POST - PLUS-CODE OFFERING SPATIAL TAGS

Samriddha Saha¹, Sneha Kour², Arpan Dawn³, Biplab Biswas¹
¹ Department of Geography, The University of Burdwan, Burdwan, West Bengal
² Department of Geospatial Science, The University of Burdwan, Burdwan, West Bengal
Email- bbiswas@geo.buruniv.ac.in
Contents of the Presentation

I  CONVENTIONAL ADDRESS SYSTEM & ITS IDENTIFIED ISSUES

II  INTRODUCTION OF PLUS CODE

III  CASE STUDY

IV  BENEFITS OF PLUS CODES

V  CONCLUSION
CONVENTIONAL ADDRESS SYSTEM & ITS ISSUES
68% of the Population of INDIA lives in Rural Areas.
Soumen Chatterjee, Rasulpur Uttar Bazar
P.O: Rasulpur
P.S: Memari,
Dist.: Purba Bardhaman, 713151.
Samriddha Saha, % Chandan Saha, Sankhya Bhavan, **R.B Chatterjee Road**, Lakurdi Purba Barddhaman, Burdwan Sadar, Pin-713102
Sneha Kour, % Varinder Pal Singh, 1/1/18
**Sukanta Sarani Subhash Pally**, Benachity, Durgapur, Paschim Bardhaman, 713213
30% of deaths happen due to delayed ambulance services.

50% of heart attack cases reach the hospital late.
OBJECTIVE

CONVERTING POLYGONAL ADDRESSES (PIN)
TO
POINT FEATURE
INTRODUCTION TO PLUS CODES
WHAT IS PLUS CODE?

- Plus Codes are free, open-sourced, digital addresses that provide accurate addresses for locations, including for places that don't have accurate formal addresses. It is a geocoded system for identifying any geographical area/point on Earth, even when an address does not exist.

- Plus Codes are like street addresses for people or places that don’t have any proper address. So instead of having addresses with street names and numbers, Plus Codes are based on latitude and longitude and displayed as a alpha-numeric system.

7J9WF9FF+47

Area code  Local code
METHODOLOGY

Choosing the Study Area

Surveying the study area - taking Plus Codes using mobile phones

Tabulation of Collected Data

Mapping Collected Data

Finding Solutions

Analysing Problems

Problems

Finding Solutions
In this section, we would show the efficiency of Plus Codes in two different study areas:

1. Trading Town
2. Industrial Town
STUDY AREA - I
Ward No- 26, Burdwan Municipality, Purba Bardhaman, West Bengal, India.

I. India
II. West Bengal
III. Purba Bardhaman
IV. Burdwan Municipality
V. Ward no 26 (2.47 Sq Km)
---Major Findings of the survey---

- There are many people having same name bearing the same pin codes, so delivery executives become confused and the services are disturbed.

- There are many unnamed streets in the Burdwan town, so proper landmark can not be recognised.

- There are various unnamed houses also in this municipality.

- Most of the people are not aware about this Undressing Issue.
AREAL ADDRESS (Municipal Ward) Vs PLUS CODES
STUDY AREA- II
The second study area we chose a city (Durgapur) which has many pin codes within a small area due to the high population density. The main problem which we found out was that the addresses used by the households or other non-residential establishments were based on either the name of the road or the nearest well known landmark.
- Major Findings of the survey -

- Houses on the same road use the same address which is a big issue and is confusing as well.
- Due to industrialization and population growth in the area the pin code area of 713205 was splitted into 2 parts, smaller of which was given the pin code 713214 but we observed that the addresses written in front of the houses still had the previous pin code. To validate this we asked the residents about their pin code. All the responses were 713205. The residents were oblivious to the fact that their pin code had been changed.
- Many places in the industrial area (southern part of the pin code area of 713210) had no particular address.
- The pin code area boundaries are not very well defined due to which the border between two pin codes are puzzling and difficult to perceive.
Study Area Analysis

Pin Code- 713216
50% of the addresses given by the residents in the area are same.

Pincode- 713209
85% of the area is NIT Durgapur

Pin Code-713210
80% of the area is covered by Heavy Industries.
AREAL ADDRESS (Pincode) vs PLUS CODE

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Address</th>
<th>PLUS Code</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5537850</td>
<td>87.3307908</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5580250</td>
<td>87.3304829</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5552750</td>
<td>87.3305198</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5587780</td>
<td>87.3309889</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5573770</td>
<td>87.3306010</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5551040</td>
<td>87.3304405</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5531000</td>
<td>87.3304140</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5490915</td>
<td>87.3303809</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5371105</td>
<td>87.3305164</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5471000</td>
<td>87.3307400</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5470927</td>
<td>87.3308000</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5379900</td>
<td>87.3303000</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5460100</td>
<td>87.3305600</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5461905</td>
<td>87.3308645</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5845304</td>
<td>87.3302739</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5395640</td>
<td>87.2999054</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5397405</td>
<td>87.2989054</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5395640</td>
<td>87.2999054</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5395640</td>
<td>87.2999054</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>16/27 Nehru Avenue, C-Zone, DURGAUPUR 733414</td>
<td>HDIO+2F</td>
<td>23.5395640</td>
<td>87.2999054</td>
</tr>
</tbody>
</table>
Follow up Questionnaire Survey

- To learn about the problems in a more detailed manner a questionnaire was designed. We surveyed residents and essential services such as The Police, Fire Brigade, Ambulance service and Delivery Services of the two cities.

- The residential questionnaire contained questions regarding the problems faced due to address, awareness about online location sharing and whether they want to use Plus Codes in the future.

- The non residential questionnaire contained questions regarding problems faced by the emergency services due to inaccurate addresses and whether they had ever used location sharing services in their field of work.
Survey Results (Study Area 1)

Usage of Location Sharing: 33%

Problems Incurred while calling Emergency Services: 36%

Problems Incurred During Deliveries due to addresses: 56%

Addition of Plus Codes to Addresses: 81%
Survey Results (Study Area 1)

Usage of Location Sharing: 35%

Problems Incurred During finding an address: 70%

Loss of life due to Late Arrival because of Address Confusion: 60%

Would they use Plus Code in their Line of Work: 100%
Survey Results (Study Area II)

Usage of Location Sharing.
- Yes: 65%
- No: 35%

Problems Incurred while calling Emergency Services.
- 81%

Problems Incurred During Deliveries due to addresses.
- 14%

Addition of Plus Codes to Addresses.
- 83%
Survey Results (Study Area II)

- Usage of Location Sharing: 50% Yes, 50% No.
- Problems Incurred During finding an address: 70%.
- Loss of life due to late arrival because of Address Confusion: 40%.
- Would they use Plus Code in their Line of Work: 80% Yes, 20% No.
—Benefits of using PlusCodes—

- **Open source and easy to use** - Plus Codes technology is open source and free to create and use. They are much shorter than traditional global coordinates, so they’re easy to share.

- **Accessible offline** - Plus Codes work whether you’re online or offline—you don’t need an internet connection.

- **User Friendly** - Plus Codes can be accessed through Google lens also. So instead of typing the code one can easily use the code through his phone camera only which also give the users the accurate location.

- **Accuracy** - It can promptly locate one’s location, no matter how dense of a cluster it might be in, and they are shorter in length, compared to global coordinates, which makes them easy to share too.

- **Language independent** - Plus Codes are based on a set of 20 alphanumeric characters. They do not include easily confused characters, are not case-sensitive, and they exclude vowels.

- **Versatile** - Plus Codes represent an area. The resolution of the area can be changed by adding or removing characters after the “+” sign.
CONCLUSION
Addressing the unaddressed

I. Developing countries like India have billions of people living in crowded and underserved urban areas. We can solve the un-addressing problem for the population and also build an example, using a digital addressing solution that is open source, free, and scalable.

II. The Plus Codes can be also used for cases like Dharavi (Asia’s largest slum) Mapping the slums and providing their residents with a proper address could be done.
Plus Codes can be especially helpful for people and organizations in emergency and crisis response scenarios. With Plus Codes, not only can people share their location quickly even without an address, but they can now do so by simply opening up Google Maps and tapping on the blue dot to view, copy and share their Plus Code location. A Plus Code can then be entered into Google Maps to help locate and navigate to that location.

Example:
1. Ahead of Cyclone Yaas (2021), Kolkata Police had urged people to download Google's Plus Codes feature on their smartphones so that they can share their location even without an internet connection, in case they get trapped during the storm.
Plus Codes can be especially helpful for people and organizations in emergency and crisis response scenarios. Emergency services like ambulance, fire trucks and police aid can promptly be obtainable.
Delivery services

Plus Codes can also be integrated in Delivery services for authenticating the correct address that the package is to be delivered. Easy accessibility of services such as water, sanitation, healthcare, electricity, opening bank accounts, postal services, etc further saving time and guiding service providers to reach individual doorsteps.

Property Disputes

We think the Plus Codes can help with keeping digital address records and in digitizing the properties and create a spatial database of properties and the addresses using Plus Codes or similar Geocoding Services. Government of India has recently launched a program called Digital India Land Records Modernization Programme. The Plus Codes can help in the initiative.
For Forthcoming Work we have thought about developing an app with the grid based geocoding system for summoning Emergency services, and For generating addresses.
Our Research Team Members

Prof. Biplab Biswas
Department of Geography, The University of Burdwan, West Bengal, India

Email: bbiswas@geo.buruniv.com

Samriddha Saha
Department of Geography, The University of Burdwan, West Bengal, India

Email: samriddhasaha12@gmail.com

Sneha Kour
Department of Geospatial Science, The University of Burdwan, West Bengal, India

Email: kursnnehabu@gmail.com

Arpan Dawn
Department of Geospatial Science, The University of Burdwan, West Bengal, India

Email: arpandawn2@gmail.com
THANK YOU
How do Plus Codes work?

Plus Codes are alphanumeric codes that represent latitude and longitude of the very same place. This code is based on a division of the globe using a square grid system based on latitude/longitude WGS84. The final portion of the Plus Code reflects a unique address within this grid, and the preceding portion of the code identifies the cell this location is in.

Google Maps Plus Codes work by converting location coordinates (latitude and longitude) to alphanumeric codes that use a standardised format. They use an alphanumeric grid (like a chess board with a grid of A - H and 1 - 8) to divide the world. That first grid forms the first 2 numbers of the code. That square is then further subdivided, forming the next portion of the Plus Code. The result is an extremely easy-to-use code that represents a unique address in the world.
In Somalia, where severe drought exacerbates already poor living conditions, people migrate towards Mogadishu, the country’s capital, which has one of the highest urban population densities in the world. About 6,00,000 displaced people live in the city’s informal settlements.. The International Rescue Committee (IRC) mapped locations of clients for an immunization and family planning project, ensuring that women and children received timely follow-up care.

https://youtu.be/HhwymZTlvs
https://www.rescue.org/country/somalia
The Rural Utah Project (RUP) empowers underrepresented voters in rural Utah through training, education, and issue advocacy. RUP’s Navajo Nation voter registration program provides addresses to Navajo Nation residents to aid in voter registration, emergency services, and mail delivery.

https://ruralutahproject.org/

Rural Utah Project

Voter Registration in rural Utah
Kolkata Slums

Dharavi
Conventional addresses can be classified into two categories:

Relative Addresses

Refers to the addresses that are defined as a consequence of landmarks/points of interest near them.

Example: “Across the street from Lions’ Club, Purba Bardhaman, West Bengal”

Absolute Addresses

Refers to addresses that are identified by their own location/name.

Example: Karmakar Para, Lakurdi, Purba Bardhaman, West Bengal, Pin code-713102
Latitude 23.246618 23°14'47" N
Longitude 87.83394 87°50'2" E
2022-05-16 (Mon) 11:29 (am)

Latitude 23.246317 23°14'46" N
Longitude 87.833551 87°50'0" E
2022-05-16 (Mon) 11:04 (am)

40°C 104°F

40°C 104°F
<table>
<thead>
<tr>
<th></th>
<th>Decimal</th>
<th>DMS</th>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Latitude</strong></td>
<td>23.246589</td>
<td>23°14'47&quot; N</td>
<td>40°C</td>
<td>11:01(AM)</td>
</tr>
<tr>
<td><strong>Longitude</strong></td>
<td>87.833454</td>
<td>87°50'0&quot; E</td>
<td>104°F</td>
<td></td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td>2022-05-16(Mon)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Decimal</th>
<th>DMS</th>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Latitude</strong></td>
<td>23.246305</td>
<td>23°14'46&quot; N</td>
<td>40°C</td>
<td>11:08(AM)</td>
</tr>
<tr>
<td><strong>Longitude</strong></td>
<td>87.833673</td>
<td>87°50'1&quot; E</td>
<td>104°F</td>
<td></td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td>2022-05-16(Mon)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>