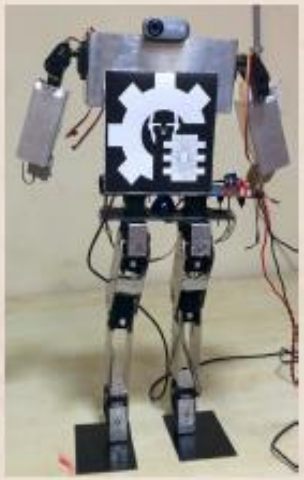
SRM TEAM HUMANOID

One of the only two humanoid robotics teams in India.
Bronze Medalist at Robogames, 2015, World's largest Robotics Competition.





TEAM DETAILS BROCHURE 2016-17

WE, THE TEAM HUMANOID…

With the dream of two people to explore the world of Humanoid Robotics and realizing the lack of education in the field of robotics led to the formation of SRM TEAM HUMANOID in September 2013 which now stands tall on it's 14 student's shoulder.

With a single vision to put India as a forerunner in the field of Robotics and Artificial Intelligence the team is striving towards excellence.

Being one of the only two official Humanoid teams in India we feels proud to introduce the tallest walking biped model, and now the run is for the fastest.

ABOUT SRM UNIVERSITY

The SRM University , formerly SRM Institute of Science and Technology, is a co-educational private university in the state of Tamil Nadu, India. It was founded in 1985 as SRM Engineering College in Kattankulathur, under University of Madras. It now has four campuses in Tamil Nadu Kattankulathur, Ramapuram, Vadapalani and Tiruchirapalli—and three in the rest of India such as Modinagar near Delhi, Sonepat in Haryana and Gangtok in Sikkim. It became SRM University in 2006, when it attained the status of a full-fledged university, under section 3 of the UGC Act 1956.

The university is approved by the UGC and is accredited by the NAAC. It has been given an overall grade of A+ by NAAC. The university has been voted as India's No. 1 private university by Zee News, Deccan Chronicle and India Today.

SRM University is one of the top ranking universities in India with over 38,000 students and more than 2600 faculty across all the campus, offering a wide range of undergraduate, postgraduate and doctoral programs in Engineering, Management, Medicine and Health sciences, and Science and Humanities.

AIM

Our aim at **SRM Team Humanoid** is to put India as a forerunner in the field of Robotics and Artificial Intelligence, the team is striving towards excellence.

Our mission is to successfully represent India at one of the most coveted Humanoid Robotics competition, the RoboGames and the RoboCup.

RoboGames (previously ROBOlympics) is an annual robot contest held in San Mateo, California. The most recent RoboGames was held April 08-10, 2016. RoboGames is the world's largest open robot competition

RoboGames is the *Olympics of Robots* - they invite the best minds from around the world to compete in over 50 different events: combat robots, fire-fighters, LEGO bots, hockey bots, walking humanoids, soccer bots, sumo bots, and even androids that do kung-fu. Some robots are autonomous, some are remote controlled.

About two thirds of the robot events are autonomous, while the remaining third are remotely operated (RCVs).

The Various Humanoid events include:

- Freestyle (original)
- Biped Race (R/C)
- Stair Climbing
- Obstacle Run
- Penalty Kick
- Sprint

RoboCup is an annual international robotics competition founded in 1997. The aim is to promote robotics and AI research, by offering a publicly appealing, but formidable challenge.
The official goal of the project:
"**By the middle of the 21st century, a team of fully autonomous humanoid robot soccer players shall win a soccer game, complying with the official rules of FIFA, against the winner of the most recent World Cup.**

In the Humanoid League, autonomous robots with a human-like body plan and human-like senses play soccer against perception and world modeling is not simplified by using non-human like range sensors. In addition to soccer competitions technical challenges take place. Dynamic walking, running, and kicking the ball while maintaining balance, visual perception of the ball, other players, and the field, self-localization, and team play are among the many research issues investigated in the Humanoid League.

TEAM'S PROGRESSION

Since its inception in September 2013, the team built its first wooden model **MARK I** with only four servos and coded on Arduino Uno to grasp the basics of Humanoid Robotics.

Then in December, came much stronger and stable model built with Aluminium frame and six servos, which was coded with Arduino Mega, **MARK II**.

In order to work on sensor calibration, the team decided to try their hand on "Automatic Car Parking System"

MARK III

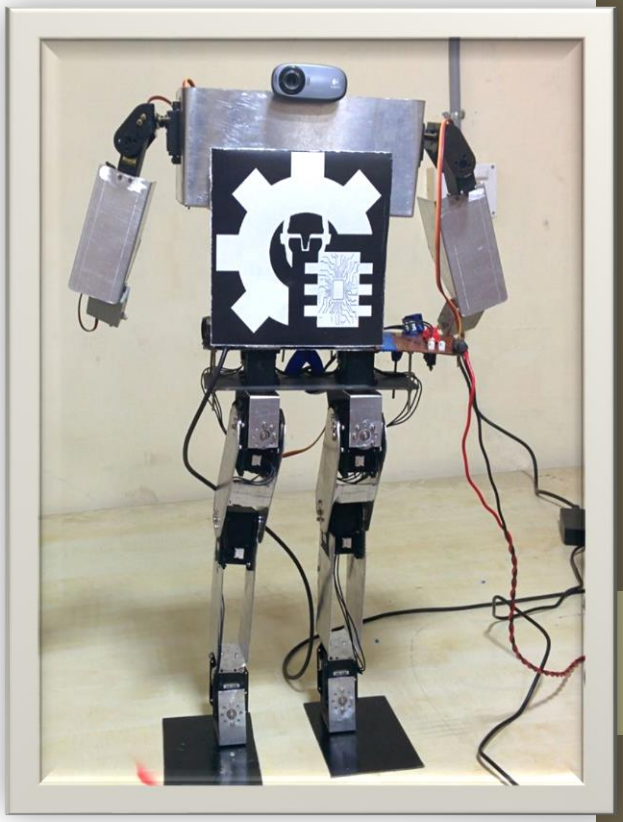
The prototype for the main bot framed with Aluminium Alloy.
MORE STRONGER. MORE STABLE. MORE AGILE.
This bipedal structure is supported by a chest plate making its walking algorithm more stable and powered by 6 Dynamixel series of Robotis.

DESIGN STATS:

- HEIGHT : 88.5CM
- FOOT LENGTH: 5 inches
- STEP LENGTH: 2.5 inches
- ARM CORTEX-X64 PROCESSOR

MARK IV

Meet our new semi-autonomous Humanoid MARK IV (Vajra).
This bot has 18 DOF and runs on 4th generation Intel core i7 processor powered by Turnigy Nano Tech 3S Lipo Battery (5000mAh).It is fully actuated using Smart Servos by Robotis, the Dynamixel MX-64T.



DESIGN STATS:

- HEIGHT : 120 cm
- WEIGHT: 3.8 kgs
- Controller : ARM Cortex M3
- Actuator : Robotis Dynamixels MX 64T

A.T.Hum

A.T.Hum stands for Artificially Telepresent Humanoid whose movements are controlled by a human from some distance away by extracting the joint locations of a person standing in front of the camera in 3D Space through an RGBD Camera and that of the fingers by using data gloves, calculating the angles between each of the links, then transferring the data to the robot at a different location through a web server and recreating the movements on the humanoid robot platform as precisely as possible. The camera mounted on the humanoid transfers the live feed through a VR Headset to the user.

A.T.Hum is inspired by the inFORM Project by Dr. Daniel Leithinger and by the robot "ATOM" from the Science Fiction Movie "Real Steel". The unlimited applications of telepresent robots such as health care, robot warfare, virtual reality, reconnaissance in dangerous zones etc. has driven us to build A.T.Hum.

A.T.Hum

Chéri Voitheías- The Helping Hand

Chéri Voitheías (Greek for "The Helping Hand") is a vision-based user interface of a mobile robotic arm for people with severe disabilities to help them carryout a few of their day to day activities without human assistance. The user interface using eye movements consists of a web camera, computer, and display unit. We are currently working on a user interface that would enable a person to pick up objects from a location by controlling the arm with eye movements and Brainwaves. The arm is highly precise. Inverse Kinematics is used for calculation of motor angles.

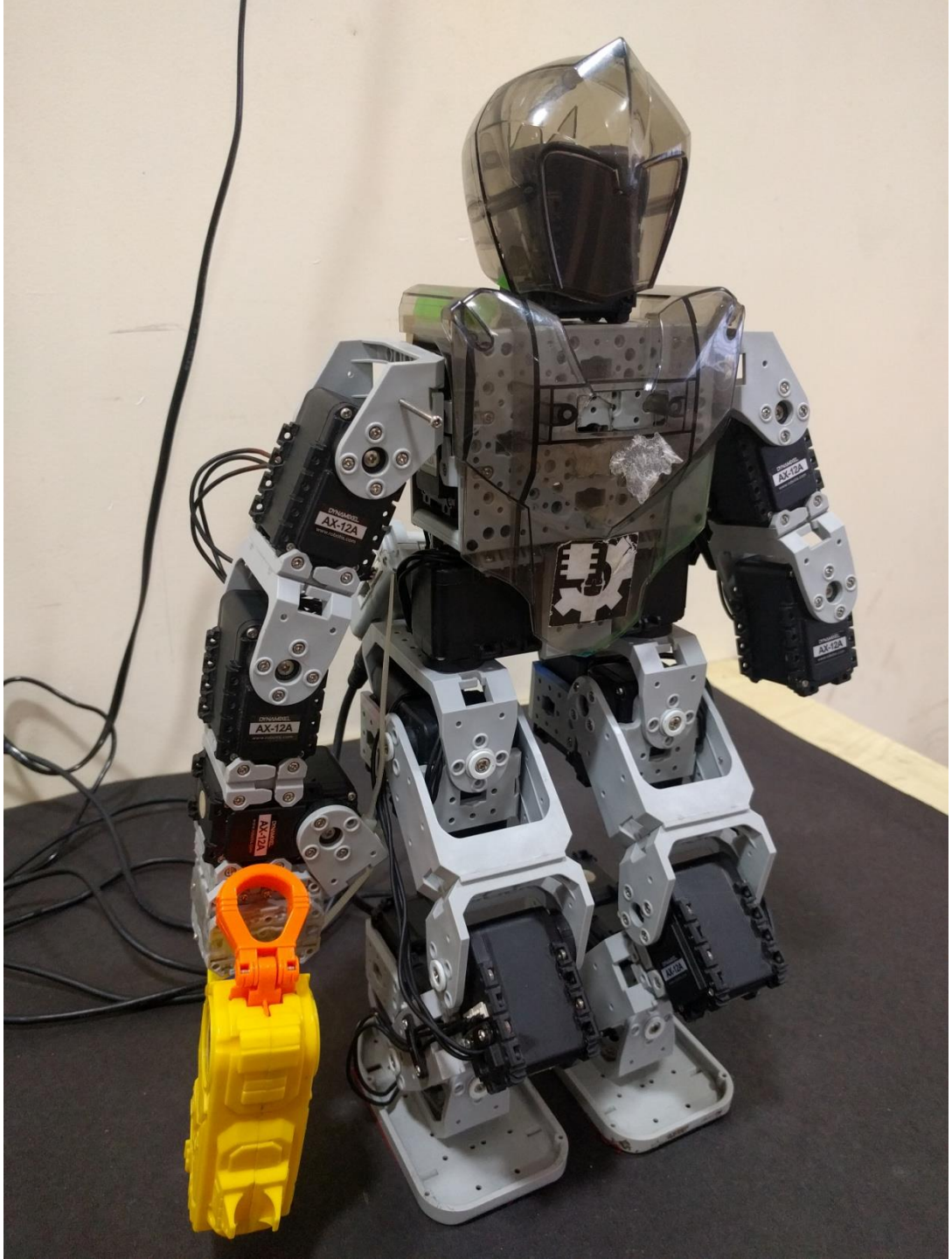
The helping hand is designed for the people suffering from Tetraplegia and other mobility issues to make the world more accessible for them. Below neck paralysed could not exhibit any motor actions other than eye movements. Hence eye tracking is used to control the motors.

Chéri Voitheías- The Helping Hand

Autonomous Shooting Humanoid using Visual Servoing

The robot uses a combination of computer vision techniques like image processing and depth imaging to detect the targets and drives the servos accordingly to shoot them using a gun. The angles of rotation of the motors are determined by using inverse kinematics and Vector Algebra. The system is currently implemented on a 45cm Humanoid as a proof of concept. The robot can shoot moving targets by predicting their position by calculating the acceleration and velocity. We are currently working on implementing Machine learning based facial recognition on the robot to differentiate between friends and foes.

This robot is designed to serve as a surveillance robot in top secret research facilities and as a sniper in covert operations.


DYNAMIXEL
AX-12A

Shadow & Ghost (Ongoing Project)

ACHIEVEMENTS

BRONZE MEDAL at RoboGames 2015 for Free Style event.

Robogames is the World's largest open robot competition and considered to be the Armageddon of world class robots and is the greatest robotics competition on the planet with a participation of 227 teams from 18 different nations.

9 member's of the team represented the country in the 11th International RoboOlympics, RoboGames 2015 in San Mateo, California and procured a BRONZE MEDAL for the nation in it's first attempt in the Humanoid Freestyle Original Event.

SILVER at INDO-US Robo League for Robotic Arm event.

Indo-US Robo League (iURL) is An International Level Robotics Competition, organized by Technophilia Systems in association with Robotics and Computer Applications Institute of USA (RCAi-USA).

8 members of the team participated in Robotic Arm event at National Round of Indo-US Robo League 2015 held during Aavriti 2015 at IIT Bombay on 28th & 29th March 2015.

The team came up with the prodigious result during the event and secured SECOND position with a record of 3minutes and 20 block.

iURL vedio link-
https://www.youtube.com/watch?v=5e8e1aFfv6s

CONSOLATION at RoboGames 2016 for Freestyle event .

Robogames is the World's largest open robot competition and considered to be the Armageddon of world class robots and is the greatest robotics competition on the planet with a participation of 227 teams from 18 different nations.

9 members of the team represented the country in the 12th International RoboOlympics, RoboGames 2016 in Pleasanton, California.

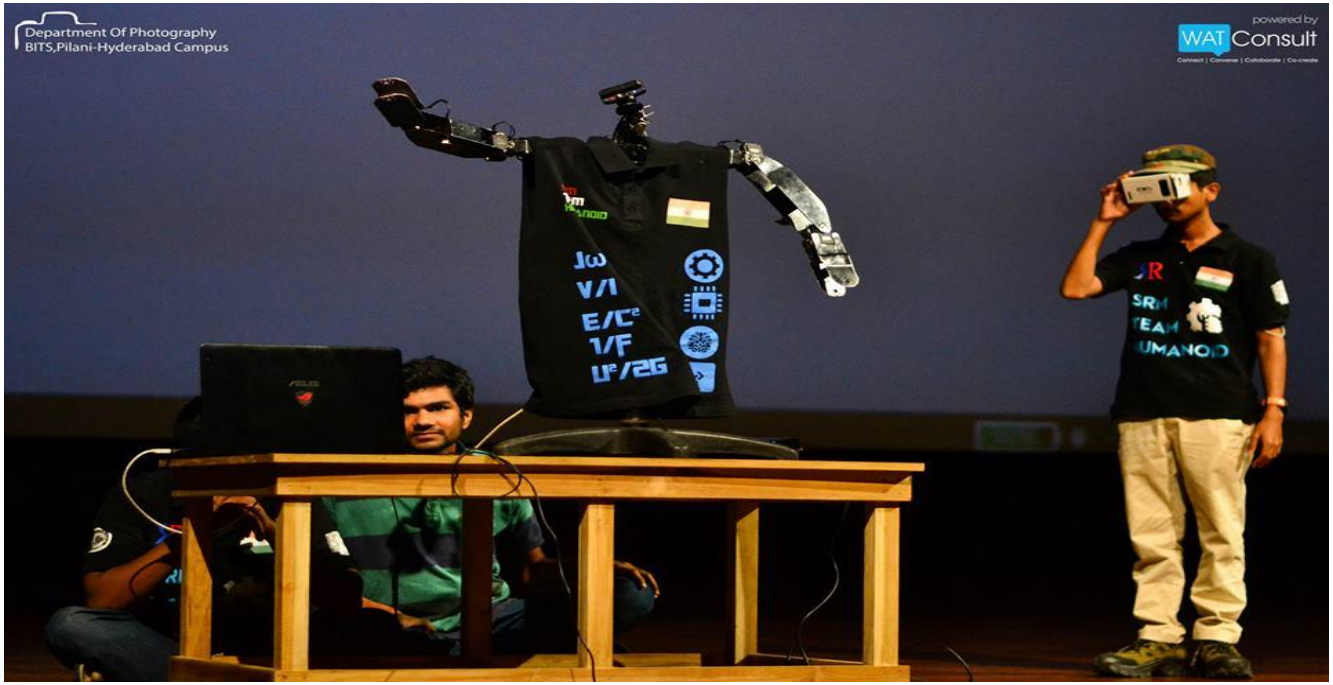
GOLD at IIT Guwahati Techniche 2016 for Phototron event.

Techniche is the flagship tech fest of IIT Guwahati and 9 of our team members represented the University and secured 1st position.

Best Innovation, Bazaar, National Management Expo, 2014.

Third Position at BITS ATMOS'16 Tech Expo.

The team exhibited ATHum, the Artificially Telepresent Humanoid Robot and secured 3rd position at the tech expo.



KINDS OF SPONSORS:

- Monetary
- In-Kind/Components
- Logistics Support
- Software/Educational/ Technical Support

SPONSORSHIP OPPORTUNITIES

Think!Sponsorship

We are actively looking for partners and sponsors to help make the coming year's ROBOCUP and RoboGames entry possible.

Potential future employees, publicity, brand awareness, and relationship building with the society are just a few of the benefits you can receive for being a sponsor of the SRM TEAM HUMANOID. The benefits to students involved in the team are immeasurable. They can develop experience, skills and professionalism as hands on engineers with an awareness of the pressures and requirements of modern day industry.

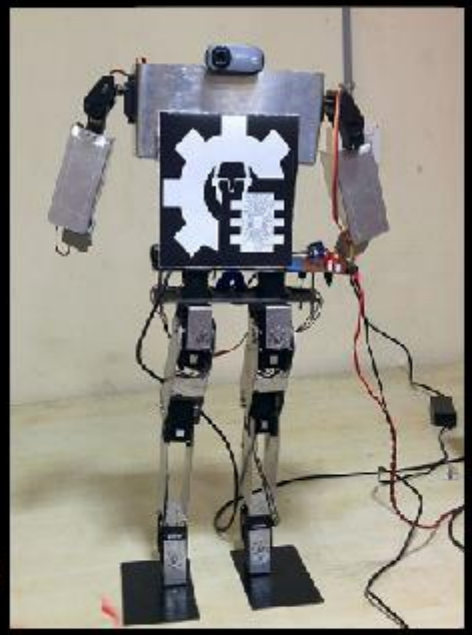
Companies involved can benefit in a number of different ways and help develop engineering excellence in the most exciting and competitive student event in the world through simply becoming a sponsor. The team must raise sponsorship every year to be able to go to the Humanoid Robotics competition.

It is our hope to assemble a group of partners who can not only help us achieve success but who can also benefit from involvement with our team.

To learn more about SRM TEAM HUMANOID, SRM University or to request information on becoming a sponsor, please do not hesitate to get in touch.

HUMANOID ROBOTICS CENTRE.

SRM TEAM HUMANOID



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