

Prospectus

Automated Labor Assigner Using The Max Flow Algorithm
(Technical Topic)

Intentional Communities and Technology
(STS Topic)

By

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Technical Project Team Members: NA

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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Introduction:

To understand my projects you must first understand Twin Oaks. Twin Oaks (TO) is an intentional, egalitarian, sustainable community of around 70 people in Louisa County, Virginia. Equality is highly valued at TO. Members share almost everything; cars, food, land, income, etc. Their value of equality extends to how they value labor. All labor is valued equally. An hour worked making income is equivalent to an hour spent taking care of children.

Here are some facts to help you better understand the community: It was inspired by B.F. Skinner's *Walden Two* (*Twin Oaks Intentional Community - FAQs - One Long Page*, n.d., p.5). People can leave whenever they like (*Twin Oaks Intentional Community - FAQs - One Long Page*, n.d., p.3). And there is no central religion (*Twin Oaks Intentional Community - FAQs - One Long Page*, n.d., p.1). The reason I know so much about Twin Oaks, and why I'm interested in it, is because I was born and raised there.

This information is important because both my projects relate to Twin Oaks. My technical project is an automatic labor assigner using the max flow algorithm. It will take in TO members' preferences and the work that needs to be done, and output work schedules for everyone. Almost all the work that is done at TO is scheduled; for example, working in the dairy, making community meals, and making income for the community. The automatic labor assigner will deal with a wide array of inputs. This will increase its value to the various groups it benefits, and it will benefit several groups. It most certainly benefits TO. It may also benefit other communities with similar labor systems. And it will benefit academia in general by exemplifying an instance of how max flow can be used to schedule labor.

But some at TO might not see it as a benefit, because some people move there to get away from technology and modern society in general. Twin Oaks used to have a very anti-technology culture

(Kinkade, 1994, p. 105) but through the years TO has become more accepting of modern amenities. It has come a long way from not allowing microwaves (Kinkade, 1994, p. 204). Currently, almost all modern appliances are allowed at Twin Oaks.

My STS project will examine this changing relationship. It will show how Twin Oaks, Acorn, and East Wind (which are similar intentional communities) have evolved with evolving technologies. This project, too, has several benefits. It benefits these communities because it will give them an easily accessible piece of their history, it benefits people in the mainstream who would like to better understand these communities, and it benefits society in general. These communities try to be utopian. Seeing how they interact with technology and how this influences their societies will help us better understand each of our societies and see how they might be improved. First, I'll talk more in-depth about my technical project.

Technical Topic:

My technical project is an automatic labor assigner that will generate Twin Oaks members' work schedules using the max flow algorithm. The main problem it will fix is the amount of time spent on labor assigning. Currently, one person does it all by hand. This takes around 30 to 40 hours of skilled work per week. My program will be faster than this. In addition, it will be a boon to society at large. Works do exist that outline, theoretically, how to make a max flow scheduling algorithm – see Brucker and Qu's max flow scheduling algorithm that they outline in their paper "Network flow models for intraday personnel scheduling problems" (2014) – but mine will detail a real-world implementation. It will also incorporate feedback from the users so that future algorithms, and my algorithm, might be improved.

I will draw on many sources to help construct my technical project. Firstly, I will model it off of

Brucker and Qu's max flow scheduling algorithm (2014). My capstone advisor, Professor Nathan Brunelle, will be of great assistance in guiding me through my entire capstone creation process. I will also call on the experience of Twin Oaks' resident programmer. He has researched this topic a great deal and has made a preliminary model of a scheduling algorithm. He did not use max flow but this does not significantly diminish its value. I will also consult with the labor assigners at Twin Oaks. I have already interviewed some. As they will be the actual users of the program their input will be critical. The only people whose input will be of more importance will be the members of Twin Oaks themselves. Their schedules will be generated by my program and so their input on it will be met as closely as possible. Versions of this algorithm do exist although implementations are bound to slightly differ as all jobs differ. But just because I can make this program, should I? How has the interplay of technology and culture developed over the years at Twin Oaks and other intentional communities? This is the question my STS project will answer.

STS Topic:

In my STS topic, I will study how Twin Oaks, and other intentional communities, have changed as technology has advanced. There is a definite lack of literature on this topic. Kat Kinkade, one of the founders of Twin Oaks, wrote two books on its history. Both only briefly touched on technology and the most recent was written as the modern technology boom was just starting. It was published in 1994. My thesis will fill this gap in knowledge. But it is more than just important because it is unresearched, it will actively benefit society. Kat Kinkade said her book, "Is It Utopia Yet?" really only relates to people who have considered joining an intentional community (Kinkade, 1994, p. 307). My work will certainly benefit these people. It will tell them more about community life and history. But I think Kinkade was wrong. My work and her books are applicable to so many more people than just those interested in living communally. Twin Oaks, Acorn, and East Wind are societies trying to be utopias,

and just like in the Republic where Plato defines what makes a good person by increasing the scale of the question and asking what makes a good society, we can use the magnified aspects of these mini societies to find what would make our societies great. These communities are not utopias (Kinkade, 1994, p. 307; *Self Governance – East Wind Community*, n.d.). They do some things decidedly worse than what is commonly done. But through studying their cultures, we can come to a better understanding of how to truly make a society exceptional.

The use of technology significantly affects many aspects of our culture. For example, it affects how much time we spend together as a family. Mullan and Chatzitheochari found in their paper “Changing Times Together? A Time-Diary Analysis of Family Time in the Digital Age in the United Kingdom,” that, strangely, families spent more time together in 2015, when mobile technology was more pervasive, than in 2000 (Mullan & Chatzitheochari, 2019, p. 12). However, the amount of time families spent together while not interacting increased by an even greater margin (Mullan & Chatzitheochari, 2019, p. 12). My study of Twin Oaks will touch on how this – family time and technology – is reflected in community culture. I will also explore how the education of Twin Oaks’ kids affects their technology consumption. I was unschooled, meaning I was home-schooled and if I wanted to learn something I had to seek out someone to teach it to me. This is different than most Virginian residents. To study this, and community technology culture in general, I will interview current members of Twin Oaks, Acorn, and East Wind. I may interview some ex-members as well to get a better understanding of these communities’ culture around technology in the past. I will also read through these communities’ policies on technology and any significant records they have on the topic. This will be a historical study but I will also identify these communities’ current technology culture as well. To synthesize all this data, I will use actor-network theory.

Conclusion:

My projects will be an asset to academia and society. My technical project, the automatic labor assigner using max flow, will help improve understanding of how to build effective labor assigners of this nature. It will give people a template they can use to build their own labor assigners. In this way, it will be a similar boon as Brucker and Qu's algorithm (2014). However, it will be of greater benefit in this way because it will demonstrate how to actually build such a program, rather than just state the concepts of the algorithm. It will also incorporate user feedback so that future programs that follow my template will be even more effective.

My STS project will look to the present and to the past to see how the use of other technical artifacts, like my technical project, have affected Twin Oaks and intentional communities like it. It will also give its consumers deeper understanding of these utopia-seeking communities. Comparing it to the mainstream will give deeper insight into how our use of technology affects us and some options on how to change that.

The current sample size of these communities is not large. Twin Oaks has a maximum capacity of 100 members (*Twin Oaks Intentional Community - FAQs - One Long Page*, n.d., p. 1), East Wind has 73 members plus some additional non-members (*Life at East Wind – East Wind Community*, n.d.), and I know that Acorn has around 30 members. However, these communities have dozens of members pass through them every year. So while the current sample size is small, it becomes much larger by including past members. My projects are beneficial to society at large. I hope they will inspire more articles to be written about these fascinating communities (even if they are all simply written by me).

References

- Acorn Community. (n.d.). Acorn Community. Retrieved March 21, 2021, from <https://www.acorncommunity.org/>
- Brende, E (2005). *Better Off: Flipping the Switch on Technology*. Harper Perennial.
- Brucker, P., & Qu, R. (2014). Network flow models for intraday personnel scheduling problems. *Annals of Operations Research*, 218(1), 107–114. <https://doi.org/10.1007/s10479-012-1234-y>
- Dakota, Keenan. (Forthcoming). *Kat Kinkade, the anti-guru: her complex but enduring legacy*. Commune Life.
- East Wind Community – Income-sharing, egalitarian community in the rural Ozarks. (n.d.). Retrieved March 24, 2021, from <https://www.eastwindblog.co/>
- Ford, L., & Fulkerson, D. (1956). Maximal Flow Through a Network. *Canadian Journal of Mathematics*, 8, 399-404. doi:10.4153/CJM-1956-045-5
- Kinkade, K (1973). *A Walden Two Experiment: The First Five Years of Twin Oaks Community*. William Morrow and Company.
- Kinkade, K (1994). *Is It Utopia Yet?: An Insider's View of Twin Oaks Community in Its Twenty-Sixth Year*. Twin Oaks Publishing.
- Life at East Wind – East Wind Community. (n.d.). Retrieved April 6, 2021, from https://www.eastwindblog.co/?page_id=32
- Mullan K, Chatzitheochari S. Changing Times Together? A Time-Diary Analysis of Family Time in the Digital Age in the United Kingdom. *Journal of Marriage & Family*. 2019;81(4):795-811. doi:10.1111/jomf.12564
- Schade, L., Sandberg, J., Bean, R., Busby, D., & Coyne, S. (2013). Using Technology to Connect in Romantic Relationships: Effects on Attachment, Relationship Satisfaction, and Stability in Emerging Adults. *Journal of Couple & Relationship Therapy*, 12(4), 314–338. <https://doi.org/10.1080/15332691.2013.836051>
- Self Governance – East Wind Community. (n.d.). Retrieved April 4, 2021, from https://www.eastwindblog.co/?page_id=24
- Shin, J., & Lee, C. H. (2019). Exposure to internet pornography and sexually aggressive behaviour: protective roles of social support among Korean adolescents. *Journal of Sexual Aggression*, 25(2), 90–104. <https://doi.org/10.1080/13552600.2018.1528795>
- Twin Oaks Intentional Community—FAQs—One Long Page. (n.d.). Retrieved March 21, 2021, from <https://www.twinoaks.org/about-twinoaks-community/75-frequently-asked-questions-one-page>