



**CHRIST**  
(DEEMED TO BE UNIVERSITY)  
BANGALORE • INDIA

# **SURGE**

## **NEWSLETTER**

### **SEPTEMBER 2021**

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Department of Electrical and Electronics  
Engineering  
School of Engineering and Technology

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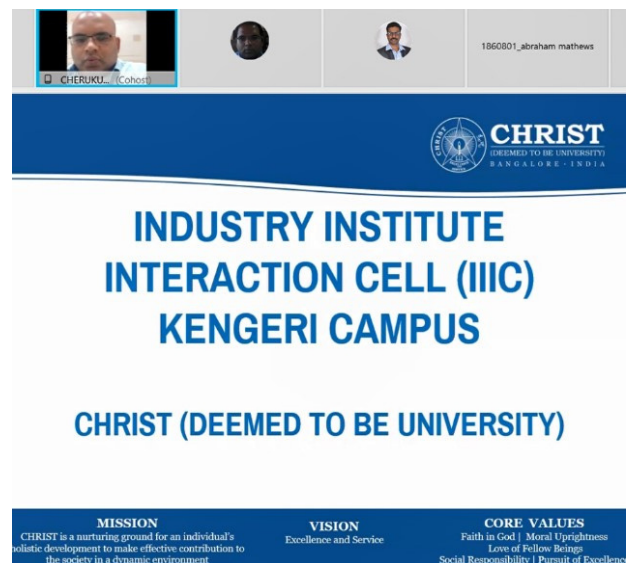
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# INDUSTRY- INSTITUTE INTERACTION CELL (IIIC) ORIENTATION SESSION

The Industry- Institute Interaction Cell is an association that helps to integrate industrial training and other inputs from the industry with the teaching- learning process, interaction with experts which is necessary as evolution in the program and awareness on job functions in the industry and ecosystem. It has been incepted to provide the students a real-time industry experience through various projects and case studies from the repositories of industry to ensure they are well prepared. The cell also inculcates the need skill develop program through certification programs for the students for innovation through applied research and product development in niche areas of Data science, Artificial Intelligence, Robotics, Design Thinking, Cyber Security Internet of Things and Network Security. They also mentor and support the incubation ideas while providing infrastructure and financial help based on the mutual agreement.

The IIIC organized an orientation session for the Department of Electrical and Electronics Engineering on 29th September 2021. The session was hosted by Prof. Venkataswamy R and Lisha Mathews, lead consultant of IIIC. The orientation was held by Dr. Ravindranath Chowdary of the Office

of IIIC. The session gave a brief account on the evolution of IIIC and the current era and facilities that the cell provide. It also explained about the Industry Oriented Curriculum (IOC), the Centre Of Excellence (COE) and the consultancy activities that the association provides. With this, the one-day orientation session was concluded.



# ENERGY CONSERVATION AND AUDITING WORKSHOP

The department of Electrical and Electronics Engineering in association with IIC - Kengeri Campus organized an online two-day workshop on 'Energy Conservation and Auditing' on the 27th and 28th of September 2021 by Consortium of Energy Auditors.

The first session by Prof. Haneesh KM gave a brief account on the need for energy audit and helped to understand the need and process of energy auditing. The session also detailed the process of energy audit in an academic institution and explained the structure of an energy audit report. It gave an insight of the energy management policy for better energy conservation in the academic institution at individual and departmental level.

The second session by Prof. Venkataswamy R gave the task for making a sample energy audit of the room present at the point and the audit of home electricity bills and to how much it can be conserved with solar panel installation. Later, he briefed in detail about the detailed study of energy audit by the institute. The session also explained on the basic concepts we should have to be part of an energy audit and the

various projects and start-up opportunities can be taken up as students.



## Energy Management Policy Implementation



### A REPORT ON DETAILED ENERGY AUDIT

Study conducted at  
CHRIST (DEEMED TO BE UNIVERSITY), BANGALORE

Study conducted by  
Department of Electrical and Electronics Engineering  
School of Engineering and Technology,  
CHRIST (Deemed to be University),

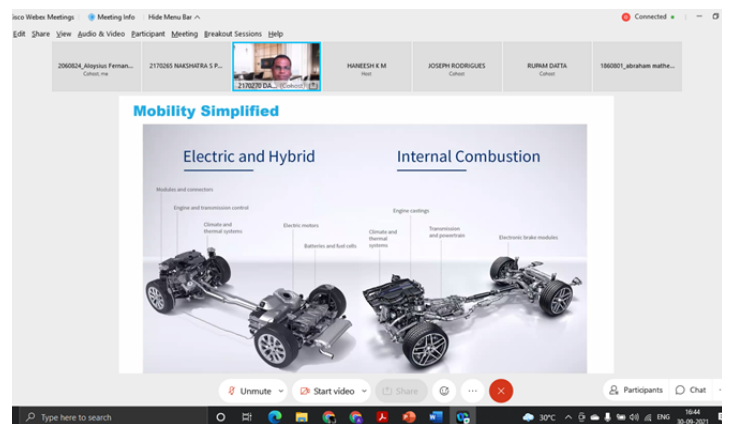
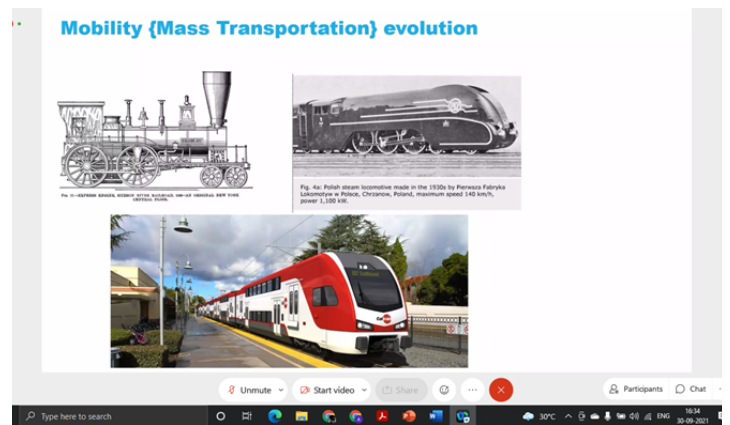
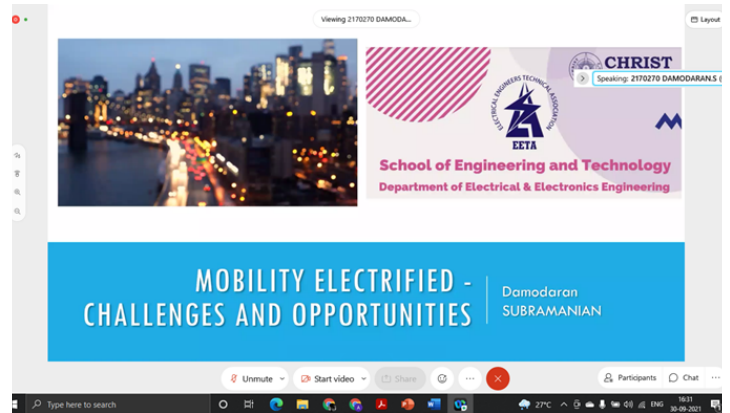
# EETA INAUGURATION

The Inauguration of EETA activities took place on (date). The Master of Ceremonies for the event was Roshni Tresa, the Vice Chair of EETA.

The event began with a Prayer song. This was followed by the EETA report for the academic year 2020-2021 by Rupam Dutta, the Chair of EETA, who briefed the audience about EETA's mission and the events held by the association in the last year. This was followed by the Head of our department, Dr. Joseph Rodrigues, announcing the new EETA office bearers for the year 2021 - 2022. He thereafter addressed the students about the EETA and how it was a place for building skills - not just technical, but also interpersonal skills and teamwork. He encouraged the students to take part in the activities and get themselves registered in the different project/research verticals.

This was followed by the keynote address given by the guest speaker, Mr. Damodaran Subramanian on the topic "Mobility electrified - Challenges and opportunities". Topics such as changes in the Mobility Domain were covered. It was a very informative and interesting. A Q&A session followed, where the students asked Mr. Damodaran their queries and

clarifications. The event ended with the vote of thanks by Alston Vinoo, the Secretary of EETA.



# RESEARCH ACTIVITIES

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## Optimal Load Control for Social Welfare Maximization | SEP in a Smart Distribution System using ATLBO Algorithm | 4 - 5 2021

2nd Congress on Intelligent Systems (CIS 2021), Soft Computing Research Society and CHRIST (Deemed to be University)

**Authors:** Nirmala John, Varaprasad Janamala, Joseph Rodrigues

### **ABSTRACT**

The demand for reactive power support from Distributed Generation (DG) sources has become increasingly necessary due to the growing penetration of DG in the distribution network. Photovoltaic (PV) systems, fuel cells, micro-turbines, and other inverter-based devices can generate reactive power. While maximizing profits by selling as much electricity as possible to the distribution companies (DisCos) is the main motive for the DG owners, technical parameters like voltage stability, voltage profile and distribution losses are of primary concern to the (DisCos). Local voltage regulation can reduce system losses, improve voltage stability and thereby improve efficiency and reliability of the system. Participating in reactive power compensation reduces the revenue generating active power from DG, thereby reducing DG owner's profits. Payment for reactive power is therefore being looked at as a possibility in recent times. Optimal power factor (pf) of operation of DG becomes significant in this scenario. The study in this paper is presented in two parts. The first part proposes a novel method for determining optimal sizes and locations of distributed generation in a radial distribution network. The method proposed is based on the recent optimization algorithm, Teaching Learning Based Optimization with Learning Enthusiasm Mechanism (LebTLBO). The effectiveness of the method has been compared with existing methods in literature. The second part deals with the determination of optimal pf of operation of DG sources to minimize reactive power cost, reduce distribution losses and improve voltage stability. The approach's effectiveness has been tested with IEEE 33 and 69 bus radial distribution systems.

# Political Optimizer Based Optimal Integration of Soft Open Points and Renewable Sources for Improving Resilience in Radial Distribution System | 5 SEP 2021

CIS 2021, CHRIST (Deemed to be University)

**Authors:** D. Sreenivasulu Reddy, Varaprasad Janamala

## **ABSTRACT:**

A novel and simple meta-heuristic optimization technique viz. political optimizer (PO) is proposed in this paper to identify the size and optimal location of solar photovoltaic (SPV) system. The main objective is to minimize the distribution loss and is solved using proposed PO. The computational efficiency of PO is compared with the literature and its superiority is highlighted in terms of global solution at initial stage. The physical requirements of SPV system via soft open points (SOPs) among multiple laterals is solved considering radiality constraints in second stage. The proposed concept of interoperable-photovoltaic (I-PV) system has been applied on standard IEEE 69-bus system and has shown the effectiveness in performance enhancement of the system.

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# IMPORTANT HEADLINES

- Bosch unveils unique EV cable without bulky 'charging brick'.
- UltraTech Cement joins RE100, commits to 100% renewable energy usage by 2050.
- Ultrathin quantum dot LED that can be folded freely as paper.
- Indian Standards for low-cost AC charging point for EVs within 2 months: Govt.
- TI Hopes to Extend EV Drive Time with New DC-DC Bias Supply Module.
- EU Pitches Chips Act to Heighten Its Global Semiconductor Status.
- Electronics brand boAt plans to float Rs 3,500-crore IPO.
- TI's Integrated Transformer Module Technology Helps Maximize Drive Time in Hybrid and Electric Vehicles.
- New Breakout Boards from NeoCortec Simplifies Prototyping of NeoMesh Ultra-Low Power Wireless Networks



# DATES TO REMEMBER

- 2 October – Gandhi Jayanti
- 4 October – World Animal Welfare Day
- 5 October – World Teachers' Day
- 9 October – World Post Day
- 15 October – World Students' Day
- 16 October – World Food Day
- 17 October – International Day for the Eradication of Poverty
- 23 October – Mole Day
- 31 October – Rashtriya Ekta Diwas or National Unity Day

# ANNOUNCEMENTS

Following are the covid protocols that should be followed for on campus instructions from october 21st:

- At least one vaccination completed certificate.
- NOC from parents on their ward attending offline instructions at the campus.
- RTPCR Negative Report valid within 72 hours of reporting on 21st October @9 am irrespective of where you are coming from.
- Quarantine rules will be based on Governmental COVID Protocol at that time.

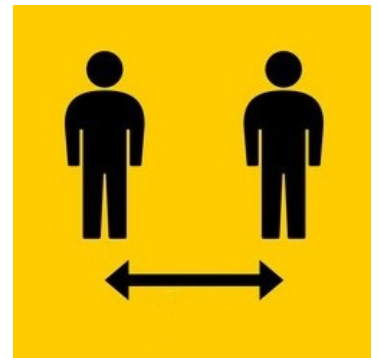
## THREE GOLDEN RULES WE EXPECT YOU TO FOLLOW



**Always wear  
a face-cover/Mask**



**Wash Hands frequently  
and Sanitize**



**Maintain Distance  
from others**

# CREATIVITY CORNER

## TECH CORNER

### SOLAR-MECH ELECTRIC BIKE

#### ABSTRACT

Current Electric Bicycles need approximate 3-4 Hours for charging the batteries attached to them. Leading to an idle charging time of 3-4 hours, this can also pose a problem in finding a charging station while on commute.

The solution to this problem would be to have the battery charge while on commute. This is where a dynamo and piezoelectric discs come into the equation. Mounting a dynamo on the wheels and piezoelectric discs on the rim of the bicycle wheel is the basic design of this Project. Through this process the rider can continue on his/her commute without worrying about range anxiety.

This micro-mobility project aims to improve the present e-bicycles and make them self-sufficient.

#### Charging Stations

In public spaces that have around 10 bicycles in a parking station, the primary source for charging them will be **solar power**, having a **mobile app** that connects you to payment methods for public use is also part of the project.

The mobile app can show the meter cost, mode of payments, nearest parking stations to drop off or find a bicycle.

The stations can be equipped with solar panels on top, which in turn will charge the e-bicycles when in idle mode. The e-bicycle will be locked in idle mode and when a customer wishes to utilize an e-bicycle they will have to pay an initial amount to unlock the bicycle through the mobile app. Based on this model; the app will identify which bicycle will offer the best range based on your destination entered. On completion of the ride the nearest parking station from the destination is shown on the app and the user can lock the bicycle back. A bill is generated based on the travel and extra expenses are added if the bicycle shows any sign of damage.

This could turn into a potential start-up idea.

**Roshni Tresa, Alston Vinoo  
and Jyothi Priya**

**5BTEE**

## TEAM FCW

### ABSTRACT

Adaptive cruise control system is a feature already available on many car models in the market. Focusing mainly on active safety, a number of vehicle dynamics control systems and driving assistance systems have been being developed for many years. Forward Collision Warning System has been a very important feature of advanced driver assistance systems as well. It concentrates on avoiding major crashes. Many FCW systems have been proposed but they mainly focus on algorithm development. This project focuses on a forward collision warning algorithm based on the inputs from various sensors, stereophonic cameras or LIDAR, that passes via track manager and undergoes sensor fusion, where it tends to increase the number of components for obtaining multiple varieties of data from different sensors, thereby improving the hardware of the system for better accuracy and efficiency. After the implementation of the system it is expected to obtain a human-machine interface for driver assistance systems to obtain the satisfactory interaction in cooperative maneuver between safety system and human driver manual control. Its application extends to autonomous vehicles as well. This project has the provision to interact with other systems such as speed sensors, steering angle sensors, and airbag control modules. FCW systems warn the driver through visual, audio, and/or tactile means of an impending collision. The goal is to provide correct, timely, and reliable warnings to the driver before an impending collision with the vehicle in front. To achieve the goal, vehicles are equipped with forward-facing vision and

radar sensors. Sensor fusion is required to increase the probability of accurate warnings and minimize the probability of false warnings. After the data is obtained from the sensors, they are fused to get a list of tracks that includes estimated positions and velocities of the objects in front of the car. After that, warnings are based on the tracks and FCW criteria, that takes into account the relative distance and relative speed to the object in front of the car. The step of sensor fusion to estimate the relative distance and speed is of very much importance in the determination of the accuracy of the values. Hence, an efficient state estimator is critical for the development of an autonomous vehicle and for driver assistance systems. The Kalman filter is used as the state estimator. Specifically, we use an Error State Extended Kalman Filter (ES-EKF) based state estimator to perform sensor fusion of data from LIDAR, IMU, and GPS sensors.

We use visualization techniques too, such as monoCamera and birdsEyePlot with the help of MATLAB. The presentation includes the design and implementation details of this system. This project can be further developed to integrate pre-crash brake assist and autonomous pre-crash braking systems with it. The effectiveness of the algorithm is verified by using driving simulator experiments as of now. The FCW system has been designed to warn the driver close to the last possible moment before a driver corrective action can possibly be taken to avoid the collision

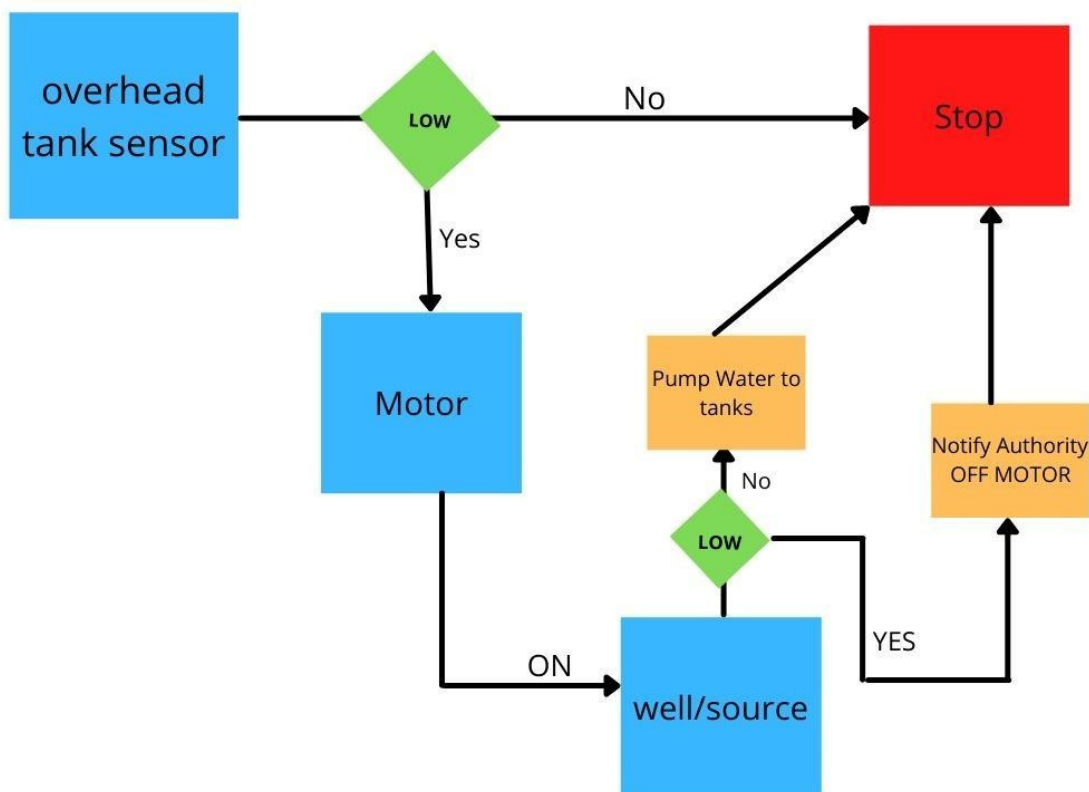
**RYAN THOMAS JAMES (7BTEE)**  
**GLADIS P SAJI (7BTEC)**  
**MENTA CHANDRAHAS (5BTEE)**

## AUTOMATED WATER PUMPING SYSTEM

**Team JRA: John Joy Ukken, Ryan Thomas James, Ashwin C. Abraham**

Team JRA aims to create a water pumping system that negates the need for human intervention, except in cases of malfunction and shortage of water at the source. This system consists of 3 modules, one to sense the water level and signal motor to start, one to start and stop the motor, and finally a module to stop the motor in case of dry running.

The block diagram for the same is as follows:



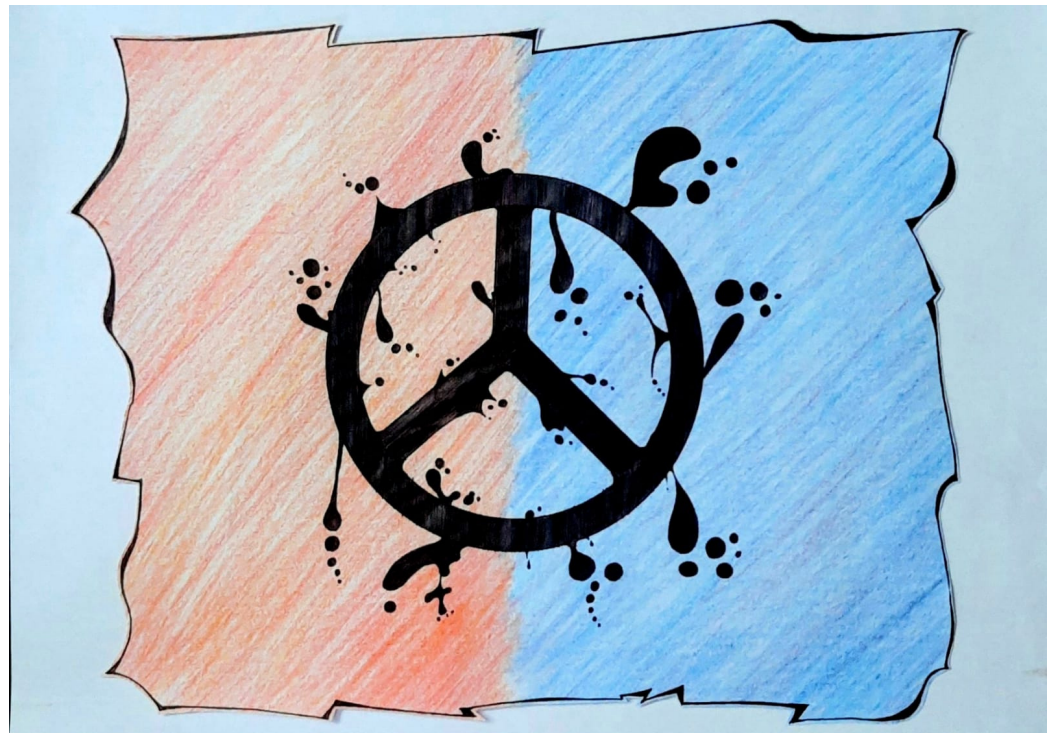
This project works toward making strides in wireless automation for pumping systems that are at different ends of a complex. This makes systems more self-contained and efficient. The project is part of an effort to save resources by ensuring no wastage of water and also longer life spans of motors by avoiding dry running.

This project is unique as no other existing system aims to create a wireless automated loop for both dry-running as well as water level sensing. If made into a product, it could find use in large complexes and institutions.

## ART NOOK



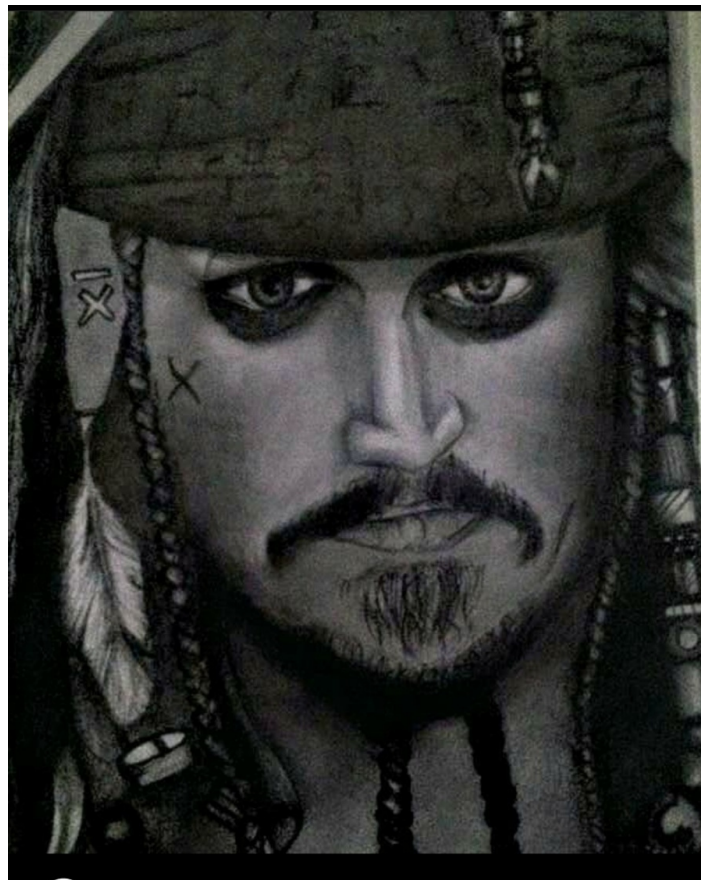
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