RAJALAKSHMI INSTITUTION'S

Center for Excellence Lab

Vision

The Center for Excellence Laboratory provides state-of-the-art laboratory designed to engage students by actively involving them in cutting edge work. Our strategic intent is to achieve distinction with excellence and become uniquely identified as leading Institution in India. The laboratory is intend to bring together more than 600 students, including research scholars, UG and PG students. The cross laboratory with multidisciplinary approach brings in funded projects and meet the challenges of the society.

Goals

- Increase innovation, entrepreneurial and leadership skills of students
- High quality teaching and promote self learning capability of graduate students
- High standards of laboratory practice
- Excellence in teaching methodology and research
- Professional and career growth of staff and trainees
- Optimal support for Laboratory skill
- Workplace characterized by mutual respect, teamwork, and open communication

The research center focuses on 5 digital forces: Cloud Computing, Big Data, Internet of Things, Mobile Development and Artificial Intelligence.

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Cloud Lab @RI

Rajalakshmi Institution aims to provide flexible, scientific infrastructure for research on the future of cloud computing to build our own clouds, experimenting with new architectures that will form the basis for the next generation of computing platforms. It is expected that Cloud Computing will help in pooling of computing resources of Government Departments into large clouds thereby increasing utilization of computing resources effectively. It is built for running experiments that will lead to, or to a deeper understanding of the fundamentals of cloud computing.

Mission

- The mission of cloud lab is to identify new capabilities in future clouds for high performance computing.
- RCLs to conduct fundamental and applied research on all aspects of systems that integrate computing and information processing.
- To deliver virtual machines for remote access and reduce the cost of implementation of remote lab.
- To establish center of excellence through providing computing resources for small and medium enterprises and establish a business value.

RoadMap

Year 1-2

- Strengthen our faculty and students in utilizing the resource of cloud lab.
- Coordinates talks and trainings focused on cloud computing services such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform.
- Enable scholars and students to compute their research works.

Year 2-3

- To Enable students and faculty to publish their research activities done in the lab

- To expand the cluster from a 4 node to 20 node and apply for funding's to undertake research projects.
- To assist in deploying private cloud setup in other institutions.

Year 3-5

- To develop scientific solutions for government projects and gain resources and funding.
- To make the cloud lab setup to perform better and increase infrastructure on par with entry level supercomputing facility.

Requirements

Physical Infrastructure for PRIVATE CLOUD SET UP

System	Quantity	Price	Total Price
IBM/ DELL blade servers - with INTEL XEON Quad Code 16GB RAM	4	3,60000	360000
Dell i7 processor 8 GB RAM	4	40000	160000
Cisco SF300-24P 24-port 10/100 PoE Managed Switch with Gigabit Uplinks	1	20000	20000
Software Requirement	VM WARE WORKSTATION	17000	17000
Operating System	UBUNTU	Open source	--
Cloud Middleware	VMware ESXi,hypervisor Eucalyptus, OpenStack, Cloud Sim, OpenNebula Citrix Xen	Open Source	--
Big Data Tools	Hadoop, Hive, Hbase, etc	Open Source	--
TOTAL COST			**485000**

BIG DATA @ RI

Rajalakshmi Institution leverages its research expertise to develop new methods that transform data into value. Analyzing large and complex data sets, also known as "big data," can provide solutions to many challenges. Applying data analytics to social networks may help industries understand trends in consumer behaviors. Similar computational capabilities may also provide insight on tackling some of the most critical issues facing society today. Analytics in big data may lead to more confident decision making, and better decisions can mean greater operational efficiency, cost reduction and reduced risk.

Mission

- The Big Data Lab's research mission is to identify, engineer and evaluate innovative technologies that address current and future data-intensive challenges.
- To facilitates and collaborate with other scientific disciplines and industry to develop data-intensive and data-enabled applications and inform a long-term roadmap to compete
- To deliver low-cost, high-performance, agile BI and data discovery.
- To prove business value to growing industries and startups To establish a permanent "Innovation Hub" and center for big data analytics for skill building to next generation engineers.

RoadMap

Year 1-2

- Strengthen our faculty and students in Big Data Tools by invited lectures from industry experts.
- Workshops to educate Faculty and Students from other institutions.
- Enable scholars and students to execute their research works.

Year 2-3

- To Enable students and faculty to publish their research activities done in the lab
- To undertake consultation work with startups and deploy their data sets to gain funds.
- To undertake training activities from IT majors.

Year 3-5

- Inviting vendors specific problem from Industry and develop algorithms and analytical engine for solving the problems
- To develop theoretical, innovative scientific and technological solutions to cater to the needs of the industry, the society and the environment.
- To analysis, the forecasting, and the simulation of complex socio-economical phenomena.

Requirements

Hardware Requirements:

Physical Infrastructure

System	Quantity	Price	Total Price
IBM/ DELL blade servers - with INTEL XEON Quad Code 16GB RAM	2	180000	90000
Dell i7 processor 8 GB RAM	10	40000	400000
Cisco SF300-24P 24-port 10/100 PoE Managed Switch with Gigabit Uplinks	1	20000	20000
Software Requirement			
Operating System	UBUNTU	Open source	--
Big Data Tools	Hadoop, Hive, Hbase, etc	Open Source	--
TOTAL COST			**510000**

IOT LAB @ RI

Mission

Rajalakshmi Institutions IOT Lab provides opportunities for dynamic minds to perform R&D in the field of wireless and embedded devices that are connected across internet. IoT involves communication of a wide range of devices through internet to perform certain predefined functionalities, that may include vehicle monitoring, agriculture monitoring, security surveillance, telemedicine and smart cities. Our IoT lab at Rajalakshmi aims at helping the nation in achieving the vision of smart cities by developing conceptual ideas through student's innovative ideas and research.

- The Internet of things lab at REC aims to identity dynamic minds, who could implement concepts into working model.
- To undertake challenging tasks and deliver low-cost solutions for enabling a good communication network among pervasive devices.
- To enable various networking infrastructure to communicate with tiny devices to prove that IOT is here for the future generation.

RoadMap

Year 1-2

- To gain understanding in this future generation field by experimenting basic devices to work with the environment.
- To study the potential of Intel boards and other open source environments and deliver it to educate students.
- To focus on scholars and students to execute their research works for day to day problems.

Year 2-3

- To Enable students and faculty to publish their research activities done in the lab
- To undertake consultation work with startups to gain funds.
- To undertake training activities from IT majors.

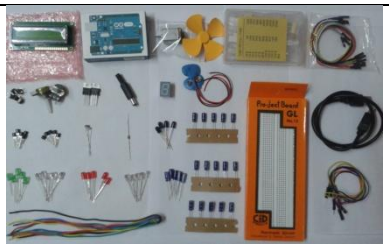
Year 3-5

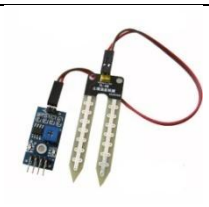
- To propose reliable solutions to real world problems and market them.

- To analysis the forecasting, and the simulation of complex socio-economical problems and provide it for government agencies for embedding into smart city solution.

Requirements

Arduino and Rasberry pi

Product	IMAGE	Qty	Amt	Total
Arduino Starter Kit With Genuine Arduino Uno R3		5	3000	15000
Raspberry Pi 2 Starter Kit - Embedded - v3 (includes Raspberry Pi 2 Model B)		5	6000	30000
DHT11 temperature and humidity sensor module For Arduino Raspberry Pi		5	200	1000
ELEMENTZ IR INFRARED PROXIMITY / OBSTACLE DETECTOR SENSOR		5	200	1000
Vivotech Hc-sr04 Arduino Ultrasonic Distance Measuring Sensor Module Good Compatible		5	200	1000

Soil Moisture Meter testing Module, Soil Humidity Sensor, Water Sensor, Soil Hygrometer Detection module for Arduino		**5**	**200**	**1000**
Raspberry Pi Camera Board		**2**	**2500**	**5000**

INTEL BOARD

Product	**IMAGE**	**Qty**	**Amt**	**Total**
110060064 Grove Indoor Environment Kit for **Intel Edison** Base Shield V2 x 1 Grove - LCD RGB Backlight x 1 Grove – Temperature & Humidity Sensor x 1 Grove - Relay x 1 Grove - Moisture Sensor x 1 Grove - Servo x 1 Grove - Light Sensor x 1 Grove - Buzzer x 1 Grove - UV Sensor x 1 9V to Barrel Jack Adapter x 1 Grove - PIR Motion Sensor x 1	  	**5**	**10000**	**50000**

26AWG Grove Cables x 2 Grove - Encoder x 1 USB Cable x 1 Grove - Button x 1 User Guide x 1				
Intel® Galileo Gen 2 Development Board		**2**	**8000**	**16000**

Xadow Wearable Kit for Intel Edison

Product	IMAGE	Qty	Amt	Total
Xadow Wearable Kit for Intel Edison is a perfect kit to make wearable devices with Intel Edison. It includes an expansion board together with eight tiny and powerful Xadow modules, covering sensors, actuators, displays and communication parts. The connectivity through FFC makes it quite flexible for wearable projects. Based on the kit, you could build your own pedometer, thermometer and NFC enabled devices! Kit includes **Xadow - Expansion Board x 1** **Xadow – 3 Axis Accelerometer x 1** **Xadow - Programmer x 1** **Xadow – Barometer BMP 180 x 1** **Xadow - SD Card x 1** **Battery x 1**		**1**	**15000**	**15000**

Xadow - Q Touch Sensor x 1 Digital RGB LED Flexi-Strips x 5 Xadow – NFC x 1 Power Cables (Red) x 5 Xadow – Breakout x 1 Power Cables (White) x 5 Xadow – Buzzer x 1 Power Cables (Yellow) x 5 Xadow – Vibration Motor x 1 FFC Package x 1 Xadow – OLED x 1				

Tot Cost :Rs. 300000

Mobile Development @ RI

Mobile Development Lab provides unique environment for experimental research in the field of developing app and app based products. The lab helps in identifying the potential of student who is competent in programming android, windows and iPhones. Through Mobile application development, the possibility of creating innovative ideas and help the society by bringing all

Mission

- To provide resources for students to become more competitive in the workplace by gaining exposure to the power of apps as well as experience in the various aspects of the process of defining, designing and testing apps in a cross-disciplinary and innovative learning environment.
- To establish a center of software development for mobile devices and carter to the needs of young generations.
- To undertake challenging tasks and deliver low-cost solutions future generation.

RoadMap

Year 1-2

- To create a clubhouse environment for student developers to share knowledge and ideas and pursue collaborative projects
- Periodic public apps-related events, including developer workshops, panel sessions, and student showcases
- To Support opportunities for student research and development projects

Year 2-3

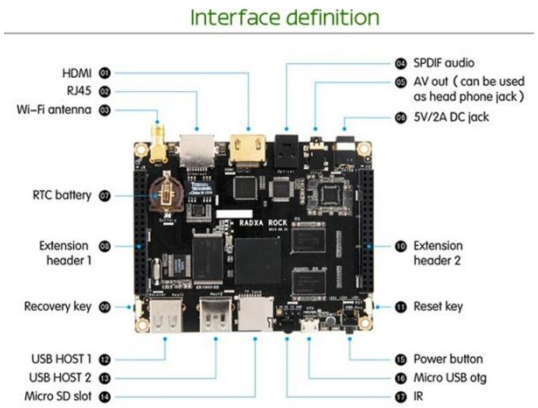
- To Enable students and faculty to publish their research activities done in the lab
- To undertake consultation work with startups to gain funds.
- To undertake training activities from IT majors.

Year 3-5

- To propose reliable solutions to real world problems and market them.
- To design and develop native apps in iPhone, iPad, Android and mobile platforms. We help businesses create mobile capabilities for their internal business as well as their customer base.

- To deliver innovative mobile apps for both the enterprise or standard app store licenses.

Requirements

FriendlyARM S5PV210 Cortex A8 Development Board , TINY210 SDK+7inch Resistance Touch Screen,512MRAM+256M SLC Flash, Android4.0		5	20000	100000
Radxa Rock Pro RK3188 Quad-core 1.6 GHz 2G RAM 8G Flash open source Single-board Computer Supported Linux, Android, FreeBSD hdmi, RCT,diy development kit,NAS ,MINI PC power than respbeery pi		10	12000	120000

Tot Cost:Rs.2,20,000

Artificial Intelligence @ RI

The Artificial Intelligence Laboratory (AI Lab) is designed to facilitate an intellectual home for researchers and interested students from the Faculty of Organization and Informatics whose main research focuses on various fields of AI.

Mission

- To conduct cutting-edge, long-term standalone and collaborative research as well as education in artificial intelligence, multi-agent systems, robotics, computational intelligence, web and data mining, semantic web and related topics with a sharp focus on transferring knowledge into practice.

- To develop machine learning algorithms using prediction methods

RoadMap

Year 1-2

- With mathematical research, investigate important strategies in AI.
- Gathering Training data to solve complex problems
- Design a model smart enough to meet programmers goal

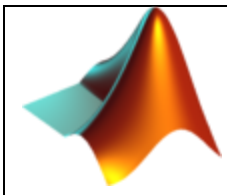
Year 2-3

- To Enable students and faculty to publish their research activities done in the lab
- To undertake consultation work with startups to gain funds.
- To build valid decision criteria for uncertain problems.

Year 3-5

- To design software agents for world-models
- To develop techniques for the synthesis, integration and combination of decision procedures for a variety of problems.

ALL PURPOSE SOFTWARE

 MATLAB (matrix laboratory) is a multi-paradigm numerical computing environment and fourth-generation programming language.	Rs 27000 – academic use 1 license

DATA MINING AND MACHINE LEARNING

Alchemy is a software package providing a series of algorithms for statistical relational learning and probabilistic logic inference, based on the Markov logic representation. Alchemy allows you to easily develop a wide range of AI applications, including: • Collective classification • Link prediction • Entity resolution • Social network modeling • Information extraction **https://code.google.com/p/alchemy-2/**
   **http://www.cs.waikato.ac.nz/~ml/weka/index.html Weka** Machine learning software to solve data mining problems • machine learning • data mining • preprocessing • classification • regression • clustering • association rules • attribute selection • experiments • workflow • visualization

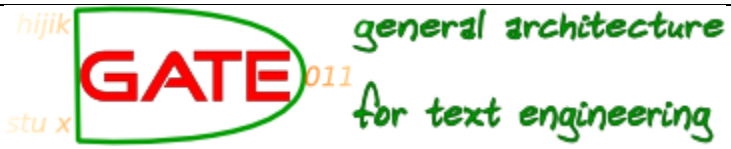
- **Canvas**: graphical front-end for data analysis
- **Widgets**:
  - **Data**: widgets for data input, data filtering, sampling, imputation, feature manipulation and feature selection
  - **Visualize**: widgets for common visualization (box plot, histograms, scatter plot) and multivariate visualization (mosaic display, sieve diagram).
  - **Classify**: a set of supervised machine learning algorithms for classification
  - **Regression**: a set of supervised machine learning algorithms for regression
  - **Evaluate**: cross-validation, sampling-based procedures, reliability estimation and scoring of prediction methods
  - **Unsupervised**: unsupervised learning algorithms for clustering (k-means, hierarchical clustering) and data projection techniques (multidimensional scaling, principal component analysis, correspondence analysis).
  - **Add-ons**:
    - **Bioinformatics**: widgets for gene set analysis, enrichment, and access to pathway libraries
    - **Data fusion**: widgets for collective matrix factorization and exploration of latent factors
    - **Text mining**: widgets for basic tasks in text-mining

- **RapidMiner** is a software platform developed by the company of the same name that provides an integrated environment for machine learning, data mining,text mining, predictive analytics and business analytics

NATURAL LANGUAGE PROCESSING

The Apache OpenNLP library is a machine learning based toolkit for the processing of natural language text.

It supports the most common NLP tasks, such as tokenization, sentence segmentation, part-of-speech tagging, named entity extraction, chunking, parsing, and co reference resolution. These tasks are usually required to build more advanced text processing services. OpenNLP also includes maximum entropy and perceptron based machine learning.



GATE is…

- **open source software** capable of solving almost any text processing problem
- in active use for all sorts of language processing tasks and applications, including: voice of the customer; cancer research; drug research; decision support; recruitment; web mining;information extraction; semantic annotation

Apache Mahout is a project of the Apache Software Foundation to produce free implementations of distributed or otherwise scalable machine learning algorithms focused primarily in the areas of collaborative filtering, clustering and classification