UNIVERSITY of GUELPH

COLLEGE of ENGINEERING AND PHYSICAL SCIENCES

SCHOOL OF COMPUTER SCIENCE

PhD Defence

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Digitizing Agriculture: Examining the Adoption of IoT in Farming

Chair: Dr. Stacey Scott
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Abstract:

Agriculture is changing for many reasons. One of these reasons is that IoT is changing the practices of agriculture. The first objective is to contribute to the understanding of how farmers view IoT. By examining how farmers view and practice farming-enabled IoT we can identify how their views impact the use of this technology. To address this first objective, I conducted a discourse analysis of 19 interviews with farmers in Ontario, Canada, asking them to describe their experience of working with IoT and related technologies. One main discourse with two opposing tendencies was identified.

The second objective is to examine how farmers' views of IoT influence their decision-making regarding technology adoption. To understand what characterizes farmers' experiences with IoT, we conducted a discourse analysis of 32 interviews with farmers in Ontario. Discourse analysis was used to understand the range of meanings associated with IoT by farmers. We find that two main discourses are present (1) the extent to which IoT was viewed as useful/helpful vs not useful/unhelpful and (2) the extent to which IoT was viewed as being their choice. The results indicate that farmers respond to IoT in four categories: embrace, accept, ignore, and caution. This chapter contributes to the literature by categorizing the farmers' responses to IoT implementation and highlighting why farmers adopt these categories. Current literature recognizes that diagnosing the current readiness and use of innovations is a proxy for their readiness to scale.

The third objective is to expose the discourses in farming with the Internet of things at the levels of government, farmers and industry. From November 2019 to September 2021, we interviewed 47 members of the Canadian agricultural community, including 32 farmers, ten industry members, and five members of the government. The results displayed 12 discourses present among participants titled: Training, Understanding, and Learning are Essential/Lacking, Changing Daily Routine, The Move from Manual Labour, Need Partner Encouragement, Tech is Changing the Structure of the Industry – Push back, Values and Big Ethical Questions, Need for Simplicity, Reliant on Tech, Smart phones make Dumb Farmers, Beneficial to Human and Animal, Farming is still Farming, Not a risk to me – I am just a Farmer. Our results reflect 12 discourses organized into the two continuums of rational/cultural elements and individual/structural opportunity. This study highlights the key questions and issues around the Internet of Things from multiple stakeholder perspectives.

The fourth objective is to study the concerns and recommendations from this thesis. We aim to understand the farmer-centric design thinking principles for smart farming technologies. We suggest that we can see the practicalities exposed in transitioning discourses by focusing on how matters of concern are framed. As farming viewpoints are necessary for a successful transition, these recommendations will provide value to policymakers, IoT technology designers, and farm associations.