
Re: IIT Professor's Support for Robotics Project

Sujith R Kumar <sujith.kumar1@sbi.co.in>
To: "aaron@kletech.ac.in" <aaron@kletech.ac.in>
Cc: SB RIA <SBRIA@sbionline.onmicrosoft.com>

Wed, Nov 13, 2019 at 2:33 PM

Dear Sir,

Greetings from SBI!

We are from State Bank of India, Innovation Cell (Software Factory Dept), working on a humanoid project which can be placed in branches of SBI.

Team members working on the project are basically from Computer Science background.

Software part of the Humanoid has been developed already and we are looking for guidance in the following areas of Hardware part.

- Hardware specification for the movements involved in Humanoid.
- Body design(Auto-CAD) and building.

Please advise whether any guidance can be provided.

Also share contact details (including Skype) so that further discussion can be done.

Looking forward for a favourable reply.

Regards,

Sujith R Kumar

Asst. Manager (Systems)



Innovation Cell

Software Factory Dept

State Bank Global IT Centre, Navi Mumbai

Mob +91 9967 55 2800

From: D Manjunath <dmanju@ee.iitb.ac.in>

Sent: 12 November 2019 13:17

To: G Sivakumar <siva@iitb.ac.in>; MOIN FAIYAZ SHAIKH <moin.s@sbi.co.in>


Cc: Sujith R Kumar <sujith.kumar1@sbi.co.in>; aaron@kletech.ac.in <aaron@kletech.ac.in>

Subject: Re: IIT Professor's Support for Robotics Project

Warning: This email is not originated from SBI. Do not click on attachment or links/URL unless sender is reliable. Malware/ Viruses can be easily transmitted via email.

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Automation & Robotics
K.L.E. Technological University,
HUBBALLI-31.

State Bank RIA (Robotic Intelligent Assistant)

State Bank Robotic Intelligent Assistant is a humanoid robot, which can be placed in State Bank branches. SB RIA can interact with customers to answer their queries, perform transactions for them and guiding them via robotic movements.

Current Status:

We have already done the development of the software part (excluding movement) of the humanoid and are currently working on the design and development of the humanoid body and its movements.

Design details of RIA:

- Height: 5 ft.
- 2 Degree of Freedom (DoF) in head, 3 DoF in both hands and a wheeled base.
- Software Details (Already Completed).
 - ◆ Face recognition
 - ◆ Biometric client software and touch screen integration
 - ◆ Text to Speech
 - ◆ Hot word detection and client part of speech recognition
 - ◆ A chat window for users to key-in queries and get its response. It also displays user interactions performed through speech (for ready reference).

Problem Statement:

All the team members, working on this project, are from Computer Science background; having done some basic courses on the Robotics. We are looking for guidance in mechatronics part of the humanoid.

Clarifications Required:

1. During a course attended, we had done the assembly of Robot (Biped walking) with servo motors for its movement. Are servo motors good enough for industry ready humanoids?
2. Please provide the specification of such servo motors and its controllers or a method to calculate the minimum specification required.
3. We are thinking of options for humanoid brain as Raspberry Pi or a PC Motherboard. What do you suggest for the brain, considering the software components we have already designed? (Ref. Section: Design details, given above)
4. If we are working with a PC motherboard as the brain of robot, do we need separate Arduino or controllers for implementing the movements? If yes, can that be controlled/coordinated using the PC (Linux Ubuntu)?
5. Can you provide an idea on the battery specification, size and weight that will be required based on the robot's configuration?
6. What material is normally used for humanoid body? Which method can be used for making the body for a robot prototype? Is 3D printing a good option considering the cost and accuracy for a prototype (single piece)?

7. Does KLE Tech have any list of vendors/service providers who are known to provide quality services/components for humanoid projects?
8. What are the hardware requirements and specifications for the Line follower robot like movement (including obstacle detection/avoidance)?



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Guidance for Robotics Project

Sujith R Kumar <sujith.kumar1@sbi.co.in>
To: Arun Giriyapur <aaron@kletech.ac.in>
Cc: SB RIA <SBRIA@sbionline.onmicrosoft.com>

Wed, Nov 20, 2019 at 3:05 PM

Dear Sir,

Greetings!

As discussed over the telephonic call we would like to initiate the engagement process.

As MoU signing is a time consuming process we would like to proceed directly with consultation.

We request you to provide the quotation for consultation fee so that we can proceed with the project.

We may take forward the MoU signing, later in production stage of the project.

Regards,

Sujith R Kumar

Asst. Manager (Systems)



Innovation Cell

Software Factory Dept

State Bank Global IT Centre, Navi Mumbai

Mob +91 9967 55 2800

From: Arun Giriyapur <aaron@kletech.ac.in>
Sent: 19 November 2019 21:08
To: Sujith R Kumar <sujith.kumar1@sbi.co.in>
Cc: SB RIA <SBRIA@SBIOOnline.onmicrosoft.com>

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Project Proposal for RIA

Ajit 3.0 is a humanoid robot platform developed at KLETech for the purpose of rapid prototyping of use cases and applications which can help us understand how humanoid robots can be deployed. This reduces the time required to build and deploy an application and takes away the burden of building the kinematics of the robot. Since the platform also involves a software framework it becomes very easy to architect the application. Humanoids are expected to be intelligent and autonomous, hence Ajit has the necessary hardware to run AI based applications. Ajit has the required sensors and very sophisticated actuators to get very precise motions.

KLETech team proposes to assist SBI GITC in developing a prototype of their humanoid robot RIA by using Ajit as a rapid prototyping platform on which the POC will be done. The POC will in turn help the team to finalize the conceptual design of RIA. Further KLETech team will help in developing the prototype of RIA.

The project will be carried out in the following phases. The deliverables and the responsibilities in each phase are as follows:

Phase	Deliverables	Responsibility
1	Training	KLETech team
2	POC on Ajit 3.0	SBI team and KLETech team
3	Use cases, Requirements, Specifications, Product Architecture, BOM	SBI team and KLETech team
4	Prototyping and Testing	SBI team and KLETech team

The various activities that will be carried out by both the teams during the above phases along with timelines are as follows:

Activities	Deliverables	Responsibility	Timeline
1	Introduction to ROS	KLETech team	01-01-2020
2	Programming in ROS	KLETech team	02-01-2020
3	Architecture of Ajit – The humanoid robot	KLETech team	03-01-2020
4	Current development on Ajit – Programming and Integration of SLAM, NLP, Pose detection and Object detection	KLETech team	03-01-2020
5	Architecture of SBI - RIA	SBI team and KLETech team	04-01-2020


A.C. Vinayak
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6	Software components and services on RIA	SBI team	04-01-2020
7	Migration of SBI-RIA software components and services on Ajit	SBI team and KLETech team	06-01-2020
8	Rapid POC using Ajit	SBI team and KLETech team	06-01-2020
9	SBI-RIA POC planning	SBI team and KLETech team	07-01-2020
10	Prototyping of Physical Structure and Kinematics RIA	SBI team and KLETech team	To be decided
11	Testing of RIA	SBI team and KLETech team	To be decided

KLETech Team:

1. Arunkumar C.Giriyapur, Head, Dept of A&R
2. Mrs Ashwini G.K, Assist Prof, Dept of A&R
3. Shridhar Doddamani, Assist Prof, Dept of A&R
4. Karthik L, Project Engineer, CASE
5. Student interns – 3 no

Consultancy Model:

KLETech will give basic training on ROS with hands-on experience. The POC will be done using Ajit humanoid robot and once approved will further help in prototyping the complete humanoid robot RIA.

The components required such as sensors, actuators, CPU or GPU, batteries and other miscellaneous parts will be procured by SBI team. KLETech team will design the parts of the structure, 3D print the parts, develop the battery pack and battery management system, assemble all the parts, integrate all the hardware and test the prototype.

SI No	Description of Activity	Amount INR
1	Complete support including: Training on ROS Integrating of SBI microservices on Ajit for POC Designing of RIA –Physical structure Preparing BOM Printing & machining of parts Assembling RIA	1,20,000.00



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	Testing	
2	3D printing of parts	At Actual cost based on weight of each component. The quote can be finalized once the component design is complete.
3	Travel – If any of the team members are required to travel to Mumbai for support or other requirements	TA/DA as per norms

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4	Current development on Ajit – Programming and Integration of SLAM, NLP, Pose detection and Object detection	KLETech team	03-01-2020
5	Architecture of SBI - RIA	SBI team and KLETech team	04-01-2020
6	Software components and services on RIA	SBI team	04-01-2020
7	Migration of SBI-RIA software components and services on Ajit	SBI team and KLETech team	06-01-2020
8	Rapid POC using Ajit	SBI team and KLETech team	06-01-2020
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Sl No	Description	Qty	Unit Price INR	Total INR
1	Nvidia Jetson Nano	1	9000.00	9000.00
2	Dynamixel actuators			
	XM430	4	23000.00	
	MX-64AR	2	36501.00	
	MX-10GR	4	49990.00	
3	Intel realsense D435i	1	14735.00	14735.00
4	Ultrasonic sensors	2		
5	Microphone	1		
6	Speakers	2		
7	Telephone receiver	1		
8	Touchscreen 10.1 in	1	7890.00	7890.00
9	LED display for face	1		
10	Batteries 12V & 22 V	30	190.00	6000.00
11	LED lighting			

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Guidance for Robotics Project

Sujith R Kumar <sujith.kumar1@sbi.co.in>

Wed, Dec 23, 2020 at 2:31 PM

To: Arun Giriyaapur <aaron@kletech.ac.in>

Cc: State Bank RIA - Robotic Intelligent Assistant <sbria@sbi.co.in>, "abhijith.s@kletech.ac.in" <abhijith.s@kletech.ac.in>

Dear Sir,

Greetings & appreciations for the Project RIA advancing to the final stage of development!

Thanks to the faculties and students for providing us the guidance and support during the course of development. It has been a great learning experience for us to work with the Department of Automation & Robotics at KLE Technological University.

Also, as a token of encouragement, We would like to issue appreciation letters to students who have helped us in the development journey. We request you to provide the names, role/responsibility, and the duration of involvement for issuing the letters.

We look forward to our continued patronage towards the production readiness, support, and future versions of the Project RIA.

Regards,

Sujith R Kumar

Asst. Manager (Systems)



Innovation Cell

Software Factory Dept

State Bank Global IT Centre, Navi Mumbai

Mob +91 9967 55 2800

From: Arun Giriyaapur <aaron@kletech.ac.in>

Sent: 16 February 2020 13:20

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K.L.E. Technological Univers.,
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INVOICE



KLE TECHNOLOGICAL UNIVERSITY

BVB College Campus , Vidyanagar,
HUBBALLI-580031
Ph : 0836-2378121

PAN : AACAK9702A

GSTIN : 29AACAK9702A1ZV

Place of Supply : Hubballi, Karnataka .

KLE TECH University Co-ordinator *Arun. C. Giviyapur*

INVOICE NO : 395

Date : 17/03/2020

To, State Bank Global
IT Centre,
Innovation cell,
Software factory dept,
Navi Mumbai .

GSTIN : 27AAAC58577K220

DESCRIPTION	AMOUNT (Rs)
Development charges for the prototype of RIA Humanoid robot .	398,400.00
Sub Total	398,400.00
<i>C98791.</i>	<i>35856.00</i>
<i>98791.</i>	<i>35856.00</i>
Total Invoice Value	470112.00

Bank Details :

Bank Name & Address : Syndicate Bank, BVB College, Hubballi
Account Name : The Registrar, KLE Technological University, Hubballi
Account Number : 12442010009267
IFSD Code : SYNB0001244
Swift Code : SYNBINBB445

For KLE Technological University

[Signature]
REGISTRAR
K.L.E. Technological University
HUBBALLI-580 031.

[Signature]
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BVB College Campus , Vidyanagar,
 HUBBALLI-580031
 Ph : 0836-2378121

PAN : AACAK9702A

GSTIN : 29AACAK9702A1ZV

Place of Supply : HUBBALLI , KARNATAKA

KLE TECH University Co-ordinator Arun .C.Giriyaapur

INVOICE NO : 358

Date : 19/12/2019

To,
 State Bank Global IT Centre,
 Innovation cell,
 Software factory Dept.,
 NAVI Mumbai.

GSTIN : 27AAAL58577K2Z0

DESCRIPTION	AMOUNT (Rs)
Training on ROS Integrating of SBI microservices on Ajit for POC, Designing of RIA- Physical structure, Preparing BOM, Printing and Machining of parts, Assembling RIA and Testing.	1,20,000 = 00
Sub Total	1,20,000 = 00
IGST @ 18%	21,600 = 00
Total Invoice Value	1,41,600 = 00

Bank Details :

Bank Name & Address : Syndicate Bank, BVB College, Hubballi
 Account Name : The Registrar, KLE Technological University, Hubballi
 Account Number : 12442010009267
 IFSD Code : SYNB0001244
 Swift Code : SYNBINBB445

Arun

For KLE Technological University

Arund
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 K.L.E. Technological University
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