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Experiment 2

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Aim: To develope an application for location based messages.

Theory

The term 'Ubiquitous' meaning appearing or existing everywhere, combined with computing to form the term ubiquitous computing (Ubicom) is used to describe ICT (Information and communication technology) systems that enable information and tasks to be made available everywhere, and to support intuitive human usage, appearing invisible to user.

Location based services have become increasingly popular in recent years with the rise of smartphone and other mobile devices. These services use a devices GPS or other location sensing technologies to provide user with information relevant to their current location. One such application is the ability to show nearby restaurant based on a users current location. In this experiment we will be developing an application that uses location based messaging to show near restaurants to a user.

Location based messaging - It is a technique used by mobile applications to provide users with messages or notifications relevant to their current location. This can include information on nearby companies, businesses

events, hospitals, etc. To implement location based messaging, the application must first obtain the user's current location through GPS or other location sensing technologies.

Mapping - It is an essential part of location based services, as it provides a visual representation of the user location and the points of interest around them. Mapping can be achieved through the use of various mapping API's such as google maps, mapbox which provide developers with a range of tools and functionalities for displaying maps and other location related information.

Conclusion: Location based messaging and mapping are powerful tools that can provide users with relevant information based on their current location. By developing an application based on their current location that shows nearby restaurants, we can demonstrate the potential of these technologies and explore some of the challenges involved in their implementation.

Academic Year 2023-24

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UBIQUITOUS COMPUTING (UBI)
EXPERIMENT 2

CODE:
Code to fetch location:

```
from geopy.geocoders import Nominatim

def get_device_location():
    try:
        geolocator = Nominatim(user_agent="get_device_location")

        # Using the geolocator to get the location based on IP address
        location = geolocator.geocode('me')

        # Accessing latitude and longitude
        lat, lng = location.latitude, location.longitude

        print(f"Latitude: {lat}, Longitude: {lng}")

    except Exception as e:
        print(f"Error: {e}")

if __name__ == "__main__":
    get_device_location()
```

```
Shree Borivli Gujarati Seva Mandal, A S Vartak Marg, R/C Ward, Zone 4, Mumbai, Mumbai Suburban, Maharashtra, 400092, Indi
Latitude =  19.2251085

Longitude =  72.8502063
```

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Code to get nearby Malls:

```
from geopy.geocoders import Nominatim
from geopy.distance import geodesic
import requests


def find_nearby_places(lat, lon, place_type, radius):
    geolocator = Nominatim(user_agent="nearby_search")
    location = geolocator.reverse((lat, lon))
    print(f"\nYour current location: {location}\n")

    query = f"{place_type} near {lat}, {lon}"
    try:
        places = geolocator.geocode(query, exactly_one=False, limit=None)
        ans = []
        if places:
            for place in places:
                place_coords = (place.latitude, place.longitude)
                place_distance = geodesic((lat, lon), place_coords).kilometers
                if place_distance <= radius:
                    ans.append(place_coords)
            print(ans)
        else:
            print("No nearby places found for the given type.")
    except:
        print("Error: Unable to fetch nearby places.")

if __name__ == "__main__":
    user_lat, user_lon = 19.2251085, 72.8502063
    if user_lat is not None and user_lon is not None:
        place_type = input("What type of place are you looking for? (e.g., park, mall, ATM, hotel): ")
        search_radius = float(input("Enter the search radius (in kilometers): "))
        ans = find_nearby_places(float(user_lat), float(user_lon), place_type, search_radius)
```

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Code for map:

```
# boulder_coords = [19.0999098, 72.8440038]

ans = [(19.22602565, 72.85462981820581), (19.21332115, 72.84914087727157), (19.2118189,
72.8673877), (19.20290105, 72.8600797318634), (19.1961389, 72.84709037091646), (19.1900395,
72.8591049), (19.18480055, 72.83405222546514), (19.2632484, 72.8743808), (19.17898665,
72.83607339476472), (19.17616575, 72.85827592278093)]
myLoc = [19.2251085 , 72.8502063]
my_map = folium.Map(location = myLoc, zoom_start = 13)

#Add markers to the map
for i in ans:
  folium.Marker(i).add_to(my_map)


#Display the map
my_map
```

OUTPUT:

```
What type of place are you looking for? (e.g., park, mall, ATM, hotel): mall
Enter the search radius (in kilometers): 10

Your current location: Shree Borivli Gujarati Seva Mandal, A S Vartak Marg, R/C Ward, Zone 4, Mumbai, Mumbai Suburban, Maharashtra, 400092, India
```

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