Safety Challenges and Solutions in Bike-Sharing Systems

Anne Kealy

Department of Computer and Information Sciences
University of Massachusetts Amherst

Jie Wu

Department of Computer and Information Sciences
Temple University

Abstract—Bike-Sharing Systems (BSS) is a new mode of transportation that allows users to rent bicycles and use them across the city for short trips. It has spread to all of the continents in the world due to its convenient nature and benefits. In contrast to other methods of public transportation, this service allows users to travel directly to their desired location, solving the first/last mile problem—when users' public transportation does not take them within one-fourth of a mile from their final destination. This allows users to get closer to their final destination than taking the subway alone, encouraging the use of public transportation. BSS also increases physical exercise, reduces carbon emissions, and is a flexible mode of transportation. These benefits have led to the growth of BSS. With this growth, several problems have emerged. These include re-balancing of underflow and overflow stations, predicting demand for each station, station placement, and, most importantly, safety. Re-balancing, predicting station demand, and station placement have been widely studied; however, safety has not been widely studied. This paper discusses the four leading safety concerns and provides new possible solutions and

Fig. 1: Bicycle Dock in Philadelphia, USA

plateaued, decreasing only 0.4% each year for the past 20 years [3]. Cyclist accidents plateauing is an excellent step