Maratha Vidya Prasarak Samaj's
Karmaveer Adv. Baburao Ganapatrao Thakare College Of Engineering
Nashik-13.
(NAAC ACCREDITED INSTITUTE WITH 'A' GRADE)

DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGG.

Departmental TeChronicle **Month: -August 2021**

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Department Vision:-

To be recognized as an excellent department offering competent technical education to create competent electronics & telecommunication engineers for the benefit of the common masses.

Department Mission:-

Committed to serve the needs of society through innovative teaching learning processes, promoting industry-institute interaction to provide competent and cultured electronics and telecommunication engineers.

Program Educational Objectives:-

1. *To impart state of art technical education in the Electronics & Telecommunication Engineering.*
2. *To promote society beneficial projects and activities.*
3. *To develop soft skill, team work, professional ethics and multidisciplinary approach for the carrier enhancement.*
4. *To bridge the gap between Industry-Institute through collaboration with Industries, Institutions and Universities.*
5. *To provide suitable infrastructure and facilities in tuned with advancing technological evaluation.*

Greeting,

Department of Electronics and Telecommunication Engineering is celebrating "MVP Samaj Din" by unveiling technical newsletter **"TeChronicle"** VOL-3, ISSUE-2 on 19th August 2021. The day is celebrated to remember all Karmaveer of M.V.P. Samaj, it is also birthday of Karmaveer Raosaheb Thorath.

Exam Supervision using AI Camera

[Esha Chokhar BE E & TC]

You must have seen the AI cameras while giving your exams and you are very familiar to its usage but what is the technology required to build the anatomy of it. Face recognition has over time proven to be the least intrusive and fastest form of biometric verification. Facial Recognition is a category of biometric software that maps an individual's facial features and stores the data as a face print. The software uses deep learning algorithms to compare a live captured image to the stored face print to verify one's identity. Image processing and machine learning are the backbones of this technology.

Image reading: The computer reads any image as a range of values between 0 and 255. For any colour image, there are 3 primary colours – Red, green, and blue. A matrix is formed for every primary colour and later these matrices combine to provide a Pixel value for the individual R, G, and B colours. Each element of the matrices provide data about the intensity of the brightness of the pixel.

OpenCV: is a Python library that is designed to solve computer vision problems. Using this, all of the Open CV array structures get converted to/from NumPy arrays. This makes it easier to integrate it with other libraries that use NumPy. For example, libraries such

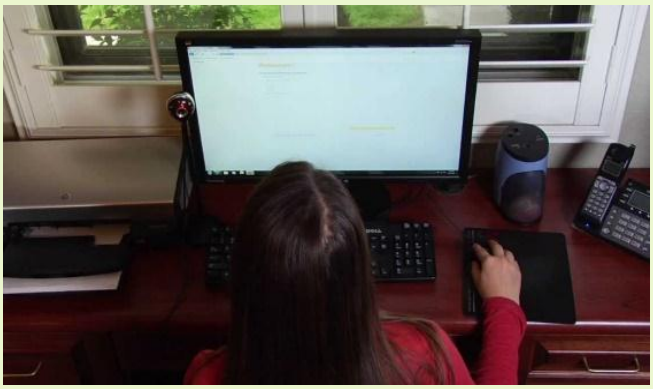
as SciPy and Matplotlib.

Machine learning: Machine Learning identifies the patterns in the data and provides the desired algorithm. For instance, to identify whose face is present in a given image, multiple things can be looked at as a pattern:

1. Height /width of the face.
2. Height and width may not be reliable since the image could be rescaled to a smaller face or grid. However, even after rescaling, what remain unchanged are the ratios – the ratio of the height of the face to the width of the face won't change.
3. Colour of the face.
4. Width of other parts of the face like lips, nose, etc.

There is a pattern involved – different faces have different dimensions like the ones above. Similar faces have similar dimensions. Machine Learning algorithms only understand numbers so it is quite challenging. This numerical representation of a "face" (or an element in the training set) is termed as a feature vector. A feature vector comprises of various numbers in a specific order. Essentially, given an image, we can convert them into a feature vector like:

Height of face (cm) Width of the face (cm) Average colour of face (RGB) Width of lips (cm) Height of nose (cm). There could be countless other features that could be derived from the image,, for instance, hair colour, facial hair, spectacles, etc.



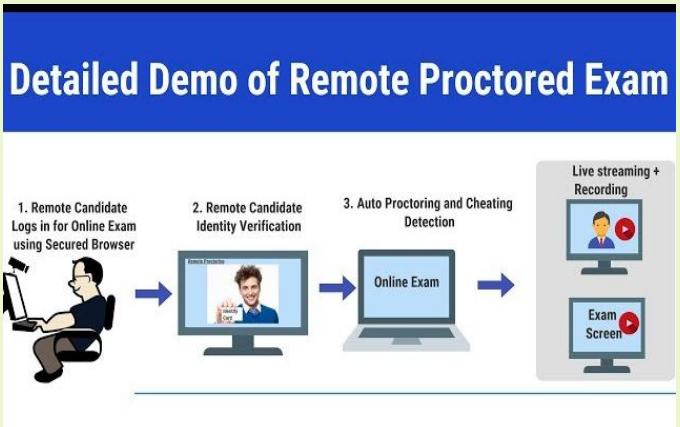
Face Recognition Operations:

1. Face Detection: To begin with, the camera will detect and recognize a face. The face can be best detected when the person is looking directly at the camera as it makes it easy for facial recognition. With the advancements in the technology, this is improved where the face can be detected with slight variation in their posture of face facing to the camera.

2. Face Analysis: Then the photo of the face is captured and analyzed. Most facial recognition relies on 2D images rather than 3D because it is more convenient to match to the database. Facial recognition software will analyze the distance between your eyes or the shape of your cheekbones.

3. Image to Data Conversion: Now it is converted to a mathematical formula and these facial features become numbers. This numerical code is known a face print. The way every person has a unique fingerprint, in the same way, they have unique face print.

4. **Match Finding:** Then the code is compared against a database of other face prints. This database has photos with identification that can be compared. The technology then identifies a match for your exact features in the provided database. It returns with the match and attached information such as name and addresses or it depends on the information saved in the database of an individual.



Problems and Challenges:

1. Pose: A Face Recognition System can tolerate cases with small rotation angles, but it becomes difficult to detect if the angle would be large and if the database does not contain all the angles of the face then it can impose a problem.
2. Expressions: Because of the emotions, human mood varies and results in different expressions. With these facial expressions, the machine could make mistakes to find the correct person identity.
3. Occlusion: Occlusion means blockage. This is due to the presence of various occluding objects such as glasses, beard, moustache, etc. on the face, and when

an image is captured, the face lacks some parts. Such a problem can severely affect the classification process of the recognition system.

References:

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- https://mospace.umsystem.edu/xmlui/bitstream/handle/10355/72268/MandalVishalResearch.pdf?sequence=1&isAllowed=y

Concepts of Wireless Charging of EV

[Yash Yatin Yeola - SE E&TC]

In this article, the purpose is to demonstrate the dynamic charging system as a prototype which can be implemented in real time.

The most important functions of wireless charging are power transmission through a source to a load without any kind of wired connection. Wireless Power Transfer (WPT) systems are one of the most important when we consider a few factors like time management, space management, comfort and many more industrial applications. In the current scenario, Electric Vehicle's (EV) are the best alternative after taking some factors into consideration like the most important Environmental Pollution", affordability (consumer spending or expenses after purchase), low maintenance and simple design.

So, to make EV a reliable solution it is vital to make amendments in Battery Charging Management System.

But there are a few challenges that need to be faced. The infrastructure that needs to be developed should be designed in such a way that it is compatible to the system and fulfills the minimum requirements. Taking into consideration the time constraint, the time required to charge an EV with a wired connection is too long and this problem needs to be worked upon. An alternate solution to the problem is creating a standardized solution which can be easily accessible. The time which is required to standstill at a charging station when the battery is getting charged can simply be saved if the charging can be done when the vehicle is in motion. The system which can be implemented to charge a vehicle while it is motion is termed as dynamic charging and similarly for a stationary vehicle it is static charging. The size of the battery can be reduced and the traverse range can be increased. Wireless charging setup can be implemented on highways, near traffic signals, parking areas or at any place where we find it comfortable.

Principle of Operation of Wireless Charging-

The working principle of wireless charging is based on the principle of Electromagnetic Induction. The coils of wire which are present in the base or the lower unit works as primary winding, and when current is passed through it, magnetic field is generated. This magnetic field induces a current in the secondary winding (placed on the upper unit which is car here) and wireless transfer of energy takes place when we connect the secondary winding to a battery, wireless charging takes place.

Merits and Demerits of Wireless Charging-

Merits-

1) Environment Friendly
2) Low Maintenance
3) Highly Convenient
4) Application on Large scale
5) Time Saver
6) Reduced Battery Size in vehicle

Demerits-

1) High Cost of Investment
2) Efficiency is comparatively low as compared to wired charging
3) Flux leakage and switching loss of energy

Future Extensions/Scope-

According to the advancement in technology, and industrial prosperity, mainly two things need to be highlighted which are "How to guarantee a sustainable growth of EV ownership", "How to allow full play of scalable growth for EV ". Power electronic devices which can be advantaged from modern materials. Dynamic wireless charging has its unique advantage and the technology can be classified into tram based and on-road type.

Conclusion-

This article has outlined a comprehensive overview

of wireless charging technology for EV which is independent of environment and applicable to unmanned operations.

Hence wireless charging offers better energy performance, less impacts on environment, low life cycle cost, highly convenient and multi-operational safety benefits.

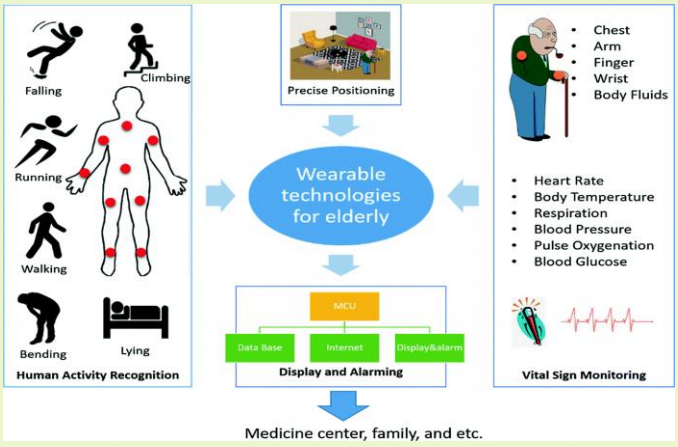
References-

- https://www.irjet.net/archives/V7/i3/IRJET-V7I3840.pdf

Advanced Sensing Techniques, Sensor Design and Image Processing Techniques for Healthcare Applications

[Pragya Rai, Shweta Bagade (BE E&TC)]

The recent advances in electronics allow the development of low-cost devices that are widely used by many people as monitoring tools for well-being or preventive purposes. Remote healthcare monitoring, which is based on non-invasive and wearable sensors, actuators and modern communication and information technologies offers efficient solutions that allows people to live in their comfortable home environment, being somehow protected. Furthermore, the expensive healthcare facilities are getting free to be used for intensive care patients as the preventive measures are getting at home.



Developing new technologies for health and social care section have always been of particular attention. Additionally, recent increasing rate of aging population, particularly in developed countries, has doubled the demand of intelligent systems for the elderly. On the other hand, super-fast advances in technology and science has raised expectation of inventing new monitoring and assistive technologies for accurate and delay sensitive acquisition, processing, transmission, and interpretation of human's physiological and behavioral data.

The advances in sensor technology, electronics instrumentation, and digital electronics have led to the production of intelligent systems that allow people to live with a sense of protection by monitoring both the parameters relating to their health and the environment in which they live. Therefore, a variety of enabling techniques such as signal and image processing, machine learning, and compression techniques could be used to improve such systems and achieve the aforementioned goal. The ultimate outcome would be increased quality of life and improving the healthcare services to the older populations.

Wearable or non-invasive sensors, together with the new information technology products, make it possible to constantly monitor patients, collect data, contact doctors immediately in case of danger, and possibly even to intervene with first aid, even if the patient is at home or away from health facilities. Sensing in environmental monitoring (pollution, food and water quality, etc.) is also particularly important for health protection, as it makes it possible to prevent conditions of physical or health hazard. So, there is a growing demand for more sensitive, selective, and stable sensors, and for new sensing techniques capable of increasing the sensitivity of commercial sensors.

The latest research and findings in design, development and experimentation of healthcare-related technologies are:

- Compressive sensing of biomedical data
- Gas and vapor sensing
- Cloud/Edge/Fog computing for healthcare systems
- Microwave sensing
- Smart phone-based vital signal monitoring
- Sensors data processing
- Big data analysis for healthcare applications
- Fluctuation enhanced sensing
- Metal oxide semiconductor sensors

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- https://www.mdpi.com/journal/sensors/special_issues/adv_sens_image_process_tech_healthcare_appl

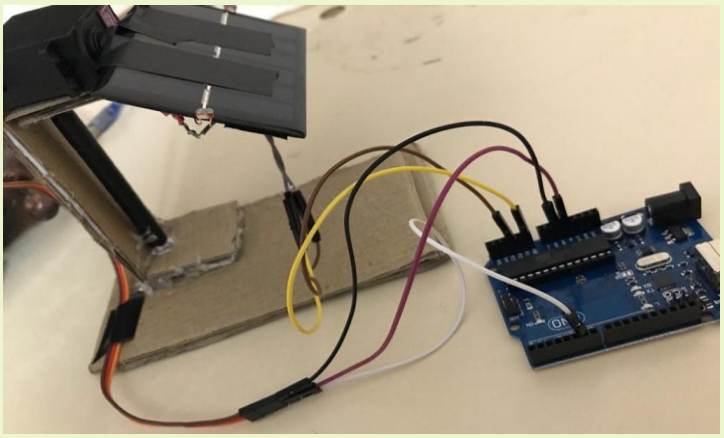
Single Axis Solar Tracker.

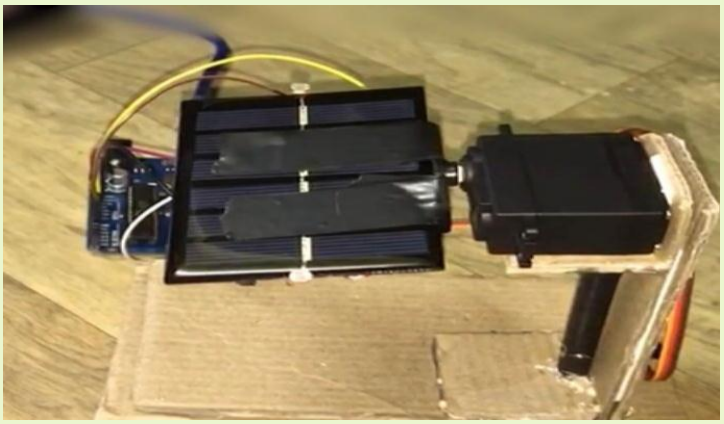
[Patil Tanvi, SE E &TC]

The world's development requires the boundless of energy to serve the life on Earth. The most abundant

purest form of energy available is solar energy, this radiant energy has powered the life for millions of years and is boon for many life forms on this planet. solar energy is renewable resource and it is becoming increasingly common as this energy is converted and used as an alternative to fossils fuels. Many technologies can harvest it directly to produce solar electricity for use in homes and businesses globally.
The basic model of solar system has fixed installation of solar panel, but the power generated will be low as panel could not harvest much more of photons due to change in direction of sun, another problem is price as solar tracking system is expensive for the average families to adopt .Fixed panels cannot generate more power, whereas single axis solar tracking system could rotate 180 degree and can detect the maximum intensity of photons, through this system we would get maximum output power. This system would also reduce time for users to change the position manually.
This project is the simplest and cheapest representation of the single axis solar tracking system. This project is accommodate with LDR'S on both side of panel, solar panel, Arduino, servo motor. Arduino controls all the logical operations and gives the feedback data to microcontroller. The intensity of the photons will decide in which direction the panel should rotate, the panel will rotate in the direction where the intensity of the photons on the LDR are maximum.
The sensors gives the digital signal to microcontroller and as per the programed installed it will check the difference in voltage drop (Error) between each LDR. Logically, the voltage drops between the two pair LDR's must be the same, which means that the panel is in the most ideal position. If the Error Voltage is not within the threshold value then the side of the panel which has a lower LDR voltage drop has more sunlight(LDR is also a resistor and it depends on resistance so less the resistance ,less the voltage drop and more the conduction would be resulted as output). Hence the microcontroller is be programmed such that servomotor turns to equalize the voltage drops between the two LDR pairs.
In future we would try to implement the same project with more up gradation and with cheap price

This system will be applied for residential area for alternative electricity generation for non-critical and low power applications.





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