Smart Bin - An Odor Oriented Approach

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ABSTRACT

Technology enhanced trash cans have already been subject to research and have become available as market products. How we handle the waste has traditionally been a logistics issue, but it can be approached also in other ways. The SmartBin perceives the trash as something more than a pile of waste - it is also something smelly! The emphasis is on improving the indoor environment to ultimately improve the quality of life by detecting odors. The technology enhancing the bin uses sensors which detect gas emissions, mainly the ones occuring in decomposition of organic materials. If any of these values exceed the threshold the SmartBin will react accordingly, supported by state of the art machine learning techniques. Any specifics will be listed in the following document. This will range from hardware prototyping to evaluation of the product.

ACM Classification Keywords

H.5.m. Pervasive computing, smart measuring: Miscellaneous

General Terms

Design; Measurement.

INTRODUCTION

RELATED WORK

This is not the first paper about Smart Waste Management Systems (WMS). Other researches explored interesting IoT approaches to the problem, mostly in relation to planning garbage collection and / or waste reduction. ...many, pick one or two... like in Australia, France implemented an RFID and weight based approach for a real time automated WMS, with the main focus on bringing down management costs and facilitate automating waste identification. citation to korean guys In another study from South Korea, the main approach was to identify food waste in a selected area of Seoul and give citizens incentive to waste less food by fining them based on the amounts of waste they dispose. The infrastructure is similar to other systems, with a centralized server and a host of devices providing data to this server. Then the server provides data for applications such as management utilities or phone apps. cite catania In another study, Vincenzo Catania and his colleagues used a Smart-M3 Platform and sensor enhanced bins in Catania, Italy with the main focus on urban planning, smart collection and monitoring of urban solid waste. In this case, the information that was collected was on the location of the trash can, level of fullness, and weight of the waste.

SYSTEM DESIGN

HARDWARE ARCHITECTURE

SOFTWARE ARCHITECTURE

EVALUATION IN SMELLY ENVIRONMENTS

The SmartBin system which has been constructed utilizes gas sensors to open up an additional dimension when measuring the state of the environment, in which it has been placed. In short these values will be used in an evaluation of how the current environment is doing in regards to air quality and potential safety hazards for individuals in the given environment.

The expectations towards these results is that they can be used to produce rather precise predictions about how smelly the air in the given environment is. People have a notion about what smells, machines need to do these predictions based on values from sensors. The assumption is that the gas emissions of some chemical reactions, namely the ones where decomposition of organic materials is happening, always produce some specific gasses as a product. It is based on our knowledge of these different gasses and how they smell - we assume that hightened concentrations of some of these gas types result in worse quality air.

CONCLUSION