Prospectus

A Ticket System and Wiki for the Piedmont Master Gardeners
(Technical Topic)

Regulation of Artificial Intelligence in Law
(STS Topic)

By

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Fall 2017

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Prospectus

I. Introduction

With web applications and frameworks becoming increasingly popular in the growing age of information, non-profit organizations are having trouble finding the means and money to reach out to their local communities. Without a comprehensive web system to handle clients and databases, companies and organizations struggle to work efficiently and information can be lost. For the technical project, the Piedmont Master Gardeners (PMG) of the Albemarle-Charlottesville community are looking to create and implement a web platform that contains a horticultural knowledge base, a client management system, and a ticketed response system for the various questions asked of them. In order to help the PMG maintain organization and increase efficiency, the web platform must be intuitive for volunteers looking to log their information and solve the horticultural problems of their clients. Without developing a system for the non-profit to efficiently handle clients and tickets, the efficiency of the organization will remain slow and possibly ineffective as their clients move away from traditional US Postal Services.

The STS research paper has little to do with the PMG and the capstone technical project. Over time, artificial intelligence (AI) has become increasingly difficult to legally define. As a result, developing and passing proper legislation around the field has become seemingly impossible. Many scientists, developers, and tech companies believe that there is no way to regulate it at all without a serious conversation about the potential these computer systems have (Markoff, 2016). The research topic will focus on how AI can be regulated in the future to ensure safety, satisfaction, and successful integration into companies and personal lives, without restricting the freedom and innovation that is essential to the growth of the industry.

II. Technical Topic

The Piedmont Master Gardeners (PMG) have reached out to the University of Virginia and its students to help design and code a web platform to improve their efficiency at handling reports through their Horticultural Help Desk. The PMG are volunteer educators who bring scientific knowledge of the best horticulture and landscape management practices from the Virginia Cooperative Extension to the Albemarle-Charlottesville community (Virginia Cooperative Extension, 2017).

The PMG are just one of many organizations that have filed for assistance from the University's undergraduate computer science (CS) engineering program. The project will be done entirely using the web framework Django, which is a framework written in the programming language, Python. For the reports submitted to the system, the four basic functions necessary for data storage known as CRUD (Create, Read, Update, and Destroy/Delete) will be utilized. The reports will also track various demographic data that are needed for government funding purposes. The form that our group will develop will mimic the paper form that the organization currently uses to make transitioning to the electronic database as easy as possible. An example of this intake form can be seen in Figure 1 on the next page.

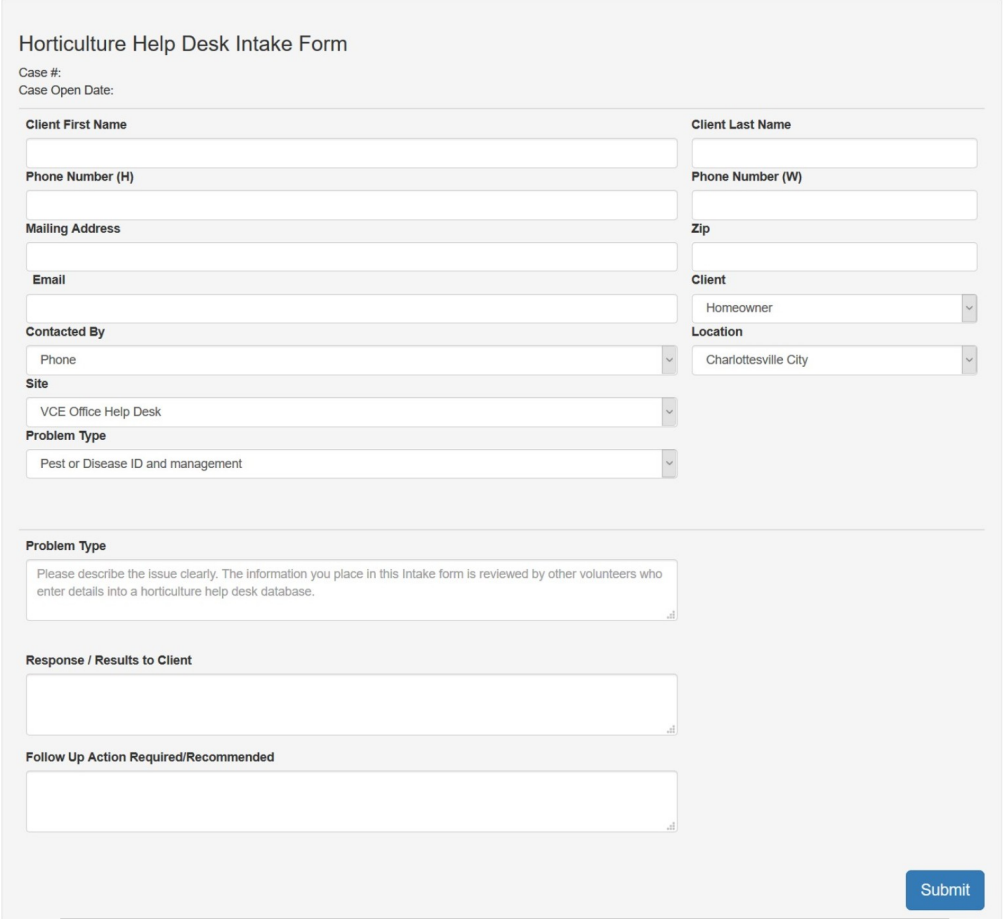

Figure 1: An example of the intake page that we've set up to mimic the PMG's long paper form.

By Matthew Schaeffer and Jack Lint

For 2 semesters, the project, under the guidance of Prof. Bloomfield, will undergo development, with basic functionality finishing in December and the final version launching in May. Each iteration will last roughly 2 weeks, and progress will be documented throughout the development cycle. The application will be worked on throughout this time collectively with John Valeiras, Jack Lint, Karley Walker, Lawson Kennan, Nathan George, and Sam Prescott. The basic requirements for the technical project include: creating user classes such as Admin or User with varying permissions and degrees of accessibility, storing and maintaining a database of all of their clients and their questions, and a ticketing system to track their reports. Additionally,

a wiki for the group to categorize and track their knowledge and common responses to various local problems must be implemented in the second semester.

Currently, the report management (ticketing) system is being developed. Already we've developed a database to store client information, created mockups to present and negotiate with the PMG organization, created a report generator and the forms to go with it, and installed a system login with basic user permissions. By the end of the month we will have the system fully up and running along with the ability of the reports to be auto-generated from emails to the organization and proper administrative and staff positions for the users.

Through a social constructivist lens, it can be seen that the application has come about because society now has established these norms of how tasks need to be performed. We've become a mostly digital culture, but the master gardeners across the country have been restricting themselves to paperwork (mostly because the government requires certain forms and details to be filed). They have begun to feel the pressure, even within their demographic (most master gardeners are 60+ years old) to go digital, despite not having a profit motive. Their goal is to transition these paper forms to an online form that can be filled out so that their clients do not only have to show up in person to ask questions.

III. STS Topic

Researchers, engineers, and scientists believe that Artificial Intelligence must be regulated soon in order to prevent it from being abused (Müller and Bostrom, 2014). Studying the regulation of AI using Actor-Network Theory (ANT), the biggest actants in the field are the major technological corporations such as Google, Microsoft, Facebook, and Amazon. The major actors are Elon Musk, Mark Zuckerberg, and select professors and lawyers from leading universities like Carnegie Melon University (CMU) and Stanford University. In the near future,

it's expected that Congress and lawmakers will play major roles as actors as well by creating the laws or even an agency to deal with the concerns over abuse of AI (Sherer, 2015). By understanding these actants' and actors' roles in regulating AI and their biases, it become apparent as to how these laws and regulations may be devised and applied across all AI systems and companies.

The most prevalent study in regulation of Artificial Intelligence was conducted by a panel of experts brought together by Stanford University (Stone et al., 2016). They argue that regulation of the industry is not as crucial as the public believes it to be, given the rate of progress. By 2030 they believe that the impact of AI will be almost entirely positive, and have a great and far sustaining impact on our very culture and way of living. The Stanford Project warns that, "if society approaches [AI] primarily with fear and suspicion, missteps that slow AI's development or drive it underground will result, impeding important work on ensuring the safety and reliability of AI technologies." Of course, their input is likely biased given that the panelists are all captains of the Artificial Intelligence industry, and as such would love to continue their research unimpeded by bureaucracy, restrictions, and legislation.

Another study discusses the overall potential for regulation of such a vague and expansive field (Markoff, 2016). A group of experts from five major tech corporations, Facebook, Amazon, Apple, Google, and IBM, believe that an "ethics panel" must be created to ensure the technology is not misused. They believe that it must be done sooner rather than later, as AI is developing quickly.

A study about the positive and negative effects of Artificial Intelligence in our lives discussed how it was likely that AI would bring us closer together and stimulate us, rather than making us lazy and unproductive (Gillies, 1996). Gillies believes that regulation would not be

necessary until it hurts overall production and intellectual stimulation. Any form of regulation in the market could otherwise stifle competition and progress within the field, hurting any potential AI has for success.

A paper from the Harvard Journal of Law and Technology proposes a possible method to regulate future AI (Sherer, 2015). Sherer proposes what he calls the "Artificial Intelligence Development Act". Its mission is "to ensure that AI is safe, secure, susceptible to human control, and aligned with human interests, both by deterring the creation of AI that lack those features and by encouraging the development of beneficial AI that include those features." The act would also establish a government agency similar to the FDA that would approve AI on the basis of their established safety regulations. Instead of forcing all AI to comply, which would be bureaucratic and slow and stifle the innovation of AI, Sherer suggests that, much like the FDA, AI can be sold without the certificate of safety, but the manufacturer will not enjoy the "limited tort liability" that the certificate protects manufacturers from. Certified AI would enjoy the luxury in court of the plaintiff needing to establish actual negligence in the design, manufacturing, or operation of an AI system in order to prevail on a tort claim. On the other hand, non-certified AI would leave the manufacturer totally liable to any injuries or claims. This method would heavily encourage non-certifiable AI to maintain safety precautions, while giving the duality of suggesting AI to be certified by the government agency.

In Witness Testimony Evidence: Argumentation, Artificial Intelligence, and Law (Walton, D. N., 2008), Walton presents how AI can be interpreted within the law, specifically when used as evidence during criminal trials. He argues that such evidence should be used and preserved like any other evidence and must be examined under the same scruples and subjection to reliability.

Research question and methods

How can we best regulate the industry of Artificial Intelligence (AI) so that it can be used safely and with good intentions without stifling innovation and creativity? This question provides the basis for the STS research to be conducted. In addressing various texts from the inception of neural networks and Turing machines, a historical precedent can be examined to set for regulation today. Understanding the uses and implications of AI is a challenging task, but by addressing the specifics of each possibility, a larger case can be made to govern the general regulation needed.

First, a working hypothesis must be established to determine what the best method for regulating AI might be. This will be derived from all of the sources and academic journals that will be read over the course of the year. The sources will be questioned for authenticity, and their claims will be subjected to intense scrutiny and require both evidence and precedent to become part of the working hypothesis. Additionally, these claims will be questioned on the bases of how much they will stifle potential innovation, how practical the approach of the laws and regulations are, and how greatly they will improve the lives of the consumer and the users of AI. The working hypothesis will be continually reviewed and revised as more research in the journals and precedents are examined, until a final conclusion can be reached.

IV. Timeline and Expected Outcomes

The technical project aims to develop a web application for the Piedmont Master Gardeners that will track client information, maintain reports about horticultural questions that are brought to their Help Desk, create a wiki for common solutions, and facilitate ease of management as they transition to a digital system. The technical paper will come as a report. The work will be done over two semesters, with the report management system being completed in the fall of

2017, and the wiki being completed in the spring of 2018. The STS research paper will seek to identify and attempt to resolve the issues that are dealt with in regulating AI systems. First, a working hypothesis as to how AI might be regulated will be drawn up based upon the academic journal articles, existing laws, and previous precedents of similar technologies. This hypothesis will be subject to modification as more research is done. After many iterations of this working hypothesis are completed, and a final system of regulation is decided upon, the research question will be answered in the thesis report. The research will be conducted over the 2017 – 2018 academic year.

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