Fayyaz Pocker Chemban

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Summary

A multitalented engineer with interdisciplinary knowledge in Computer Science, Mechanical and Electronics. Expertise in designing and building intelligent robotic systems. Profound knowledge in Control System, Mechanical designing, Micro-controllers, Image processing, Path planning and Simulation software.

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

Post Graduate 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

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 Three-Dimensional Path Planning of UAV

e-Yantra

VIDEO LINK : `https://youtu.be/JaWfXySPnOg` — *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
- Pose estimation of Obstacles and Hoops using ArUco 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

Autonomous Two-Dimensional Path planning of a Differential Drive Robot

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 path planning and image processing algorithm for a line following robot to recognize and pick corresponding objects and drop them into a defined location
- Object recognition based on shape and colour of fruits using image processing from the feedback of camera connected with the Raspberry Pi interfaced with the robot

Fish Bot

e-Yantra

VIDEO LINK : `https://youtu.be/-gYOw3eALVs` *Aug. 2017*

- Designed and implemented Bio-mimetic Robotic Fish which can swim underwater and can be wirelessly controlled via NRF24L01 module
- Maneuvering of fish achieved with active control of Caudal(Tail) and Pectoral(Side) Fins

Auto-tuning of Controller for UAV

e-Yantra

VIDEO LINK : `https://youtu.be/pW4zvJKTons` *Oct. 2017*

- Employed two methods of auto-tuning PID and estimation of values of PID parameters for a UAV
- Analyzed the nature of what the controller is driving and then reverse-engineered to calculate tuning parameters from the output using Ziegler Nichols oscillation method

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 a cascaded PID loop of position 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