We: a robotic system to extend social impact of community gardens.

JOSHI, S., RANDALL, N., CHIPLUNKAR, S., WATTIMENA, T. and STAVRIANAKIS, K.

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'We'- A Robotic System to Extend Social Impact of Community Gardens

Swapna Joshi
SICE, Indiana University Bloomington, USA
swapna@indiana.edu

Natasha Randall
SICE, Indiana University Bloomington, USA
nprandal@umail.iu.edu

Suraj Chiplunkar
SICE, Indiana University Bloomington, USA
sugochip@umail.iu.edu

Theodora Wattimena
SICE, Indiana University Bloomington, USA
twattime@umail.iu.edu

Kostas Stavrianakis
SPH, Indiana University Bloomington, USA
kstavria@iu.edu

ABSTRACT

The social, educational, economic and health benefits from community gardens often stay limited to the gardeners. 'We' is a community-oriented robotic system designed to extend such benefits to the public and community. It consists of 1. 'We-Sense,' garden sensors that encourage community participation, and 2. 'We-Grow,' a responsive installation that reflects the state of and allows to explore the garden and its social life. 'We' aims to provide awareness about the community gardens in public spaces, to increase public literacy about food and community gardening, provide out-of-class education, encourage participation in citizen science and increase community engagement.

1 INTRODUCTION

Community gardens offer benefits to gardeners such as space and resources, monetary savings and access to fresh produce [1]. A community formed around community garden is deemed far more valuable than such individual benefits. Community aspects of gardening encourage social interactions, leading to cohesion, responsible social behavior, sense of belonging, social support and opportunities of sharing knowledge and skills. In return, the community garden benefits from the support and resources from diverse set of organizations, such as neighborhood groups, schools and community colleges, and nonprofit organizations [2] However, one of the biggest hurdles to such a mutually benefiting relationship is lack of engaging opportunities and interactions for the community, apart from gardening activities.

Attempts of building community at the gardens are often limited to holding events, such as potluck and food swapping, or sending out informational resources through flyers and websites. Informal, out-of-classroom education and awareness of local food gardening and social life at the gardens can be extended beyond few individuals, to attract people and encourage participation.

We present the design of a robotic system with garden sensors that provide opportunities for community participation, and a responsive installation that encourages people to explore social and educational aspects of community gardening through different robotic interactions in public spaces.

2 RESEARCH

We did observations at three community gardens and conducted eleven in-depth interviews with garden supervisors, volunteers and gardeners to understand wider community's engagement with the gardens. Further, we conducted surveys of broader public to explore the aspects of community and gardening that might be most interesting to them. Finally, we examined literature, to understand the ways in which benefits from community gardens could be extended to public and community. We also studied recent examples of engaging interactive technologies for public spaces [3]. Some of the significant findings from our research are as follows:

1. Lack of engagement from community, its people, experts and institutions, leads to disengagement and abandonment of community garden plots by gardeners who need education, knowledge, social support and motivation.

2. Organizations and institutions, such as schools and aging centers are looking for ways to engage with community gardens to avail social, educational, recreational, and therapeutic benefits.

3. Gardeners perceive social engagement and involvement as most crucial and await opportunities to share their knowledge.

4. Public surveys indicate an inclination to educational aspects of food gardening such as knowledge of locally grown varieties of plants and their bloom cycles or growth stages.

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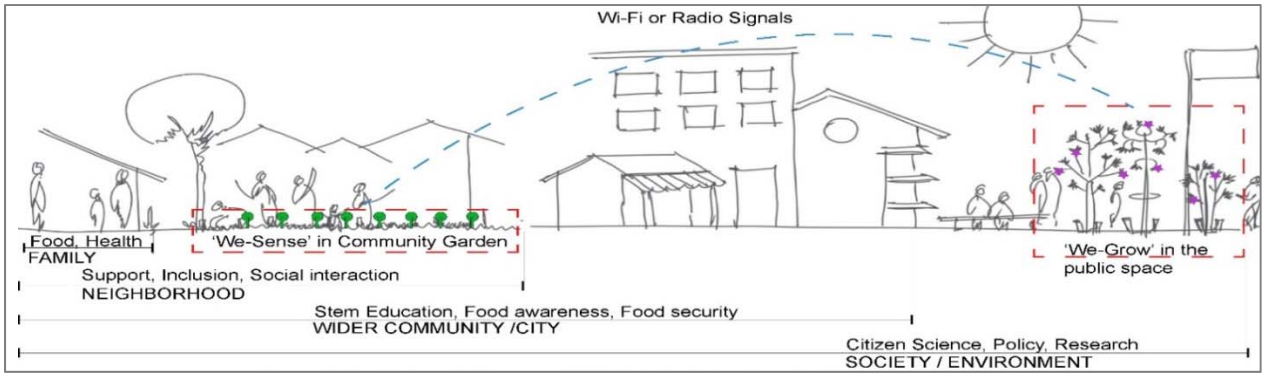

Figure 1: Social impact diagram of proposed 'We' robotic system showing varying benefits for individuals to society.

5. Flyers, websites and apps from community gardens, are ineffective in gaining public and community attention, or meeting with the above social, participatory and educational needs.

Our proposed robotic system 'We' provides unique and engaging ways for the public and community to participate in and benefit from the community gardens.

3 CONCEPT

Our design consist of a robotic system with 1. 'We-Grow,' to raise sense of community, food gardening education and awareness in public spaces, and 2. 'We-Sense' to encourage community participation and social engagement at the gardens. 'We-Sense' automatically senses garden health and the social environment and allows for participatory activity of logging plant growth stages such as budding or flowering. It provides engaging opportunities for community, such as for kids and elderly from schools and elder care facilities, to engage with and support gardening activities through such observation and logging, while providing them with education and therapeutic benefits from close contact with nature and social life at community gardens (Fig. 1).

Sensory data and logs from 'We-Sense' are synced in real time via Wi-Fi or 6LoWPAN with 'We-Grow,' a responsive installation in a chosen public space. 'We-Grow,' uses this data to represent the social life and state of the garden to the wider community. It brings real-time awareness of food varieties grown, plant health, growth stages, bloom cycles and social activity in the garden. It senses public presence such as touch or movement of people and responds through lights and movement to engage people with social and educational aspects of community gardens.

Design (Fig. 1): 'We Sense' is a timer/clock turned into social activity and garden metrics sensor and a plant growth logging device. It's interactive; the interface presents logging data collected from a flexible circular potentiometer and a soil moisture sensor. 'We Grow' is a metal coat rack converted into a responsive public installation. Its flower-like ends are crafted from disposable spoons and are equipped with infrared sensors, vibration motors, LEDs, speakers and servo motors.

Interaction scenarios: Set in a public space, 'We-Grow' has blossomed with flower-like ends. People can watch and learn about the vegetables that are being grown this season. When in close proximity to people, its buds light up, their color reflecting the plant family, such as grass or cucumber, they represent. When touched, these buds replay the movements of the last bloom cycle. Elements of the installation also vibrate or buzz to convey social activity in the community gardens.

At the community garden, children visit for out-of-classroom activity, observe plants and use the rotating knob on 'We-Sense' to log plant growth stages. When gardeners visit their plots, they can see logs and visual indications on 'We-Sense' that gives them scientific information on plants and interactions from 'We-Grow' in the public space.

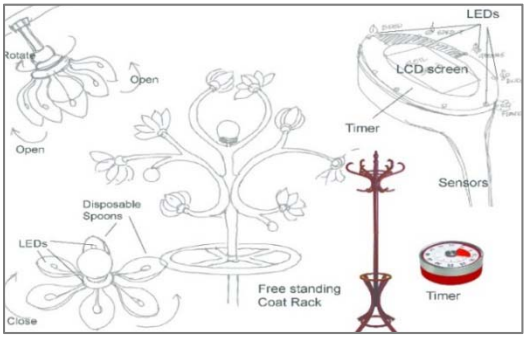

Figure 2: Design of 'We-Grow' (left) and 'We-Sense' (top right) and everyday objects used to make them (bottom right).

4 NEXT STEPS

We will evaluate our design for improvements by analyzing community member's perceptions and experiences with 'We'.

5 ACKNOWLEDGEMENTS

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