KARAN JAYACHANDRA

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SUMMARY

I aim to build expertise as an engineer and enjoy working with challenging goals. This helps push me to be a better problem solver and requires me to think out of the box. I enjoy seeing the things I make have an impact on the world. My strengths are in having a strong sense of ownership and learning quickly. The things I am working on to improve myself relate to sustaining work on a single focused objective.

My technical interests are in system design for signal processing applications. I am proficient in working together with analog designers and software developers to get a working system due to by broad background. I specialize in signal processing and have worked on the evaluation and selection of algorithms for radar applications. I have developed novel signal processing algorithms for use internally which has been patented and have published a paper.

DEMONSTRATED VALUE

Joint Velocity Estimation and Ambiguity Resolving *International Radar Conference 2023*
Paper and US Patent (Submitted)
Often frequency ambiguity is often solved by using multiple chirp sequences with co-prime delay shifts between them. However, coherent processing of multiple signal sequences is not possible using classical spectral estimation techniques based on Fast Fourier Transform (FFT). This results in statistically not efficient frequency estimation and loss of processing gain. In this work, we proposed an algorithm that can jointly process multiple chirp sequences and resolve possible ambiguities present in the velocities estimates.

Radar System Designer *NXP Semiconductors*
Python Dash Dashboard (Internal Tool)
Converted an Excel sheet into a Python Dash dashboard for internal use. This helped standardize the design of the chirp signal and the antenna array. This allowed for easier tracking of issues and standardized the different front end settings and array configuration that can be used for the radar applications.

Fast Front End Models *NXP Semiconductors*
Python Numpy Package / MATLAB® Toolbox (Internal Tool)
Lead the development of an extremely fast model of the radar front end based on textbook models with minimal imperfections considered. This enabled statistical simulation of the entire radar chain along with signal processing which lead to a 1000x faster testing cycle.

EXPERIENCE

NXP Semiconductors September 2021 - Present
Signal Processing Engineer *Eindhoven, The Netherlands*

- **Key Learning:**
  - Automotive radar: System design
  - Signal processing chain development and testing
  - Statistical evaluation and testing of algorithms
- **Activities:**
  - Worked with stakeholders to create technical requirements.
  - Created models of the radars to simulate behavior.
  - Developed algorithms for radars to estimate target properties.
  - Development of test suite to evaluate algorithms statistically.
  - Development of standardized internal design tools.
  - Evaluation of system performance using target simulators.
  - Calibration of phased arrays using anechoic chambers.
  - Liaison with the lab manager for team related activities.

NXP Semiconductors August 2020 - August 2021
Thesis Student / Intern *Eindhoven, The Netherlands*

- **Key Learning:**
  - Automotive radar: application
  - Working with a research oriented mindset
- **Activities:**
  - Developed automotive scenarios for simulations using the dSpace tools.
  - Compressed of dSpace data to speed up simulations for hardware simulators.
  - Collaborated with a global team to setup a standard way of simulating complex scenarios.
  - Gained knowledge of the signal processing chain in radar systems and the front end models.

SAP India Pvt. Ltd. April 2019 - July 2019
Associate Business Process Consultant *Bengaluru, India*

- **Key Learning:**
  - Development ownership and capturing complex requirements
  - Time management and organization of work supporting multiple clients
- **Activities**
  - Documented clients' requirements for data analytics.
  - Converted functional requirements into technical requirements.

SAP India Pvt. Ltd. August 2016 - March 2019
Associate Development Consultant *Bengaluru, India*

- **Key Learning:**
  - Critical problem solving
  - Work with a global team remotely
  - Cultivating professional responsibility
- **Activities:**
  - Worked on both green field and brown field implementations.
  - Identified key performance indicators and dimensions in the data.
  - Aggregated the data for easier retrieval using SQL queries.
  - Upgraded database and database management software.
  - Conducted client training and created demos for showcases.

Defence Research and Development Organization April 2012 - July 2012
Intern *Bengaluru, India*

- **Key Learnings:**
  - Working in a professional environment
  - Systematic progress towards deliverables
- **Activities:**
  - Fingerprinted FPGAs based on the Physical Structure determines the gate delay.

PROJECTS

Master Thesis, TU Delft
Keywords: Kalman Filters, Resource Management
Thesis research investigating joint communication and sensing for automotive Radar Systems. RRM Optimization problem involving antenna arrays in a multi-sensor environment. Generate a globally optimal understanding of the environment by distributing Radar Resources

Bachelor Thesis, Amrita Vishwa Vidyapeetham

Keywords: Neural Networks, Antenna Design, FANN
Using Neural Networks, an antenna array, consisting of antennas placed in different orientations, was trained to pick up the location of an object emitting signals. Training to estimate the location of the object based on the signal strength at each of the antennas.

Compressed Sensing, TU Delft
Keywords: Compressed Sensing, Convex Optimization
Recover signal that has been sampled at a rate which was much lesser than that prescribed by the Nyquist-Shannon Theorem. Signal reconstruction using Norm Minimization and a Low Complexity Algorithm was implemented. Perfect reconstruction of the signal was possible due to sparse nature of the signal.

EDUCATION

Technische Universiteit Delft, Delft *2019 - 2021*
M.S. in Electrical Engineering
Major in Signals and Systems
Overall GPA: 8.5
Focus: Signal Processing, Radar Systems and Antenna Design
Courses: Radar Systems, Antenna Systems, Electro-magnetics, Information Theory, Control System Design, Estimation & Detection, Ultra-Wide Band Systems, Applied Convex Optimization, Statistical Digital Signal Processing, Signal Processing for Communication, Microwave, Radar and Remote Sensing, Introduction to Wireless Communication

Amrita Vishwa Vidyapeetham, Bengaluru *2012 - 2016*
B.Tech in Electronics and Communication Engineering
Overall GPA: 8.6
Focus: Signal Processing, Radar Systems and Antenna Design
Courses: Signals and Systems, Digital Signal Processing, Wireless Communication, Radio Frequency Engineering, Analogue and Digital Communication, Micro-controllers and Micro-processors, Transmission Lines and Radiating Systems, Information Theory and Coding Techniques

RECOGNITION

Awards	SAP Project of the Quarter Q1-2018, SAP Project of the Quarter Q2-2019
Papers	Second position at International Radar Conference Sydney

SKILLS

MATLAB	Extensively worked on scripting for algorithm development and data generation
Python	Testing and data modelling experience as part of a package development
C/C++	Mostly used to create small scripts to interface with other programs
Verilog	Basic experience as part of an internship to create simple components

TOOLS

LaTeX	Typesetting internal and external documents extensively
git	Proficient in the use of version management for software development
JIRA	Several years of experience using agile development practices with JIRA
Flask	Web application development for development of standardized internal tools