

Thesis Project Portfolio

Ultrasonic Automated Watering System

(Technical Report)

Leveraging AI for Inclusive Education for Student with Learning Disabilities

(STS Research Paper)

An Undergraduate Thesis

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Alex Medrano Morris

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Department of Computer Engineering

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Executive Summary

The research paper discusses the importance of integrating technology within our educational systems to help recognize and support the needs of students with learning disabilities. The main point was to advocate for a paradigm shift in our education where we implement technology that helps with the identification of learning disabilities and creates an environment that values inclusivity, accessibility, and personalized learning over a one-size-fits-all education. Technological innovations can help create personalized experiences that are tailor to individual preferences and accessibility needs. This will contribute to a more inclusive learning environment as technology has the ability to analyze and recognize individual learning styles. By understanding the effectiveness of the integration of technology in education and how it creates a shift toward a more inclusive and equitable educational system individuals with disabilities can feel empowered individuals and thrive academically.

Conversely, the capstone project is about developing an automated watering system that uses ultrasonic sensors to detect plant dehydration and offer the precise amount of water needed. This project addresses the limitations of conventional plant watering methods by creating a system that responds to the unique hydration needs of plants. Our innovative watering system finds a solution to the common issues of under and over watering by responding to plant distress signals outside of human frequency range. A user-friendly web page was made to remotely monitor and control the watering system while the plant owner was away from home. Users who have busy schedules don't have to stress about whether they watered their plants because our automated watering system would handle it. This device would help many people who don't have

the knowledge, time, or attention to take care of a mundane task such as watering your own plants.

In terms of the relation between the two projects they are drastically different topics yet highlights the importance of technology in creating equity in our society and efficiency in our day-to-day lives. On one hand, My research paper focuses on implementing technology in our education system to help students with learning disabilities. On the other hand, my capstone project focused on designing and implementation of an automated watering system for plants using an ultrasonics sensor to detect their dehydration. While it is hard to see the correlation between the two papers there is a slight connection in terms of the technical project being an example of technology that can be used for people with attention deficit disorders. The technical project was used to benefit individuals with who struggle to take care of plants. Caring for plants requires a combination of knowledge, attention, and consistency. People with attention deficit disorders commonly lack attention, have a misconception of time, and tend to be very forgetful; this can make it difficult to establish and maintain a consistent care routine. The technical project shows how technology can simplify tasks that require regular attention and precision which are qualities that individuals with attention deficit disorders may find challenging. The juxtaposition of these projects demonstrated the versatility of technological solutions in addressing diverse needs, including educational support and simplification of daily tasks. serves as a critical enabler of accessibility, empowerment, and inclusion for individuals facing various challenges, including those with learning and attention disorders.

Working on these projects shows the value of designing technology from a perspective of inclusion and diversity. It is critical to understand the importance of considering the user's specific needs and challenges in the development process of making meaningful and impactful

technological solutions. This approach would help contribute to the creation of a more inclusive society where technology serves as a bridge rather than a barrier. In conclusion, the synthesis of insights from both the research paper and the capstone project illuminates the profound impact of thoughtful technology integration in various aspects of human life. When technology is designed and implemented with a deep understanding of diversity it can significantly improve quality of life, accessibility, and inclusion. Through working on these projects I can see the potential of technology and the importance of inclusive design principles in technological development.