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Assignment 1

The article, “Robots working as a group are able to determine the optimal order of their tasks”, is about using artificial intelligence in robots to help rescue crews save survivor victims of a natural disaster. For this to work, robots have to be able to perform tasks in a specific order to reach a goal. For instance, a robot would have to know that they must lift an object off a survivor before pulling them out of harm's way. In their research of swarm robotics, two researchers from the Brussels School of Engineering, Mauro Birattari and Lorenzo Garattoni, found that robots can perform orderly tasks. Swarm robotics uses the collective and organized behavior of social animals, such as bees and ants, to create groups of robots that display artificial intelligence. With swarm robotics, robots possess a complex cognitive skill. They can work collectively and communicate with each other to perform three actions without previous knowledge of the correct order. Birattari and Garattoni showed this in their study, where they had robots move to three different points in space to perform a simple task. The robots would only learn the correct order after the tasks were completed. The two researchers found that the robots solved this problem by splitting into groups and working together. Some of the robots formed a chain between the three points, while the other robots used them as a guide and followed their instructions to test multiple possible combinations. Together, they were eventually able to determine the correct sequence. With this ability, robots have been trained to partake in rescue missions. They can search for survivors after a natural disaster by inspecting unknown or

hostile environments such as building structures on dangerous sites and explore several applications in agriculture.

Robots having the ability to perform tasks they previously did not know is very significant and useful because it can be applied to many applications. These robots could fill practically any job where humans work collectively to complete a task. Some of these jobs include cleaning, cooking, nursing, landscaping, bell hopping, or even programming or engineering. Though these robots could take over any job along this line, it would be ethically best to have them provide aid with work that is involved in dangerous environments or demanding conditions to reduce the cost of putting workers in possible fatal circumstances. In this case, it would be jobs like constructing buildings, putting out fires, commercial fishing, agricultural farming, or going into war. Also, with the amount of police brutality in the United States, it may be a good idea for these robots to help with police work. One of the reasons why police brutality is high is because the police are being put in settings where they feel unsafe. They do not know how to handle an uncomfortable situation, so they end up murdering innocent people. The robots could lower the number of casualties by helping officers conduct arrests or searches. Creating a software engineering project to assist with any of these jobs would be fascinating. It would be interesting to think more about the design of the robot and how it affects a particular task. If a robot lacks the necessary tools to get a job done, then that could be a problem. For instance, robots made for constructing buildings should be able to reach high places and be built so they can carry things, robots made for fighting fires should be fireproof, and robots fighting in war should be robust and unbreakable. Without these features, the robot would be ineffective, and the task would take much more time to complete resulting in dire outcomes.

In the article, the author discusses how these robots are used to help save survivors of natural disasters. The idea of having them work in a dangerous environment with a time constraint is interesting - the time constraint being that they have to search for people who require immediate attention and could pass away without it. Putting the robots in rescue mission roles would be best because they could help save many more lives than if only rescue workers were doing the saving. However, it is crucial to account for errors. What if there is a bug and the robots are ineffective in carrying out the necessary steps? Any flaws or glitches could put many people at risk. Also, since the robots are working as a team, if one robot has a glitch, it could affect the rest of the crew. The best way to prevent this is to train and test the robots with several simulations and debug any errors found. On another note, one way to improve upon this project is to use artificial intelligence to have the robots help with reconstructing buildings after the natural disaster, or helping restore and clean up the area.

The topic of artificial intelligence is an interesting one. Whenever the subject gets brought up, I think of iRobot and Asimov's Three Laws of Robotics. The idea that robots are becoming more and more human-like is intriguing yet somewhat unsettling. If humans create robots to help with war or police work, could this have negative effects in the long run? What happens if the robots end up killing humans? This mainly has to do with problems on the programmers end. For example, it is proven that artificial intelligence systems can acquire human biases, such as socio-economic status, race, gender, age, etc., during their machine learning phase. Therefore, it is imperative to think about ethics when it comes to working with artificial intelligence. If a programmer is unconsciously biased towards older people, then it could show up when the robots are in the field. Maybe the robots will help the young survivors and not the older survivors. Fortunately, companies, programmers, and scientists are coming up

with ways to prevent biases and ethics problems. Programmers can create frameworks, guidelines, or tests, and researchers are studying roboethics to gain more understanding.

Despite the negatives, I think artificial intelligence can help humanity in many ways by assisting in healthcare, transportation, rescue missions, etc. The fact that robots can now exchange information and collaborate can help pave the way for this. It would also be interesting to research animals who work alone, such as spiders since they build webs on their own to complete tasks. Then perhaps we could find a way to create a robot who can complete orderly tasks, without prior knowledge, on its own rather than in a group.

Link to article:

[Robots working as a group are able to determine the optimal order of their tasks](#)