Tomorrow's cities - the lamp-posts watching every move

Imagine an app **aimed at** showing thieves the best places for stealing. It is actually not hard to do - simply put together publicly **available** data on **disposable** income, crime levels and problems reported in a district. It may **reveal** that the optimum place to go stealing is in an area of high income, low reported crime and broken streetlights. The app not only exists but it won first prize in the "safety" category at an Amsterdam hackathon a few years back. Makkie Klauwe (it means "easy pickings" in Amsterdam slang) was created by Bram Fritz, a student who wanted to "provoke discussion on the role of open data in our society". Luckily for the citizens and police of Amsterdam the app never went into **public** use - but it is proof that data can be used for both good and bad. If that is the bad, then **consider** the good. In Oslo, the city's environment department is looking to **gain** **insight into** where to build new **pavements** and where to **reduce** traffic speeds. According to European Commission statistics, children under 12 make more journeys on foot than any other age group, so it was to them that Oslo city **council** turned for help. Working with technology firm Capgemini, it has **developed** a mobile app that **allows** children to **report** information on what they **perceive** to be dangers along their routes to school. It is designed as a game that allows the children to play the role of an undercover agent and report anything **suspect**. Cities are increasingly **gathering** data from **a range of** unusual **sources** as the cost of chip technology falls and data-gathering sensors can be **fitted on** pretty much anything, from bridges to sewers, streetlights to bins. It is part of a huge technology shift known as the internet of things. Research firm Gartner **estimates** that by 2020 there will be more than 26.5 billion devices connected to the network.

In the US, Philadelphia estimates that it is saving $1m every year just as a result of putting sensors on bins. Instead of having three rubbish collection **shifts** each day, it now collects rubbish only when the sensors indicate that bins are full. The knock-on effect of fewer bin lorries is to reduce both **congestion** and pollution. In Glasgow, the city council is looking to **upgrade** its streetlights to more energy-efficient LED lights - likely to **make up** to 50% savings on one of the city's largest bills. But Glasgow has also programmed them to **increase** in **brightness** if noise levels **rise** - for example if there is a **disturbance** in the area. The pilot project will be integrated with the newly built City Operations Centre, where CCTV cameras across the city are monitored and staff can zoom in on any problems. A way to **solve** crime, some would say, but for others a **privacy** nightmare.

Having data at their fingertips can be **advantageous** for citizens. In Santander in Spain, residents can **access** up-to-the-minute information on road closures, parking **availability** and bus **delays** via street signs. London has made 500 datasets available via a city dashboard that can be accessed on a public website and shows a **variety** of data from air pollution, crime statistics, weather and even a happiness index for the city. It means that it is possible, for example, to **track** the real-time location of every bus on the streets. There are also the so-called "click-and-fix" services that allow citizens to report issues such as potholes and broken swings by taking pictures, for example, and sending them to a portal. Philadelphia and Salt Lake City are using an even more simple **platform**, known as Textizen, to give citizens a say on a variety of city issues. It works very simply by posting questions in bus stops and other key points in the city. They **range** from the very general - "What do you like about your city?" - to more specific ones such as whether people would use a new railway line if the city built one. Citizens can **respond** immediately with a text message.

When it comes to sensors, citizens carry around the most powerful of all in the form of a smartphone that can be used to monitor a whole range of things. So they can **contribute**, for example, to NoiseTube, which monitors sound levels via mobile phones to combat the problem of noise pollution. Cities that get citizens **involved in** data collection will be the smartest, thinks Dr Andrew Hudson-Smith, who designed London's data dashboard. "We are moving away from regimented government-controlled data into **crowdsourced** data from smartphones," he said.

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