learn, Matlab, Pandas
Description:

- Train a GMM-UBM based model to extract i-vectors for each speech utterances
- Trained a DNN network to classify i-vectors for each languages
- Analysed the performance of the system on different duration of speech utterances

2.Domain Adaptation of speech segments using Generative Adversarial
Networks(GANs)
Role Played:
Developed a model which can adapt the the shorter duration of speech to a
longer duration ones.
Environment / Technology used: PyTorch, Python, Scikit-Learn, Matlab, Pandas
Description:

- Train a Generator-Discriminator based system for domain adaptation of i-vectors of different durations.

Current Projects

1. **Self Supervised Learning with Wav2vec2 for French ASR and text alignment.**

Role Played:

Developed a French ASR with text alignment with speech utterances

Environment / Technology used: SpeechBrain, PyTorch, Kaldi

Model: used Wav2vec2

Presentations

- LabTalk on “Variational Treatment of Probabilistic Models” at LEAP Lab,IISc Bengaluru.
  https://github.com/Satishpas2/Variational-Treatment-of-Probabilistic-Directed-Graphical-Models/blob/master/Var_Inference.pdf

- LabTalk on “Generative Adversarial Networks(GANs)” at LEAP Lab,IISc Bengaluru.
  https://github.com/Satishpas2/Generative-Adversarial-Netwoeks-A-Tutorial/blob/master/GAN_PPT_LEAP.pdf

- Presentation on "Language Identification from Monologue" at Reverie Language Technologies,Bengaluru

Education

Uttar Pradesh Technical University, Lucknow, Uttar Pradesh,India
Batchelor of Technology,2008, Electronics & Communication Engineering, June. 2008

National Institute of Technology, Surathkal, Karnataka,India
Master of Technology, 2016, Communication Engineering, July. 2016

References

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Personal Details

Mother's Name : Mrs. Sharada Devi
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Additional Information

Github Link:
https://github.com/Satishpas2
Linkedin Link:
https://www.linkedin.com/in/satish-kumar-571034109/

Publications

- B. Padi, S. Ramoji, V. Yeruva, S. Kumar and S. Ganapathy, "The LEAP Language Recognition System for LRE 2017 Challenge - Improvements and Error Analysis", Odyssey: The speaker and language recognition workshop, 2018. https://www.isca-speech.org/archive/Odyssey_2018/pdfs/39.pdf