BHADALE GROUP OF COMPANIES - IT AND REAL ESTATE

Oct 02 2019

Robotics Catalogue

Bhadale Group of Companies

Bhadale Group of Companies consists of Bhadale IT Developers Pvt. Ltd and Bhadale Real Estate Developers Pvt Ltd.

1. **Bhadale IT Developers Pvt. Ltd** is an IT and Computer Engineering company

   This company provides consultation in areas of cutting edge technologies, research outsourcing, and software consultation related to data center and related engineering practices

2. **Bhadale Real Estate Developers Pvt. Ltd** is a Real estate company

   This company provides development of Infrastructure for IT Datacenter and allied sectors. It manages the engineering design, landscaping, civil architecture, presently serving internal projects.

Bhadale Group of Companies has aggressive programs in place to serve the niche market.

Bhadale IT Developers Pvt. Ltd Programs and Services

IT Division programs

1   Cloud Architecture
2   AI
3   Digital
4   Automation
5   R&D services
6   Engineering services
7   Mentoring Services
8   Data center services
9   Outsourcing

There are various services offered under each program, details are described below

IT Division program related services

Cloud Architecture

- Cloud Enterprise Architecture
- Cloud Business Architecture
- Cloud Information / Website data Architecture
- Cloud Solution Architecture
- Data center Virtualization and Cloud services (IaaS)
- Cloud Technical Architecture – Project specific
- Cloud ERP Solutions (SaaS, PaaS)
- Cloud Strategy and Transformation
- Cloud Systems Integration and consolidation
- Cloud Project Management
- Cloud Pre sales support
- Business Needs (RFI/RFQ/RFP assistance)

- Cloud Quality Initiatives
- Cloud Business Analysis
- Cloud Infrastructure Planning – hardware , network, storage , backup (IaaS, PaaS)
- Cloud business portfolio assessment services (workshops)

AI

- Artificial intelligence and advanced machine learning
- Intelligent applications, Intelligent things
- Conversational systems
- Mesh app and service architecture
- Adaptive security architecture

Digital

- Virtual reality and augmented reality: Brief capability, deliverables and service offering
- Digital twins
- Blockchains and distributed ledgers
- Digital technology platforms

Automation

- Robotic Process Automation
- IoT
- Manufacturing robots
- BPO call center robots
- Chatbots
- Remote workers
- Hazardous jobs robots(Mine bombs, nuclear waste, underwater, space etc)

R&D services

- PHD mentor, buddy
- BPO - Outsourced work in areas of research areas related to IT and Computer Engineering

Engineering services (Only Engg)

- Engineering services for Data centers
- Engineering services for IT Departments
- Engineering architectures, drawings, road ways, town house planning, parking, safety, outdoor maintenance, lighting etc
- All other aspects of engineering: Civil, electrical, water and sewage, safety and mechanical motors, pumps, refrigeration, cooling

Mentoring Services

- IT Mentoring
- Engineering Mentoring
- Business Mentoring
- Mentoring for specials categories based on age, and disabled
- Mentoring for special professionals like Military and Govt officials under Govt Programs

Data center services (Engg + IT)

- Data center Engineering services
- Data Center IT Services
- Data center Security services
- Data Center QA services
- Datacenter Cloud services
- Datacenter compliances services
- Data center based business solutions

Outsourcing

- Insourcing
- Outsourcing
- Near sourcing
- Cloud sourcing
- BPO services
- IT specific services
- Engineering specific services
- Training specific services

Service details for Bhadale IT Developers Pvt. Ltd

IT Division programs – Robotics

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We have a large set of offerings; few are mentioned below

No	Name	Key component features / Use cases
1	**Design of Robotics manipulators**	We offer planning, design and prototyping assistance for Industrial robot manipulators, serial, parallel micro & nano types with mobility in six degrees of freedom. We design robotic arm, wrist, grippers, robot joints that are either translational (prismatic) or rotational (revolute), define safety poses (position and orientation). We offer Robot joints powering unit either electric or hydraulic motor types. We have experience in design of robot arm types , mainly anthropomorphic and SCARA (Selective Compliant Articulated Robot for Assembly) We design serial robots with 2, 3, and 6 degrees of freedom, various roll, pitch, yaw based locomotives, parallel robot types like three legs of various type like RTR-RRR-RRR, and delta robots, Cartesian / gantry robots with various combinations like XX-Y, XY, YZ etc
2	**Design of robot vehicles**	We assist you in planning, design /engineering and prototyping of various types of robot vehicles. Few of these are: Land (bipeds, quadrupedal, hexapods) , water (amphibians, deep sea explorer, snakebot, & fishbot) and air (drones, UAV) We help you in analyzing your business needs and offer unique solutions that help in proper design, inventory and performance as per requirements.
3	**Design of man-robot systems**	We offer services related to planning, design of haptic robots for the assessment and evaluation of movements in paralyzed persons and rehabilitation centers We assist in design of telemanipulators that are few feet away or remote with large distance like a WAN coverage of a remote village. Our design spans through electronic,

		hydraulic, or mechanical linkages, that allows a hand-like mechanism to be controlled by a human operator
		We assist in design of exoskeletons that offer essential support for human motion, training muscle movements and assisting in injury recovery, fight fatigue and injury, and ergonomic support for laborers. We offer quality services that provide torques within normal biomechanical ranges, leveraging upon pHRI (physical human-robot interaction) and cHRI (cognitive human-robot interaction) based sensor technologies
4	**Design of bio-inspired robots**	We offer planning and design services of animals robots like nature protection agents, bat chasers in agriculture fields, animal drones that help farmers, night inspection animals like watch dogs, insect repeller bird robots. We help in design planning and assist in fabrication as per industry standards and expected function and performance
5	**Design of industrial robots**	We assist in planning, design and prototyping of industrial grade robots like articulated, Cartesian, gantry, cylindrical, polar, SCARA and delta, Robots-Master in a workcell for welding, painting, coating, machining and assembly and Robots-Slave in a workcell for work piece/ material handling, palletizing/ part feeding, die casting and fixturing We assist in design of robots for special applications like QA, Testing, repairs, food processing/ packing, textile and construction , wheeled robots, hotel servers, cargo lifters, security guard robots, night visit robots, standing inspection robot, quality inspector, sorting robot, and cleaning robot We help you in adopting AI / ML for your software based apps that integrate with the robot system for remote control, autonomous tasks handling and automation using RPA
6	**Design of office robots**	We offer services related to planning, design and prototyping of robots for various functions like document scanners, office attender, front office receptionist, personal secretary, expert system, IVR , auto phone call replier, and office organizer We help you integrate the existing/ required ERP software to run the operations and automate various repetitive tasks that required regular computations like salary slips, payroll, meeting organizers, calendars, schedulers and many more for various departmental needs and team work
7	**Design of home & personal use robots**	We offer services related to planning, design and prototyping of robots for home maids, cooking robots, aged assistant, personal assistant, dishwasher robot, and baby sitter. We use industry safety standards and quality metrics that are safe-to-human-use and have tolerance limits that are applied all the time of usage. We help in repairs and reprogramming in case of issues and faulty/ undesired moves by the robot.
8	**Design of robot workspaces,**	We offer various services related to planning and safety design for serial and parallel robotic systems , offer ISO advices, QA assessment process , HAZOP, AI based error

	safety calibrations and training	corrections, kinematics, prevention of loss and damage, and Stewart- Gough platform related services We offer software computing services for various math functions, transformations like homogenous transformation matrix and Jacobian matrix. We offer digital platform based services like HPC for real time transformation and movement calculation. We offer engineering services for pendulum based and human mimicking based training sessions that ensures robot learn from human body movements, actions, and application of proper torques to motors and allowed impact with human body parts
9	**Design of control units, navigational units, micro-controller, sensors, motors**	We offer various services related to planning and design for AI based intelligent control units, smart sensors, and knowledgeable navigation units using reinforced learning, localized maps, control of internal and external variables, and data / feeds processing. We offer electronic units integration with other systems like mechanical systems, sensors robot prime movers and locomotive devices that are part of the robotic system right from prototypes to production We offer computing services for Direct kinematics - calculation of the position of the robot end-point from the known joint angles and Inverse kinematics that calculates the joint variables from the known position of the robot end-point, PID related differential derivations, control loop planning, scheduling, Analog to Digital conversions, IC chips for built in intelligence, mechatronics, instrumentation, signal analysis, sensors testing and calibrations, minor repairs and power unit design We offer various design services of Robot sensors - proprioceptive sensors for assessing the internal states of the robot mechanism (positions, velocities, and torques in the robot joints); and exteroceptive sensors delivering to the controller the information about the robot environment (force, tactile, proximity and distance sensors, robot vision), electrical sensors (potentiometers or strain gauges), electromagnetic sensors(tachometer), Optical sensors(optical encoders), Tactile sensing based on an array of touch sensors (deformation-based sensors, resistive sensors, capacitive sensors, piezoelectric sensors, magnetic sensors), force sensor, bumper sensors, torque sensors, 2D,3D stereo vision, hall sensors, light switches, body mounted sensors, trajectory planning , actuators, proportional-derivative (PD) controller with gravity compensation, linearization of system, position control, and inverse dynamics
10	**Design of Robert Safety**	Our design assure safe cooperation of human workers and industrial robots that is divided into three major groups: (1) robot safety features, (2) robot workspace safeguards, and (3) personnel training and supervision for all three modes of operation: normal work, programming and maintenance. We offer three major approaches to the robot workspace protection: (1) barriers and fences, (2) presence sensing, and (3) warning signs, signals and lights , three levels of safety We design assembly production line configurations using robot assistance : • In-line (direct, L-shaped, U-shaped, circular, rectangular), • Rotary,

			• Hybrid. Proper design for feeding systems, like Part feeders, vibratory bowl feeders, rotary tables, & magazine feeder Proper design for conveyor systems, like sliding chain conveyor, belt conveyor, rollers, grippers, vacuum grippers, hot and fragile material handlers, suction heads
11	**Design of collaborative robots**		We assure our quality adheres to ISO 10218-1:2011 and ISO 10218- 2:2011 (ANSI/RIA R15.06:2012) We design the workspace zones like restricted, operating, maximum, and collaborative No pinch design, light weight materials, tactical skin, highly safe grippers. We help in operations like Safety-rated monitored stop, hand guiding, speed and separation monitoring, power and force limiting. Design of safety rated levels(stop, slow speed, medium speed) for maintaining minimum protective distance The method of power and force limiting allows physical contact between the robot system and the operator. We design for the quasi-static and transient contact that adheres to limit values presented in ISO/TS 15066:2016 We design robots as per document ISO 10218-2:2011 that provides the division of collaborative applications into five categories
12	**Design of mobile robots**		We design Mobile robots for various applications in factories (automated guided vehicles), homes (floor cleaning devices), hospitals (transportation of food and medications), in agriculture (fruit and vegetable picking, fertilization, planting), for military as well as search and rescue operations. Few of the types we support are tugger, unit loader and forklift. We offer navigation designs like Localization, sensor abstraction disk, Radio-based indoor positioning systems, odometer, Simultaneous Localization and Mapping (SLAM) Path planning that enables autonomous mobile robots to track an optimal collision free path by using an artificial potential field algorithm where repulsive and attractive fields modify the robot's path Path control using Control of position and/or Orientation, rerouting for obstacle avoidance. Path following for tracking the virtual vehicle path for predefined paths
13	**Design of humanoid robots**		Design of complex biped locomotion control units, high number of degrees of freedom of movement (30 degrees). We offer testing of various parameters like zero moment point (zmp), stance & swing walking patterns, Center of mass (COM), static and dynamic walking We offer imitation learning, also referred to as programming by demonstration where in our human teacher demonstrates to a robot how to perform the desired task step by step that enables it to pick up the demo and redo the same.

Techniques used to observe and measure human movements, include
• optical motion capture systems,
• ensembles of inertial measurement units (IMU),
• computer vision methods for the estimation of human motion,
• passive exoskeletons,
• hand guiding.

We offer design using Dynamic Movement Primitives

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