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SMART WATER MANAGEMENT

Innovation

- In this phase you need to put your design into innovation to solve the problem.

- Explain in detail the complete steps that will be taken by you to put your design that you thought of in previous phase into transformation.

- Create a document around it and share the same for assessment.

Module 11 : BUILD A USE CASE-SMART HOME AUTOMATION

Lighting

Today, the most widely used smart home application is home lighting. Most people know of tunable lighting that can change between warm and bright with different colour hues that suit your mood & requirement.
But let's check a few other use case scenarios for smart lights.

1. As you enter your home, lights can turn on automatically without the necessity to press a button. (This can also work as a **safety feature to detect intrusions**)

2. The opposite is also possible as you leave your home; the system can turn the lights off automatically, thereby **saving energy.**
3. **Home theatre** enthusiasts can have the lights programmed to automatically dim while watching a movie to provide the best viewing experience.
4. Your light can turn on when your alarm rings in the morning, waking the whole household up if need be.

Kitchen

Smart home automation devices can make the cooking process safer and convenient too.

1. It can turn on the lights or play soothing music when you enter the kitchen in the morning to prepare that hot, steaming cup of morning chai.

2. Smart sensors can check for gas leaks, smokes, water leakages and turn off the power in the house if the indicators are outside the optimum range.

3. Appliances (refrigerators, chimneys) can be controlled through voice-activated devices. You can ask Alexa to preheat the oven to 180 degrees while you prep your cake.

Safety and Security Systems

Safety sensors identify anything wrong at your home. They can notify home users of any overlooked like an appliance left on or any potential threats immediately and even trigger necessary action to prevent them.

1. Proximity, motion & video sensors can identify if a burglar makes an attempt to break into your home and automatically turn on the panic alarm, lights and call the police.

2. No more doubts or double checks on whether the doors and windows were closed or if that motor or heater are off? Smart home users can check their home state remotely through the app on their phones and control pretty much everything at home.

3. While locking the door, you can set controllers to automatically close the curtains, turn off devices and ensure your home is protected against any trespassers.

Bathrooms

Smart home IoT technologies in the bathroom can help in power and energy savings with convenience.

1. With smart home automation, you can set your geysers to automatically turn on and off at a pre-set pattern basis your shower routine.

2. This also helps make your home energy efficient by eliminating the unnecessary functioning of high power-consuming home appliances like geysers, heaters, ACs.

Gardens

A smart home can be exceptionally beneficial for those plant lovers interested in growing vegetables, fruit, herbs, and indoor plants at home.

1. The technology allows users to check if the plant is adequately hydrated and receiving the necessary amount of sunlight.

2. You can monitor your plant and turn on your smart irrigation system when needed. You can control and stop the watering system, thus optimizing water usage

3. Smart home IoT technology has led to a real breakthrough in gardening, which will completely remodel the traditional approach to growing plants.

Temperature Control

With temperature control automation, you can optimize your ACs to provide the best experience while being energy efficient.

1. For instance, users can turn on their bedroom ACs as they drive from the office to enjoy a cool room once home after a tiring day.

2. You can configure the bedroom AC with your geyser times, so once you step out from your bath, the room is ready for you.

3. You can set the ACs to function based on the room temperature while you sleep at night. So you are neither cold nor hot and get a good night's sleep.

Doors

We can safely assume the doors of our future will not need keys. Digital locks are safe and can be set to initiate a sequence of other devices in your home.

1. For instance, a door open can follow a customized sequence of actions like the light switching on; inside doors unlocked, and music and ACs are turned on.

2. The entry door digital lock can identify who opened the door when. With a custom entry assigned for each individual, you can know when your kids, your hubby, or your maid reached home through notifications on your smartphones.

Retro-fit

The most significant advantage of eGlu smart home solutions is that the patented products are retro-fit, which means:

1. It is easily fittable to existing homes & electrical systems without any rewiring required.

2. Scalable to new and existing homes – so you can do only a part of the home initially and extend to the rest of the house at a later stage.

3. Applicable for residential & commercial buildings.

Conclusion

Without a doubt, home automation can significantly improve our quality of life and make our homes safer places.

The cost could still be a barrier to entry for most Indian middle-class families. The wider adoption of the tech leading to economies of scale would reduce this barrier further. eGlu has devised affordable packages for the home user to onboard the smart home experience.

The other dependability is a strong home wi-fi network. You need to have a good broadband connection in your home to fully utilize the smart home IoT life.

Module 12: INTRODUCTION TO COMPUTER VISION WITH PYTHON

What Is Computer Vision?

Computer vision as a field focuses on giving machines a way to visually perceive real-life objects and make decisions based on what they "see." The field's end goal is to automate burdensome tasks, from navigating a car on a busy highway to categorizing medical imagery, all while achieving higher accuracy and speed of execution compared to humans.

Functionality powered by computer vision is already present in many devices and systems that we use daily. For example, a smartphone's camera app uses a computer vision algorithm to detect faces and adjust the camera's settings to focus on them. Let's look at some more concrete examples of how computer vision is taking our lives by storm.

Computer Vision in Practice

Computer vision is crucial to augmented reality (AR), where barriers between the physical and online worlds are blurry.

Similarly, developers use computer vision for **facial recognition**. This could work to improve photo and video quality, as in our example at the beginning of the article, or it could also serve more advanced use cases. Facebook famously uses facial recognition to

let you review pictures in which your friends might have forgotten to tag you. Likewise, Apple's Face ID feature tracks facial features to let you seamlessly unlock your iPhone.

Using Python in Computer Vision

Python is a mainstay when it comes to computer vision or artificial intelligence in general. This is mainly thanks to its readability and an extensive collection of community-maintained libraries for simple tasks like reading CSV files all the way to complex deep learning methods. We recommend getting started with Python if you're new to computer vision. If you take the leap, here are the pros and cons you can expect.

Pros

The official Python documentation contains a vast amount of resources and guides that can help you with almost any Python task you might have.
Additionally, a lot of effort has been put into creating machine learning-oriented packages and libraries to ease the product development process. Free access to these libraries also reduces the time and need to develop new solutions.
Overall, Python is quite simple when it comes to understanding the code, even if you're a beginner, or even if a Python application you're reviewing was written by a beginner. Most computer vision code is quite complex, so more readable code means that developers are free to focus on the aspects that require more attention.

Cons

One of the biggest disadvantages of Python is its execution speed. Python's ease of use comes at the price of performance: Its interpreted nature makes it slower than compiled languages such as C++.
To mitigate performance bottlenecks, some of Python's libraries, like NumPy, implement a lower-level API to improve performance. If you decide to work on a production-level computer vision system, make sure that you review the documentation for any frameworks or libraries you choose and understand their performance implications.

Computer Vision Libraries

As we've mentioned, one of Python's strong suits is its library availability. Let's look at a few useful libraries for computer vision tasks.

PyTorch and TensorFlow

PyTorch and TensorFlow are very popular general deep learning libraries. While they aren't specific to computer vision, you can still learn a lot by accomplishing computer vision tasks with these tools. For example, PyTorch documentation offers a list of pre-trained neural networks — some of which are quite advanced — that are being used in production computer vision systems.

Pytesseract

Pytesseract is a tool that recognizes text within images. Developers can choose to either send output to a file or to simply print the text on a console. Pytesseract supports numerous file types, including common ones like JPEG, PNG and GIF. You can even detect text in different languages.

Face-recognition

Face-recognition is a library that allows developers to process images and videos containing faces. If you're getting started with facial tracking for instance, this library can help you determine the location of specific facial landmarks within an image.
The library can also perform more advanced tasks like matching a person's face to the list of known faces that you provide ahead of time, for a simple identity detection system.

Imutils

Compared to the previous two, imutils provides quite simple, yet useful functions for processing images. It allows you to resize and rotate images, and detect edges, among other tools. When put into practice it is a vital library for computer vision in Python.

The Future of Computer Vision

We can only speculate as to what the future holds in store. Yet as computer vision continues to advance towards its goals, we may hope that these will one day be accomplished. One such key objective is to attain a level of information processing through images and other visuals that's comparable to that of humans.
The manifestation of computer vision's potential could mean the saving of countless lives through anomaly detection in medical settings. It can also aid in stopping armed individuals before they enter a crowded public space with an intent to cause harm.

Want To Become a Computer Vision Expert?

In this article, we explored just a fraction of the capabilities that computer vision has to offer. From recognizing objects and faces, to tracking and manipulating images, the field aims to reach human-like visual processing abilities.
With Udacity's specialized Computer Vision Nanodegree program, you too can start leveraging your Python skills to develop computer vision applications to add to your portfolio.