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A Review on Bike Sharing System

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ABSTRACT: This paper aims to analyse and analyses the current bike-sharing literature. The final section of this paper also introduced additional research steps. By reserving a bike for their use, anyone can take a bike from a station that is closer to them, depending on availability. Any of the bike stations closer to your destination are where you can return the bike after use. Depending on the amount of traffic, bike sharing systems can employ barcodes or QR codes. The location of the bike is determined via GPS, which also acts as a theft deterrent in an emergency event and offers real-time location of the bike using GPRS capability. When the customer's mobile phone runs out of battery, an additional lithium battery attached to the bike can be used. Payment methods include credit card, debit card, and e-banking. The existing gaps in research are noted and debated.

KEYWORDS: Bike relocation, Bike Sharing System, Bike way network design, Bike station design, Accessibility Demand management, Relocation service planning.

I. INTRODUCTION

The United Nations estimates that the current global population of approximately 7.2 billion will increase to 8.1 billion by 2025 and to 9.6 billion by 2050. In contrast to developed countries, where population growth is hardly noticeable, the highest increase is anticipated in developing regions. Urban populations are anticipated to increase along with this urbanization, going from 3.3 to 6.4 billion people living in urban areas. This means that urban regions are where the population is growing overall [1].

As a result, more and more people utilize these systems on a daily basis, placing increasing pressure on the urban transportation network, which is now the main factor in the development of sustainable cities. An important prerequisite for the kind of improvement in urban planning that could raise living standards is a high level of transportation infrastructure [2]. Mariya has offered a different calculation for this issue (Feb. 2015) [6] "Up until 2050, our cities will continue to see weekly population increases of more than a million." It is quite obvious that urban areas will influence how future generations live. With the growth in urbanization, the problem of urban transportation is escalating exponentially. You cannot solve exponential problems with linear solutions, as Banny Banerjee, a Stanford professor and founder of Buzzcar, said in many of Robin Chase's presentations (Sakari, 2013). One of these non-linear solutions, along with other cutting-edge sharing components, is public bike sharing [4].

II. LITERATURE SURVEY

The Witte Fietsenplan, which existed in the 1960s, was the first instance of the bike share that we could find. In Amsterdam, a group of white bicycles that were painted by LuudSchimmelpennink, who is regarded as the inventor of the bike sharing program, were put out in the open for anybody to use. In actuality, the initiative wasn't a commercial deal; rather, it was a political protest against city car growth and pollution.

By examining vast BSS data from July to December in 2013 and 2014, XiaoluZhou[1] examined the spatiotemporal bike trend in Chicago. Chicago's BSS increased its popularity. There were about 15.9% more customers for this service. To find spatial communities of riding flows, they created a bike flow similarity network and applied a quick greedy algorithm. Modeling of the potential impact of shared bicycles on public transportation journey times in Greater Helsinki is presented by SakariJappinen et al. [2]. In many metropolitan locations, shared bicycle programmers have been successful in promoting cycling, especially when used in conjunction with public transportation. In this study, we attempt to develop a fictitious shared bike system and estimate its spatial impact on trip times by public transportation. In order to examine system usage in these cities, Martin ZaltzAustwick et al. [3] use visualization, descriptive statistics,



spatial analysis, and network analysis tools. They do this by employing methods to look into features specific to each city's particular geography and by spotting connections between various systems. FengYouLi and Wang ShanShan [5] Bicycles can be rented through a bike sharing system, and returning them is done automatically through a network of kiosk sites spread around a city. With the help of these systems, anyone can hire a bike from a single location and combine it with their as-needed, customer-return bike to the area they wish to return it.

The history of bike sharing is covered by Paul DeMaio [4], starting with the early 1st generation programmers and ending with the current 3rd generation programmers. Included are a thorough analysis of various models of provision, along with advantages and disadvantages of each, as well as a breakdown of startup and ongoing expenses. The report ends with a consideration of what a 4th generation bike-sharing scheme might be in the future. "There are two types of mayors in the world: those who have bike-sharing and those who desire bike-sharing," the vice president of Greater Lyon cites his mayor as saying. This appears to be the case as each bike-sharing program increases interest in this mode of transportation, creating a positive feedback loop.

The demand for bicycle sharing systems is presented by InêsFradea and AnabelaRibeiro [11]. The major goal of this research is to determine the geographic distribution of bike-sharing systems by relating the demand for such systems to external factors that influence bicycle utilization. This study will concentrate on the determination of demand based on the experience of other countries due to the limited information available in Portugal. The strategy is used in Coimbra, a medium-sized Portuguese city. The key benefits of this method are that it offers a quick assessment and may be customized to the needs of other towns and cities. The approach can assist investors, legislators, and transportation planners in making decisions. The approach is helpful for the system's overall architecture, including where bike-sharing stations should be located, how big the fleet should be, and when to schedule expenditures.

Oliver O'Brien and others [12] suggested a system for categorising bike-share programmes based on their geographic reach, occupancy rates, and differences in day of the week, time of day, and space. The location of new docking stations and cycle lanes, the targeting of promotional materials to attract new users, and the maintenance of a suitable balance of bicycles throughout the system area are just a few of the applications that can be made with the knowledge of such patterns and characteristics that can be identified from the dataset. An agent-based distributed solution for bike sharing systems is presented by Ningkui Wang et al. [13], with the goal of assisting users in successfully and successfully obtaining a required shared bike. In order to increase user happiness with the intended shared bike, we focus more on user preferences. At the same time, trust and probability are taken into account to increase effectiveness and success rates. Finally, simulation study outcomes show that our suggested approach is beneficial.

III. METHODOLOGY

This involves determining things like if the system's required technology is available, how challenging it will be to construct, and whether the company has sufficient expertise using it. The evaluation is based on a conceptual design of the system's input, process, output, fields, programmers, and procedures. This can be described in terms of the amount of data, trends, and updating frequency to provide an overview of the technical system. The application's high configuration of 1GB RAM on an Intel Pentium Dual core processor and development on the Windows XP platform make it. Technically, this is adaptable. The technical feasibility assessment is concerned with assessing the organization's current technological resources and their suitability for the anticipated needs of the proposed system. It is a review of the software and hardware.

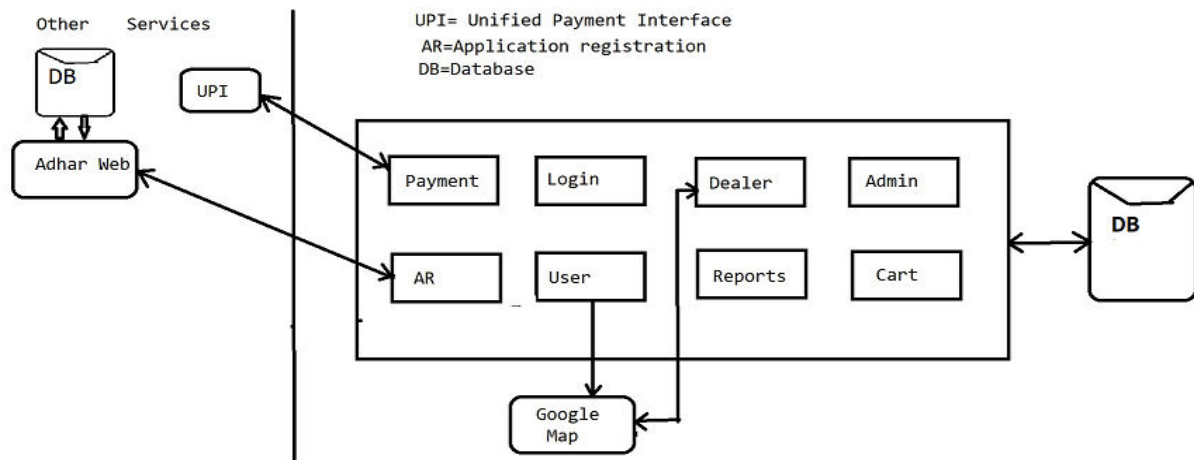


Figure1:-Block Diagram of bike Sharing System

The Bike Sharing Bike Rental application's implementation is as follows:

- 1) By employing web-based technologies, this application let tourists rent bikes swiftly and conveniently in popular tourist destinations.
- 2) This program can handle cashless rental payment transactions that are simple, quick, and secure.
- 3) For the purposes of the company's financial statements, this application can display data from bicycle rental report together with a rapid and accurate financial recording report.

A unit in procedural programming might be a whole module, but they are typically just one function or process. A unit in object-oriented programming is frequently a full interface, like a class, although it also could be a single method. The ideas of quality and software quality assurance are connected via the concepts of verification and validation. Improved data gathering of preferred bike routes and measurement of vehicle miles travelled will be made possible by better tracking of bikes while in use with implanted global positioning system (GPS) devices.

IV. CONCLUSION

Main factor for the pollution in metropolitan areas is the traffic congestion and it offers people with a terrible environmental state. The proposed system can only be used over a short distance. We call this virtuous cycle where each bike-sharing program increases interest in the mode of transportation. Leaders around the world will need to find new modes of transportation and better adapt existing modes to move people in more environmentally friendly, economically viable, and efficient ways as fuel prices rise, traffic congestion gets worse, populations rise, and awareness of climate change increases. To meet the demands of the twenty-first century, bike sharing is evolving quickly. We can draw the conclusion that bike sharing works best for short distances.

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