Fayyaz Pocker Chemban

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Summary

A multidisciplinary engineer with expertise in designing and building intelligent robotic systems. Profound knowledge in ROS, SLAM, Path planning, Motion Planning and Embedded system Design.

Work Experience

Srinar Electronics Pvt Ltd — *Chennai, India*

Robotics Engineer — *May. 2019 - PRESENT*

- Research and Development in Sensor Fusion, Mapping, Localization, Path planning and Motion planning of an Automated Guided Vehicle for warehouse management

e-Yantra, IIT Bombay — *Mumbai, India*

Senior Project Technical Assistant — *Aug. 2016 - April. 2019*

- Research work in the development of themes for National level Robotics Competition (eYRC) which combines embedded system, computer vision, mechanical designing and machine learning.
- Formulated Four themes in eYRC and trained around 1500 Engineering students in India in various concepts in robotics
- Organized and conducted more than 20 Advanced Robotics workshops for faculties covering around 300 Engineering Colleges all over India
- Evaluated and guided 19 projects of engineering students in eLSI colleges for its successful completion
- Conceptualized 5 projects and mentored 15 summer interns towards its completion

Education

Cranes Varsity — *Bangalore, Karnataka, India*

Professional Diploma in Embedded Systems Design & Development — *Jul. 2015 - Jan. 2016*

- Secured A+ grade in the course

T.K.M College of Engineering (University of Kerala) — *Kollam, Kerala, India*

Bachelor's Degree in Mechanical Engineering — *Jun 2011 - Jul. 2015*

- Secured a CGPA of 7.11 out of 10

St Jude Public School (CBSE affiliated) — *Thrissur, Kerala, India*

Higher Secondary Education — *Apr. 2009 - Mar. 2011*

- Secured overall 92% and topper of the batch in PCM with an aggregate of 96%

Airport Senior Secondary School (CBSE affiliated) — *Malappuram, Kerala, India*

Secondary Education — *Jan. 1999 - Feb. 2009*

- Secured 90% in Tenth grade

Publications

- S.Singh, **F.Pocker**, V.Fernandez, K. Arya(2019). Vision-Based Indoor Localization of Nano Drone and its Applications. [Under Review]
- **F.Pocker**, R.Madan, K.Arya(2019). Learning control system design using Nano drone in a PBL focused robotics competition, *epiSTEME 8 International Conference to Review Research on Science, Technology and Mathematics Education.* [Review & Resubmit].

Projects

Mapping and Localization of AGV — *Srinar Electronics*

VIDEO LINK : `https://youtu.be/DEqXDmCZKT8` — *Aug. 2019*

- Implemented Base controller of AGV to respond to ROS commands based on unicycle model
- Applied SLAM algorithm to map the industrial area based on visual odometry, wheel odometry, imu and scan data
- Localization of AGV on the generated Map using fusion of continous position data and global position data

Autonomous Navigation of UAV through hoops using Marker-Based Localization — *e-Yantra*

VIDEO LINK : `https://youtu.be/JaWfXySPnOg`, `https://youtu.be/pW4zvJKTons` — *Apr. 2018*

- Devised a new method for localization and path planning for a UAV to maneuver through hoops set in different orientations using feedback from a monocular camera placed at a ceiling height
- Localization of UAV using WhyCon markers mounted above them
- Path planning using RRT* algorithm available in OMPL and directing UAV via ROS
- Implementation of three parallel PID on external control loop to command the UAV velocity in direction of its pitch, roll, throttle and yaw
- Implementation of Ziegler Nichols oscillation method for auto-tuning PID parameters

Autonomous Navigation of a Differential Drive robot avoiding an Independent moving bot

e-Yantra

VIDEO LINK : `https://youtu.be/KM82iR-x8b4` *Jun. 2017*

- Designed a differential drive robot to pick objects and drop it to a line following robot having no communication with either PC or any other robot using feedback from camera placed at ceiling height
- Differential drive robot was made from scratch using quadrature encoder motors, an arm mechanism , Xbee module and high torque motors
- Pose estimation of the robot using ArUco markers mounted on them
- Utilization of Remote API (Python) in V-REP for real-time emulation and non-holonomic path planning of the robot in real world
- Implementation of PD controller to maneuver the robot through the estimated path

Object recognition and Path planning of a line following robot

e-Yantra

VIDEO LINK : `https://youtu.be/-e3T02XQMJo` *Jul. 2017*

- Implemented Dijikstra's algorithm for path planning and on board image processing on an R-Pi for a line following robot to recognize and pick corresponding objects and drop them into a defined location

Self Balancing Robot using PID controller

e-Yantra

VIDEO LINK : `https://youtu.be/LpaUS1TPWus` *Aug. 2016*

- Designed a robot which balances itself from an induced tilt angle by moving forward or backward
- Measurement of the tilt angle using GY-80 module by combining readings of accelerometer and gyroscrope using a complimentary filter, Data visualization in Scilab
- Employed cascaded PID loops of position, velocity and angle to keep the robot in upright position

Skills

Programming	C, C++, Python, Lua, Matlab, Bash, LaTeX
OS	Linux, Windows, Mac
SBC	Jetson Nano, Raspberry-Pi
Middleware	ROScpp, ROSpython
ROS	ROSEmbedded, Gmapping, Cartographer, HectorSLAM, AMCL, robot_localization, Navigation stack, State machine(smach), Behaviour tree(pi_trees)
Simulation	V-REP, Gazebo
Visualization	Rviz
Microcontroller	ATmega 2560, ATmega 8, LPC2148, STM32
Sensors	Hokuyo UST-10LX, SICK LMS101, Zed camera, Quadrature encoder, Phidgets, Sparton IMU, MPU 6050, Sharp sensor
Control system	PID, Cascaded PID, Sensor Fusion, Complimentary filter, Kalman Filter, EKF
Modulation	PWM, PTO
IDE	Atmel Studio, AVR Studio, VS Code, Eclipse, Sublime, Keil, Geany, Jupyter, Gedit, Vim
Protocols	UART, I2C, SPI
Libraries	OpenCV, Numpy, Pytorch, Moveit, OMPL
Version control	Github, Gitlab
Designing	Solidworks, Fusion 360, FreeCad, Cura, STL, URDF, COLLADA
Editing	Premium Pro, Corel Draw, Sketchup, Inkscape
Management	Trello, Slack, Prezi
Languages	English, Hindi, Malayalam, Tamil

Position Of Responsibility

2018	**Team Lead,** One of the three team leads to lead the National level Robotics Competition, eYRC-2018	*e-Yantra*
2014	**College Union Program Coordinator,** Head of the Organizing committee of "RITHU '15", the first cultural fest in college after 15 years. Also the Head of organizing commitee of "Tezoro '15", the Techfest in college	*T.K.M.C.E*
2013	**Program Coordinator,** Team Lead for organizing "Light up Kerala", a famous initiative conducted by college in Kerala associated with the Techfest	*T.K.M.C.E*

Extracurricular Activity

Football

- Champions at Sahodaya inter-district football competition in Higher Secondary
- Part of the College Team

Adventure Sports

- Completed around 13 Trekks ranging from simple to difficult
- Have tried Paragliding, Parasailing, Rafting, Rappelling, Snorkelling and Scuba diving in various places in India