

Public bicycle sharing system devised by researchers at IIT Kharagpur

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KOLKATA: A team of researchers at the department of Architecture and Regional Planning of Indian Institute of Technology Kharagpur has come up with a dock-less public bicycle sharing system or PBS that could help even locals take on the might of multinational ride-sharing companies which run their own PBS.

The PBS devised at IIT

Kharagpur uses a Bluetooth and GPS enabled electronic lock which could be fitted to a cycle. Another lock version using GPRS is also being tested. The booking and payment interfaces are accessed through the users' mobile phone. A similar interface has been developed for operators to set up a customized PBS system, including parking stations, rate charts for usage etc to run its day to day operation. The software has also been developed for an effective redistribution system of cycles to reduce operating costs and to determine the appropriate number of bicycles for a certain service area.

The real difference of this PBS system from that run by the multinationals lies in the fact that the latter import the technology of the bicycle smart lock from other companies and then develops the access control software for the ride-sharing of the cycles. The PBS developed at IIT Kharagpur adheres to the 'Smart City' and 'Make In India' initiative and integrates the entire system with an IoT smart lock technology and other hardware which has been devised in-house.

The researchers have also developed the software for PBS operations which is extremely expensive to procure. They will give the technology free to small operators and thus create an enormous potential for self-employment. The servers would be hosted in IIT campus thus relieving the operators of the burden to maintain costly hardware by them self. This will ensure widespread use of PBS and huge environmental and health benefits.

The team started the hardware development sometime around September 2017. The prototype of the locks developed by the team has gone through several versions. A Bluetooth enabled bicycle lock with GPS and alarm systems have been currently developed which also incorporates other sensor modules for improving security and theft detection.

Debapratim Pandit of the Architecture and Regional Planning department, who is leading the project, says that the real challenge was developing the operations part. They have come up trumps though. Pandit said, "Anyone can start the system in a couple of hours with 25-30 bikes. A geo-fencing area has to be created to start operation. We have an administrative app for operators to create all this."

The major issue with PBS is to ensure the availability of bicycles and parking space/bicycle dock at the bicycle user's point of demand which is limited by the location of parking stations and the number of bicycles available at each location. Pandit added, "There had to be software for redistribution– something none of the multinational or other companies had tried to develop." So, the team developed the software, including the algorithms for an effective redistribution system appropriate for the local context to reduce operations cost.

Pandit also pointed out, "We are not going to charge money for any of the technology developed. The servers will be stationed inside IIT Kharagpur and operators can be easily trained to operate the system using just mobile phones. Although the production of the lock has not been finalized, we can partner with few companies to produce the locks using our designs and dies under license."

(Source: Times of India, 2019)