

Streets – The Living and Life

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Executive Summary: Course projects are an effective means to apprehend the concepts that are studied in the course/lab. They help to connect and realize the real world problem scenarios and applications. Design and Analysis of Algorithms being a core and fundamental course of computer science, not only has direct implications on the further semester courses but also in the professional life ahead. As a student one is expected to connect the course concepts to application scenarios and evaluate with respect to space and time efficiency. In order to bring the real life context into the classrooms, the instructor along with a student took an expedition to understand the living and build a framework to extract need statements. This white paper presents the journey that was lived in parts and places of Mumbai, to live the living in ‘City of Dreams’ and understand the flavours of what can be finished better. The study happened at the near end of the year 2022.

Keywords: *algorithms, project, living, life, streets.*

Note:

As you read along this white paper, you will be presented with several questions. Each of those questions can be a need statement for your ‘Algorithms’ course project work. The question will mostly be a line. But you can grow a context, build an environment and provide a direction (like an engineer) for the city you have designed.

1. Introduction

Watching the life around us, observing the dynamics, meeting other people, seeing the generations from toddlers to old, looking at the art that streets present, the colours, the changing human scenes, the subtle, the intelligent, knowing the life in public spaces, the traditional and state-of-art, the struggles, the happiness and the variants, the patterns and the directions, to say, a street life is so much more than all of that (Gehl, 1989). It's only when you walk on the streets, in-hale the air, feel the events, the life in a street gets its definition. A city in Rome might have altogether different vibes than a city street of Hubballi. Even within the city, the consumption and behaviour can never be the same. Every city has its own informal, unstated engagement subtleties (Karabanow, 2006).

There are streets with graffiti's, a street art, that depict the history and abstractions (Avramidis & Tsilimpounidi, 2016). There are cities like Amsterdam that is known to be a bicycle paradise, making a revolution towards an environmental friendly city (Feddes et al., 2020). Berlin is known for its diversity and culture, being one of the greenest cities in Europe and exceptional range of landmarks, a mixture of historical constructs and modern architectures (Huyssen, 2012). New York is the most populous city in the USA and also known to be the most international city in the world. New York is associated with almost every tag that could exist for a city, to give a few examples: busy city, has art and culture, city of celebrities, low income, expensive, luxurious etc. (Jackson et al., 2010). Paris is famous for monuments, arts, museums cuisines, etc. it is al so known as city of lights and city of love (DeJean, 2014). Likewise, every city has its culture and folklore glued between the classics and contemporaries majorly influenced by the past and driven by the modern development and socio-economics.

The '*streets*' for me and Aryan was about experiencing street life from a research perspective. I am glad and thankful that I had a company because living homeless and experiencing the journey is something that not everyone would agree for or to be honest, not anyone would agree for. It sure would have been difficult if I was in this journey alone. Unless you sleep in a railway station, you will never know what a person sleeping would go through. Unless you are in the shoes that you wish to walk, it's challenging to understand what's happening in there.

Although one might say, "I understand," it's not the same as truly experiencing what someone else is going through. We wanted to immerse ourselves in the city's dynamics, living it firsthand, to gain long-lasting insights. And for us, it has made a difference. As you read this white paper, you will be drawing inspiration and doing your best to execute a meaningful project. When we talk about the streets, we've made every effort to capture all their diverse and vibrant aspects.

The study was conducted on the streets of Mumbai during December 2022. The reason for selecting Mumbai was multi-fold. One, the city never sleeps. The day and night are merged with no line of difference for most parts of the city. At many other parts, the city sleeps late and wakes up early. The roads always have vehicles commuting and people around. If not the whole, most parts of Mumbai are so. Number two, the police security in the city work twenty-four hours to keep the city safe in the benefit of the locality. They talk and guide people to make sure that the city is safe all through. One feels safe even to walk midnight at 3.00 am. Three, most people are supportive and helping. Everyone is going through a life hassle and still they understand and care for the ones in need of help. Four, the city has the mixture of culture and class. The city hosts almost every kinds of diversity that you can find in our entire country. Most, if not all. From the largest slum to richest areas,

Mumbai has it all. And the reasons continue to grow. The further part of this paper presents glimpses of all major events from the beginning to the end of the entire study by giving timely prompts for the need statements. The plan was to explore the streets of Mumbai and understand the way of living. Of course, we cannot study or understand life if we are in a luxury setting. Simple rule was - be one to be one.

2. The Study

We did travel in the train's general class and the return journey was a weekend with Christmas break. There was an unexplainable struggle to use the washroom between the 16 hours journey. With people constantly talking all the night, to managing in finding a space and sleeping by taking turns (of course not on the seat), the journey itself was tiring. How can we make the travel more affordable? Train though cheaper, is mostly always full. Do you know that from Mumbai to Varanasi, there are 2 weekly trains and 2 daily trains? Meaning 16 trains a week and all of them run full. How can we make city connectivity better? How can we make travel more affordable? You will find 50+ trains from Hubli to Bangalore. It's not easy to lay more tracks and increase trains. But it sure is a problem that needs a solution from the modern perspective.

A major part of the population in India prefers low-cost commutes. Regarding long-distance travel, trains are most preferred as not everyone can afford a flight. The general section in the train is the most crowded irrespective of the time and day of travel. They are cheap, and though they take longer time, most people prefer as because of their low cost. How do Indian railways make a profit? Is the profit coming from the train? Does everyone purchase a ticket? What else keeps them going? Have you ever wondered about its business model?

Notes:

This is what happened during the 'to' journey. As it was too late for us to book a ticket, we had to purchase a general-class ticket. We had two options to start our travel. One, take the general and travel in general. Two, take the general ticket and move to sleeper class by paying an extra amount to TC (which is officially permissible). As the journey was of around 16 hours, travelling in general would have not been comfortable, provided we had to get started with work the very next day. We started looking for alternatives and also to reduce the costs. We decided to do the following: First, board a passenger train to Miraj, which is around 7 hour journey. Passenger tickets are very cheap and the train on weekdays is mostly empty. As all the bogies have seater, one can travel comfortably. It reaches Miraj late evening. Then take a train to Mumbai from there. If you take the general ticket and move to the sleeper, the amount you need to pay to TC varies from where you board. As we will be boarding the train from Miraj, we will have to pay a lesser amount for moving to the sleeper coach. The plan did work. However, when we boarded the train at Miraj to Mumbai, the general was too crowded, even difficult to stand (or even to get inside), and the sleeper had no empty seats. For the first 3 hours, we had to sleep near the toilet of a sleeper class bogie, which was the only comfortable space. Way past midnight, there was one seat that got vacant, and we shifted and slept comfortably for the next few hours. Comfortable? Now that's a relative term. It was comfortable as compared to the sleep beside the toilet.

2.1 City Design

On day one we visited Matheran (Oliver, 1905). Matheran means forest on the forehead. There are several reasons why we picked this place. One, a toy train takes to this place (takes 3 hours for 25 kms). It's the only place where no vehicles are allowed inside. There are no bikes, cars or anything else to commute. How do we

commute? Well, we can walk. Or there are horses. If you refer to the internet, accommodation is pretty costly (a minimum of 4k), but we had seen that places around 8kms to it had rooms available even for 700. That was enough to go ahead. We can easily walk 8kms. Hands-down. One needs to take the train from Neral Station; there are only two trains. They cost 85 re, and the ticket counters open one hour before the train departure. The lines, however, start two hours before the counter opening.

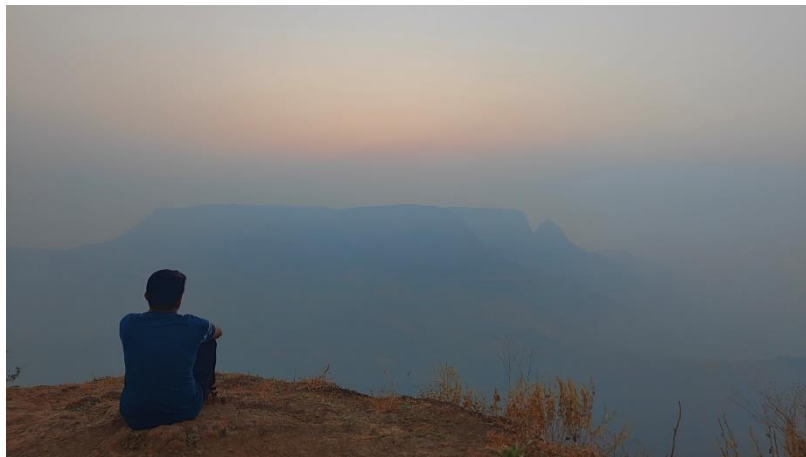


Fig 1: Matheran Hill Station

Matheran offers several viewpoints for stunning sunrises and sunsets and even has a serene lake. While horse rides can be pricey, the visit is absolutely worth it. The place is a bit muddy and dusty, but the air is fresh and unpolluted, as vehicles are not allowed, making it one of the few vehicle-free destinations in India. Since it wasn't peak season, we managed to bargain for a decent stay at 500 rupees, down from the initial quote of 1200. The room was new, with a comfortable bed. We walked over 10 kilometers, exploring various viewpoints, some of which were truly breathtaking. What, in your view, makes for a well-designed city? Could we model cities like this? What would the cost be?

Alternatively, what according to you is a smart city? Can this model or similar fit inside the city you have designed? Kindly do know that a smart city does not only mean a city with usage of technology. There is more to it than technology.

If you were to design a city with no vehicles, how would you manage and design it? How would the town govern? What would be the source of income? What would be the disadvantages? Matheran has ample space for improvement. It is a tourist destination and could have had many other things for a city with no pollution. The place is green and fresh.

2.2 The Commute

We wanted to explore and understand how the city manages so much of the population that commutes to work. Mumbai has a 603.4 km² area. The current metro area population of Mumbai in 2022 is 20,961,000. Bangalore has a 741 km² area. The current metro area population of Bangalore in 2022 is 13,193,000. Even with that difference, Bangalore seems overcrowded and has more traffic issues than Mumbai. How and why? How does Mumbai manage it? That was my major question.

Mumbai has local trains. A major crowd from Mumbai takes the train. There are three major lines in Mumbai – central, western and harbour lines. The trains are cheap and fast. A journey of 60 km would take around 70 minutes. The nearby places cost you 5 re. The distance of around 60kms costs 15 re. Further away are 20 to 25, which is the maximum one needs to pay.

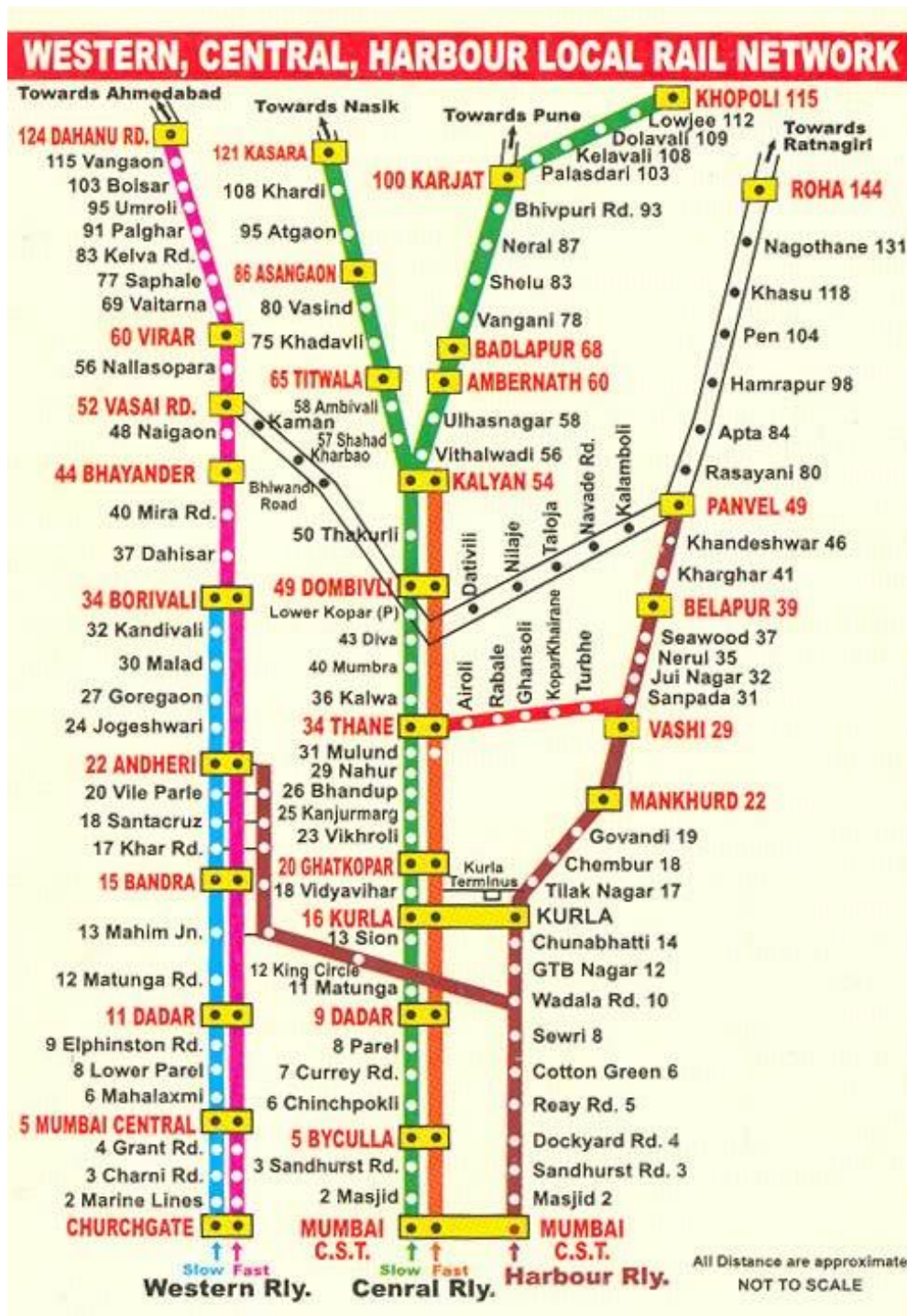


Fig 2: Train Network

Every station has fast and slow trains. There are AC trains too, with minimal frequency. Otherwise, the trains run every 5 minutes and the most commuted ones also have a frequency of 2 minutes. If you were at Mumbai central (station 5), how

would to travel to Neral (station 87)? (Because you decided to go to Mathern) Most trains from other places drop you at Mumbai central.

Observe the figure 2 carefully. Do you see how smartly the design is made? Can you build such connectivity to your new city which needs a commute plan? Can you plan your city with such a commute? What else can you infer from figure 2? What else does it inspire you?

The stations like Chhatrapati Shivaji Terminus (CST) have 16 platforms systematically arranged between local and out-station travels. Churchgate station is closer to Marine Drive, Hotel Taj, and Gateway of India. Each of the lines has its own unique features that define a characteristic part of the city.



Fig 3: A View of CST

2.3 The City Diversity

It is a most diverse city. Places in Navi Mumbai, like Vasai, are completely developed with malls, and the city looks very different from a place like Dharavi, which is known as the world's largest slum, along with being famous for many other things. How can we control slum growth? How do you think life is in the world's largest slum? Would it ever improve or continue to be one? In general, how can we ever stop the growth of slums? What action can be taken? Even Pune has several slums.



Fig 4: A View of Dharavi

Bandra is where most celebrities live. Andheri is famous for its pubs. Vasai-Virar is famous for its beaches. Byculla has a zoo. Ghatkopar is one of the oldest places. Kalyan is known to be having a highly educated population. Parel is known to be the safest. Malabar hill is where most rich people live. For students and bachelors: Bandra West, Vile Parle, Andheri, Powai, Malad are a few known better areas. Struggling actors stay close to Andheri. The most of middle class live in Colaba, Worli, Dadar, Thane, Powai etc. Each place has its own unique demography and

culture. Dadar is famous as a centre with crowded trains in the peak hours from 5.00 pm to 10.00 pm.



Fig 5: A Not-Crowded Local Train in Dadar

As it's a central connecting point across different lines, most of them will have to get down at Dadar and take an alternate line to reach office/home in morning/evening. There are several videos on YouTube that show the Dadar crowd. It is recommended to watch one. The problem is one will have to use a commute otherwise the situation is the same till 10.00 pm and any other mode of commute will cost four times more and take around 4 times more time as well. The bottom line is, if you keep waiting, you will never go home. Can the situation be improved? What do you recommend? Can you provide a better design solution? What is the cost? Is it cost-effective? Taking a train at Dadar at peak hours was the scariest experience. We would never want to be there again.

We traveled through various parts of the three railway lines, observing the streets and everyday life. At CST, you can buy a pair of jeans for just 150 rupees. The iconic Vada Pav at the old Aram shop still only costs 15 rupees, and it's a popular breakfast choice, along with samosas. On some streets, you can find two idlis for 30 rupees, while at Mumbai Central, street breakfasts are available for as low as 20 rupees. In contrast, a regular restaurant charges around 55 to 60 rupees for idli. Accommodation in the city isn't cheap either.

2.4 The Homeless

Many people make railway stations their home, sleeping there despite being frequently chased away by the police. Each morning, they wake up and head off to work. We experienced this first-hand at CST station, where we were forced to move by the police at least three times. It's a security measure—sleeping at the station is not allowed, and the police also clear out those without tickets. Many of the people there were waiting for trains, often early because they couldn't afford a room or were in between commutes.

We kept shifting from one spot to another. We were beyond exhausted, desperately sleepy, and ready to sleep anywhere. Finally, we moved a little farther down and slept on the platform near the tracks, knowing it was around 4:00 a.m., so we wouldn't get much rest anyway. It was such a dead sleep that if someone had robbed us (though there was nothing to steal), we wouldn't have noticed.

Local trains in Mumbai start at 4:30 a.m., and waking up was tough, but we kept moving. Many people live like this, sleeping in such places and getting back to work the next day. Are they used to it? Can we improve their living conditions? How can we make such environments better? Are they migrants who came to the city chasing job opportunities? Why do the police prevent people from sleeping at stations? What

do the homeless do? How do those who come to Mumbai with dreams and aspirations manage to survive?

Eating minimal food, no baths, and getting little proper sleep—those were our days. While it was exhausting for us, for many, this is their everyday routine. And they still manage to live and find happiness. As responsible citizens tasked with solving societal problems, how can we contribute to building a better nation? I would recommend reading and understanding urbanization. However, here is a short summary: Urbanization is the process where more people move from rural areas (like farms and small towns) to cities. This often happens because people are looking for better jobs, schools, and healthcare. As more people settle in cities, these areas grow and need more homes, roads, and services to support everyone. While urbanization can create new opportunities and help economies grow, it can also lead to problems like crowded living conditions, pollution, and lack of affordable housing. Good planning is important to help cities grow in a way that is healthy and fair for everyone (Berry, 2008).

3. Implications

There are several implications that indirectly originate from this study and here is a potential list:

- How can we make living better from wars?
- Can we make a city prepared for natural disasters (earthquakes, fire, etc.)?
- Can we prevent the forest fires?
- What about affordable homes?
- Can we prevent food waste-age?
- How can we better manage water/electricity for a city?

- Can we build better warehouses and manage resources well? (say for example for Amazon. How do they deliver resources? Where do they print books? How do they manage?)
- Do you want to improve the supply chain management?

Do you have any other problem, or did any other problem occur to your mind while reading this? Is there any problem that you would like to solve or approach using algorithms?

For the city design you have made, list the challenges that you can think of. Each team member can make a list. What problems could occur? What pain points do you see? What are few challenges that every city faces? What does your city have?

4. The Whereabouts

1. What did you learn from Amsterdam case study from portfolio that you can apply to your city?
2. What does Lavasa city design teach you?
3. Do you know that “Arc de Triomphe” has 12 roads meeting with the most complex traffic management? Watch the pictures and videos.
4. Have you seen the Toronto city design? Why is it hardest to navigate?
5. The sectors design of Chandigarh, what does that teach you?
6. What do you think is Cape Town known for?

Everything around us has a lesson that we can takeaway through.

5. Conclusion

The paper has no conclusion on its own. The conclusion will be the projects that will be carried out in teams seeking inspiration from this work.

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