Grass Hoper

A Mobile Robot Solution for Grasslands Cow Manure Pollution

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Objective

In Inner Mongolia of China, thousands of tons of manure are produced by cow husbandry each year, polluting the underground water and hardening the earth. However, with proper collection and processing, manure could have great economic value as backup energy or fertilizer. We proposed to design a mobile robot that can collect those manure on the grasslands automatically.

Technical Details

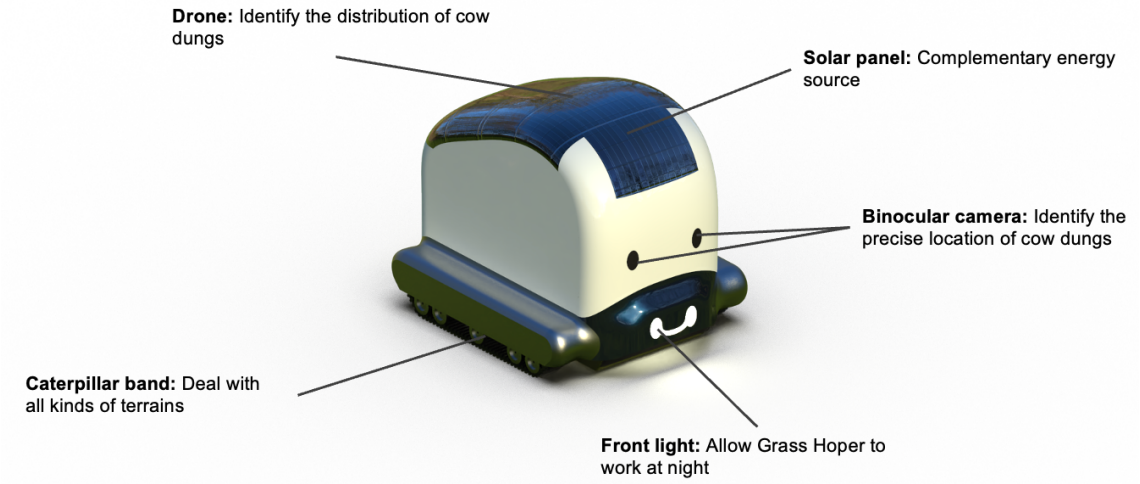

Figure 1: Outer Design

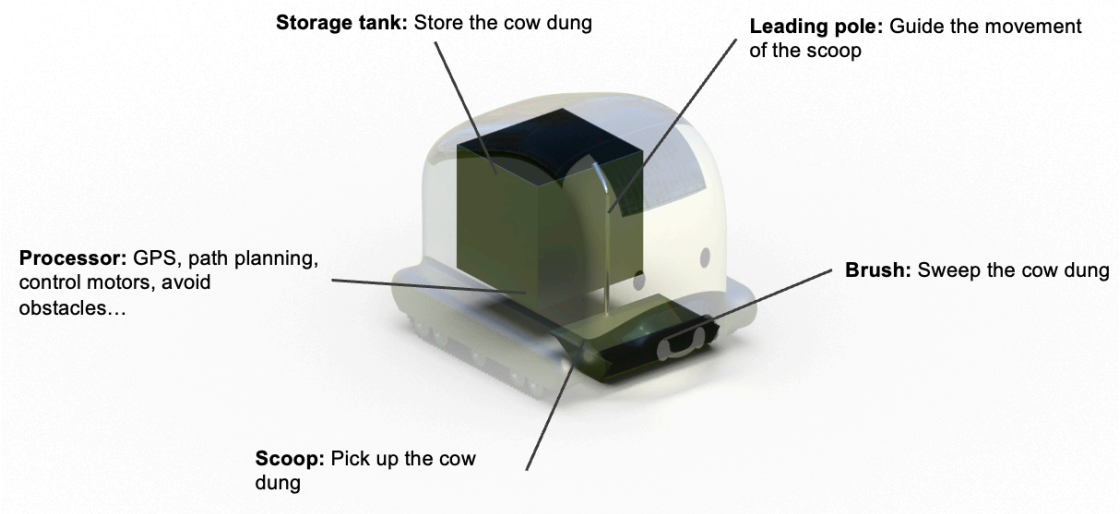

Figure 2: Inner Design

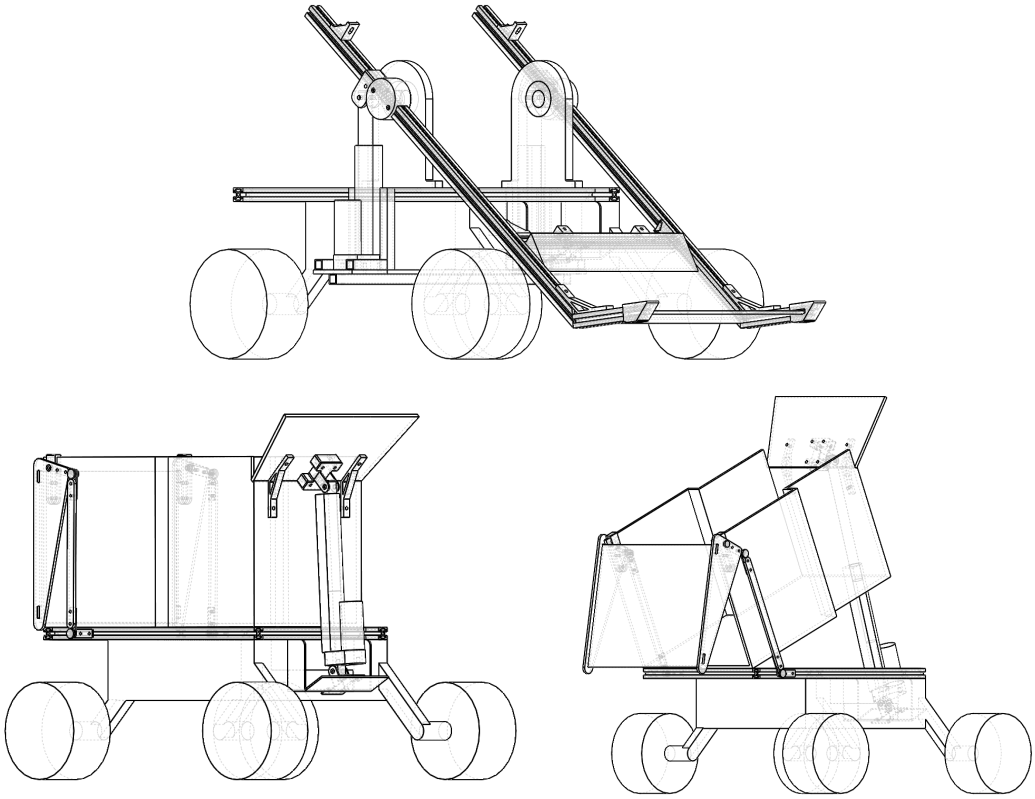

Figure 3: Mechanical Structure Design

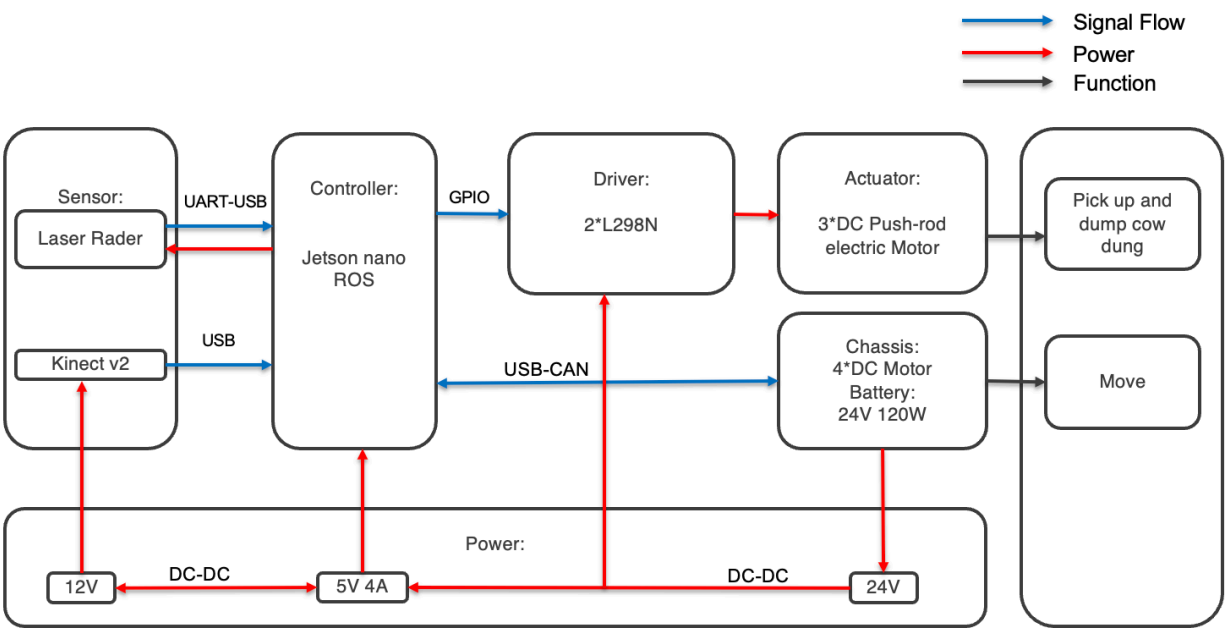

Figure 4: Hardware Block Diagram

Figure 5: Real Prototype equipped with Kinect RGBD Sensor

Outcome

Our conceptual design earned the 2nd highest score among the school and got great responses from the farmers community. The real prototype is basically functional for collecting clay material on artificial grassland.

My Contribution

1. Estimated ROI and ROT based on the overall data and potential market size.
2. I implemented object detection using RGBD camera Kinect V3 and integrated control system to Jetson Nano board with another undergraduate.
3. To keep the mechanical design team, electrical engineering team, and user investigation team on the same page, I organized weekly meetings and make sure every voice is heard.
4. I organized our presentation and designed our efficient working scheme.