Robotics and the Community: A Constructive Relationship
Ethan Rankin
Pembroke High School

Robotics and the Community: A Constructive Relationship

1 Introduction

As the 21st century continues, automation and robotics technology will play an ever-growing role in American society. As groundbreaking advances in autonomous vehicles now on the road in Google's hometown and "Robocops" in Dubai make headlines, the proliferation of robotics in the small towns and manufacturing centers of America moves forward at a similar pace. As this drastic reshaping of the U.S. economy unfolds, many Americans are increasingly skeptical of robotics technology. This trend clashes with the reality that workforce automation is not only inevitable but a necessary step in the fight for resource conservation, viable climate change remedies, and the continued growth and vitality of the American economy. Overwhelmingly, advances in robotics have originated from large urban centers. Robotics competitions and education efforts are clustered around these areas, despite the fact that robotics will profoundly impact the lives of those who live hundreds of miles from the nearest high school with a robotics club. In order to ensure the transition to robotic technology in workplaces across America benefits all, the spread of educational robotics and local participation in technological advances must mirror the proliferation of automation.

2 Embracing Robotics for Positive Change

Much positive change in American society will hinge on the willingness of the American public to embrace of robotic technology. In manufacturing, workforce automation leads to greater product quality, improved worker safety, and lower costs- all benefits that will lead to the preservation and growth of American manufacturing jobs, not their elimination. Automation in all sectors of the economy leads to

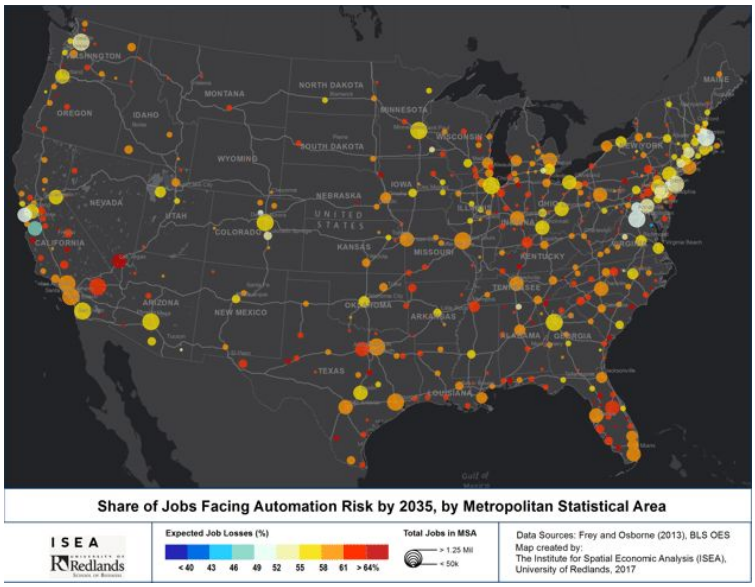
better resource management, which will become vital in a future in which climate change and resource depletion threaten the local and global economy (Groover).

Transportation remains at the center of robotics innovation, but self-driving cars are far from the only technology that is currently being prototyped and trialed in communities across the country. In Cambridge, Massachusetts, MIT startup Superpedestrian recently released The Copenhagen Wheel, a device that attaches to a bicycle wheel, automatically absorbing braking energy and redistributing it when power is needed. This type of technology is needed in order to encourage and facilitate a transition towards sustainable transportation. Similarly, a collaboration between the Massachusetts Institute of Technology and the Amsterdam Institute for Advanced Metropolitan Solutions has produced Roboat, a project to build autonomous boats for many uses including personal transportation, river cleaning, and package delivery. Embraced by local communities, Roboat will serve as a source of sustainable transportation and shipping as well as a pollution mitigation measure. These autonomous robotics innovations must reach beyond the prototype phase and gain the support and acceptance of the public in order to address the economic and environmental challenges of the 21st century.

3 The State of Robotics in American Communities

Despite its promise, Americans currently have mixed if not negative feelings about robotics. A striking 78% of those polled in a 2017 AAA poll state that they are “afraid” of autonomous vehicles on the road (Gajanan). With regards to the jobs and the economy, 50% of Americans believe automation “hurts American workers” (Brown). Workers in manufacturing and other unskilled or partially skilled fields are worried that their jobs are in danger, and fear that they will have little or no say in how robotics technology is developed and how it is adapted to produce the positive benefits of automation without eliminating jobs and displacing workers. This insecurity has translated to turmoil within many American

communities, sparking political upheaval on a local and national level. Many longtime workers in small towns and cities hold a negative view of robotics and oppose the proliferation of new and innovative technologies. Despite this sentiment, robotic technology is coming. In many small and mid-size cities across the country- **especially** in those who voted for the candidate in 2016 who promised to protect their manufacturing jobs- more than 50% and up to 87% of manual labor work is at risk for automation or is already in the process (Semuels). As shown below, cities in the Northeast and Bay Area (the centers of robotics innovation) are at the lowest risk (gray or light yellow color) of automation by 2035, while many small cities in the midwest and south with little connection to the tech sector (dark red color) are facing a complete overhaul of their local economies.



Unlike the American populace, corporate leaders have a positive view of workforce automation, with 65% of those polled stating that robotics will have a positive impact on their company in the very near future. In a recent Fox News survey, 15% of human resources leaders in major businesses say their companies have already been transformed by robotic technology, while an additional 31% say that robotics will play a larger role in their company in 2017 (Automation Can Revitalize U.S. Workforce).

These conflicting views- with corporate leaders pushing hard in favor automation and their workers pushing back- threatens to leave the country in economic and political turmoil.

4 Developing a Positive Relationship Through Educational Robotics

In order to avert a future crisis, the tech community must work to reach out to vulnerable communities, spreading robotics organizations and STEM education in order to better equip communities currently excluded from the process of technological development to establish a two-way, constructive relationship with new technologies. Communities must have a say in the future of their job prospects- and must also warm to the idea of robotics as a force for good in their communities. Founding local robotics clubs and involving youth in STEM competitions can reflect well on robotics within the community, and provide opportunities for young people from these underrepresented communities to enter STEM fields. Currently, most educational robotics programs are focused in majors urban centers on the West Coast and Northeast. As such, most of those who go on to work in robotics originate from these communities, despite the fact that robotics will most drastically reshape working class communities in the Midwest and South.

In Pembroke, Massachusetts, a recently introduced STEM program and robotics club have made front page news and sparked interest and support in a community not known for its technological innovations, engaging the community and developing a positive image of robotics as a source of town pride and of opportunity for local youth to succeed. In the future, the Pembroke Robotics club could collaborate with the Environmental Engineering program or the Recycling Club at Pembroke High School to develop equipment or programming with positive implications for the local community. This type of local collaboration is needed in order to build a constructive relationship between local communities and the future of robotics in workforce automation as well as transportation and elsewhere. Students can play

a critical role regarding the integration of robotics into American communities transitioning to automation while members of robotics clubs in high school as well as after graduation as they represent these vulnerable communities in the STEM workforce.

5 Conclusion

As automation and robotics technology spread from institutions and corporations in the Northeast and West Coast, so must educational robotics and the promise of engaging local youth in robotics innovation. Local communities must be encouraged and given the opportunity to participate in the process of innovation that will reshape their places of work, their bicycles, and their rivers- or be left without representation in a field that will drastically change their cities and towns. Without this cooperation, new technologies from MIT and other institutions needed in the fight for sustainable transport, responsible resource management, and American economic competitiveness will, without the support of the American public, remain in the prototype phase for years to come. Robotics offers opportunities for all communities to develop sustainably and grow economically. However, reshaping these communities without local involvement in robotics will inevitably result in the threat of pushback and political upheaval that will threaten the positive implications of automation. Educational robotics at local schools is a logical first step towards developing a harmonious and constructive relationship between local communities and robotics.

References

"Automation Can Revitalize the U.S. Workforce." *Fox News*. FOX News Network, n.d. Web. 02 June 2017.

Brown, Anna. "Key Findings about the American Workforce and the Changing Job Market."*Pew Research Center*. N.p., 06 Oct. 2016. Web. 02 June 2017.

Gajanan, Mahita. "Majority of Americans Fear Riding in Self-Driving Cars, Poll Finds." *Most Americans Fear Riding in Self-Driving Cars: Poll | Fortune.com*. Fortune, 08 Mar. 2017. Web. 02 June 2017.

Groover, Mikell P. "Automation." *Encyclopædia Britannica*. Encyclopædia Britannica, Inc., 24 Feb. 2017. Web. 02 June 2017.

Semuels, Alana. "The Parts of America Most Susceptible to Automation." *The Atlantic*. Atlantic Media Company, 03 May 2017. Web. 02 June 2017.