NATIONAL BICYCLE & PEDESTRIAN DOCUMENTATION PROJECT

AUTOMATIC COUNT TECHNOLOGY OVERVIEW

Bicycle and pedestrian counts can be conducted manually or with automatic count technologies; however automatic counters have certain advantages. Automatic count technologies are useful in conducting longer-term counts, establishing daily, weekly, or monthly variations and almost always require fewer person-hours. The most common technologies used for bicycle and pedestrian counts are:

- Passive infrared (detects a change in thermal contrast)
- Active infrared (detects an obstruction in the beam)
- Ultrasonic (emits ultrasonic wave and listens for an echo)
- Doppler radar (emits radio wave and listens for a change in frequency)
- Video Imagining (either analyzes pixel changes or data are played back in high speed and analyzed by a person)
- Piezometric (senses pressure on a material either tube or underground sensor)
- In-pavement magnetic loop (senses change in magnetic field as metal passes over it)

Most automated technologies work well for counting users that pass a specific point but most, with a few exceptions such as active infrared and video, cannot easily distinguish between bicyclists and pedestrians. Time-lapse video has been used to capture user type, demographic information, and behavior. A combination of technologies such as Eco-Counter's Eco-Multi, can also distinguish between types of users.

All automated count technologies have an error factor, with no-detection rates varying from 5% to 45%, depending on environmental conditions and usage patterns. A Portland, Oregon study tested the accuracy of three types of sensors: passive infrared, doppler radar and ultrasonic. The sensors were tested under a variety of conditions, and were found to have varying error rates and could be susceptible to adverse weather conditions (Beckwith and Hunter-Zaworski 1997). Comparing automated counts with manual counts allows researchers to correct for inherent error rates.

The choice of an automatic count technology primarily depends on the type of data that is required to be collected, the project budget, and the number of people who can work on the project. All automatic count technologies require calibration. The following table outlines count technologies most adaptable to bicycle and pedestrian counts.

Automatic Count Technologies

Technology	How it Works	Differentiate between bikes and peds?	Where can it be used?	Can it be moved to other locations?	Other Considerations	Technology Cost
Passive infrared	Detects a change in thermal contrast	No	Sidewalk, path	Easily		$,2000-3,000
Active infrared	Detects an obstruction in the beam	Yes	Sidewalk, path	Easily		$800-$7,000
Video imaging	Analyzes pixel changes	Unknown	Intended for indoor use	Yes	Difficult detection outdoors, no bike/ped application yet	$1,200-$8,000
Video playback	Video analyzed by a person	Yes	Anywhere	Yes	Difficult detection at night and bad weather. Considerable staff time	$7,000
Piezometric Tube	Senses pressure on tube	No	Path, on-street	Easily	Bicycles only. Potential tripping hazard	$1,600
Piezometric Pad	Senses pressure	No	Sidewalk, path	No		$2,000-3,000
In-pavement magnetic loop detectors	Senses magnetic field change as metal passes	No	On-street	No	Bicycles only. Requires cutting into pavement to install	$2,000-3,000

Automatic Counter Manufacturers:

EcoCounter: www.eco-counter.com

Jamar Technologies: www.jamartech.com

Trailmaster: www.trailmaster.com