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Human Following Using Kinect V2

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an Following U

Tori Handley, Nate T

Abstra

With the emergence of continuo

Using the Kinect

Titus, Josiah Watson

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usly improving imaging

ct v2



School of

**ENGINEERING
COMPUTER**

CEDARVILLE

*Potential
Application*

ERING and TER SCIENCE

LE UNIVERSITY

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designed to carry items
autonomously, with no
primary challenge in the
where the user is with
approach was to try to
image processing inst
electronic device, which
projects went.

Kin



is for the user and follow them
to interaction from the user. The
this project was determining
in respect to the robot. Our
keep track of the user through
instead of making them wear an
which is the route other similar

Project v2

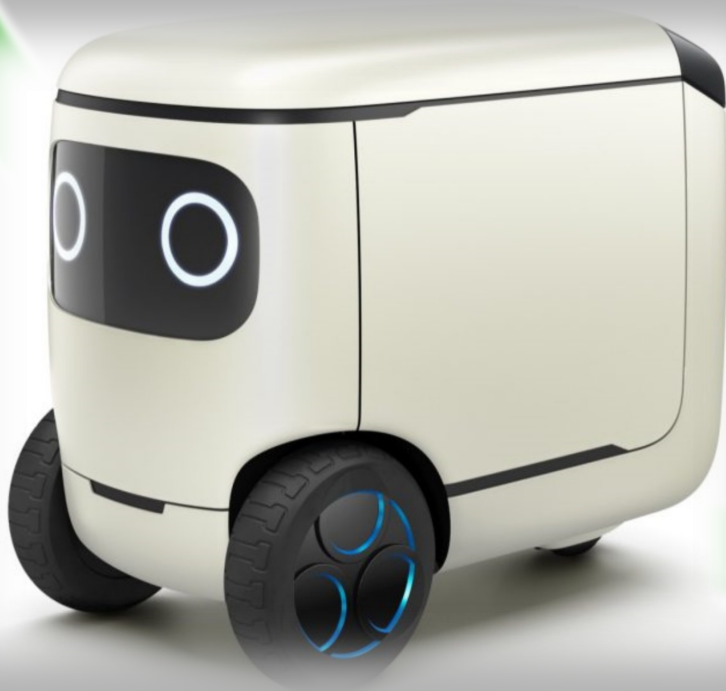


- 3 Image Sources
- RGB Camera
 - Depth Sensor,
 - Human Tracking

and image processing technologies of applying those technologies to make navigational decisions based on this project, a human-following robot implemented using the Microsoft Kinect PC. This system feeds the robot information from the environment to it to navigate obstacles and follow the user. Kinect is used to find the user's location relative to the robot, based primarily on where the user was last seen. This information is processed by the on-board PC, which uses it to make navigational decisions and drive the robot's wheels. The system's communication with a PIC18 microcontroller could be used in a variety of applications such as shopping carts, airport luggage carts, and service robots for pets.

ies comes the challenge
o create robots that can
ed on visual inputs. In
robot is designed and
it Kinect v2 system for
both color and depth
nt in front of it, allowing
w a specific user. The
ocation with respect to
at the user is wearing and
is information is fed to
o make path-planning
heels through
icrocontroller. This
v of applications, such as
carriers, or even robotic





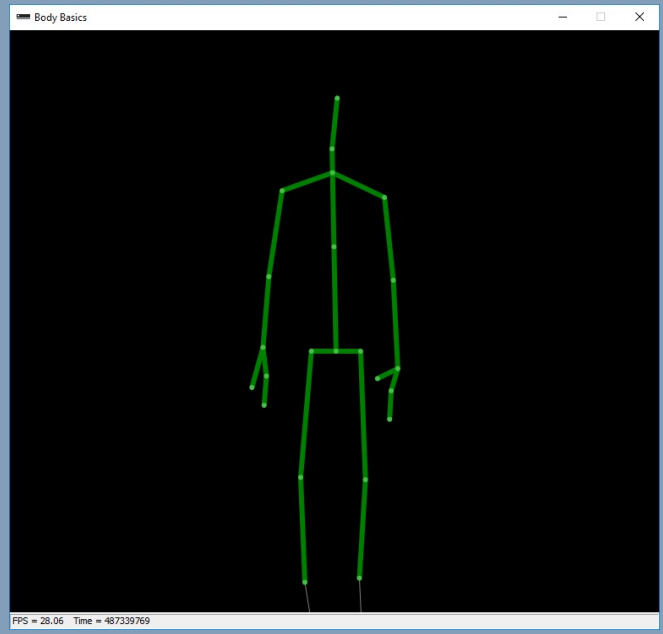
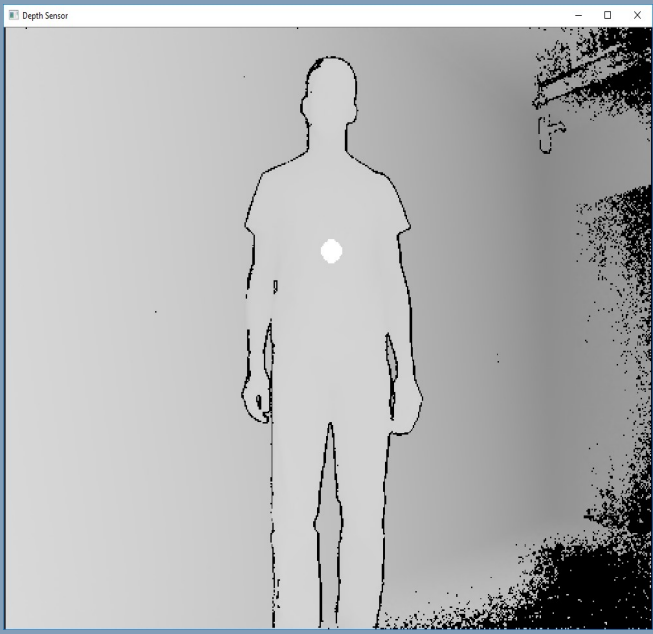


The Microsoft Kinect v2 is the second version of a sensor that was originally developed as a hands-free video game controller.

Because it gathers both color and depth information, the Kinect is uniquely enabled to track people in its field of view. The Kinect v2 improves upon its predecessor by increasing camera resolution and distance sensing range.

Automate

Using the Kinect's ability



ed Thresholding

ility to track people the robot

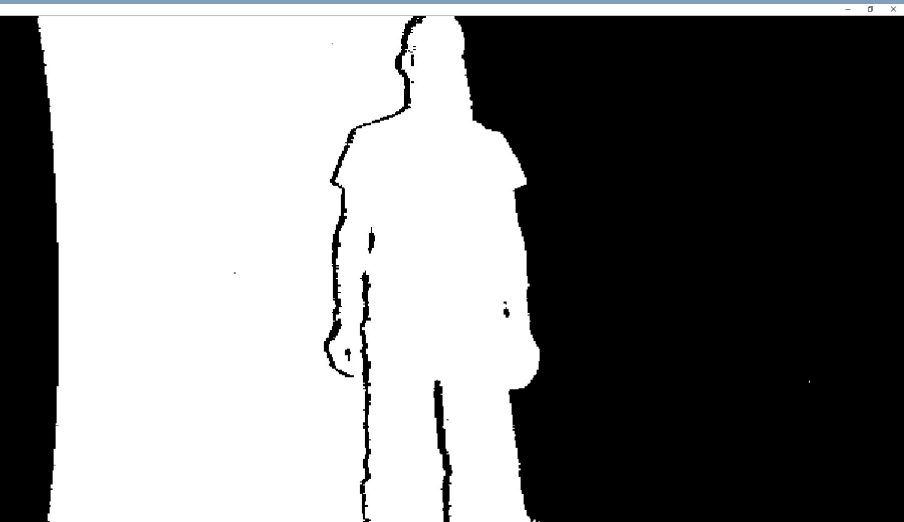
Filtering th

For every single camera frame, e
(Saturation, Value, and Depth) m
the determined threshold values.
combined to form a filter for the



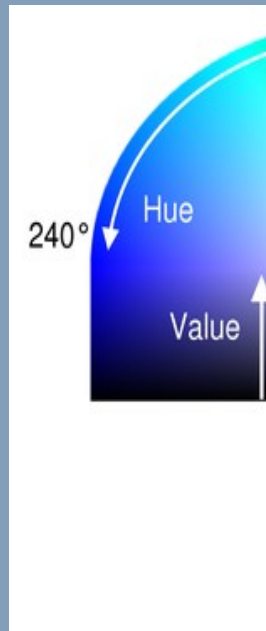
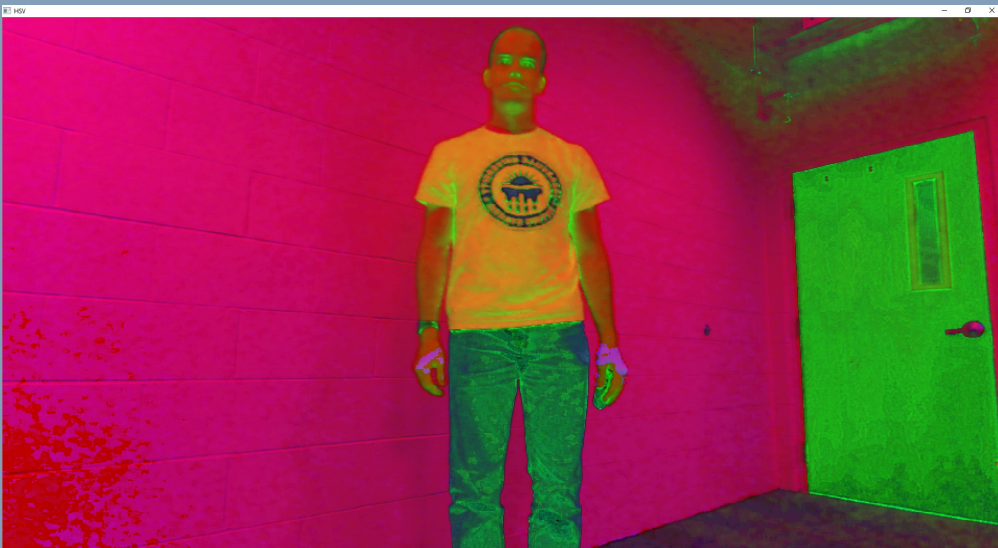
e Image

Each channel (Hue, must be filtered based on. The resulting images are current camera frame.



Hue-Saturation

Why HSV? HSV allows for a more robust method of determining color than RGB, as it is less sensitive to changes in lighting

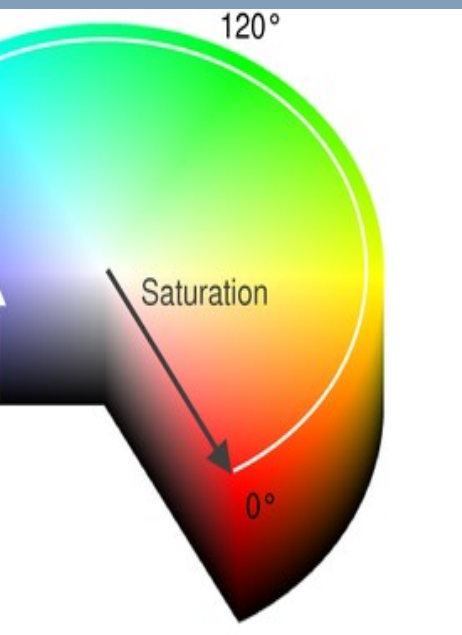


Finding the User

Once the user's shirt has been located, the system uses the Kinect's depth sensor to determine the user's position

n-Value

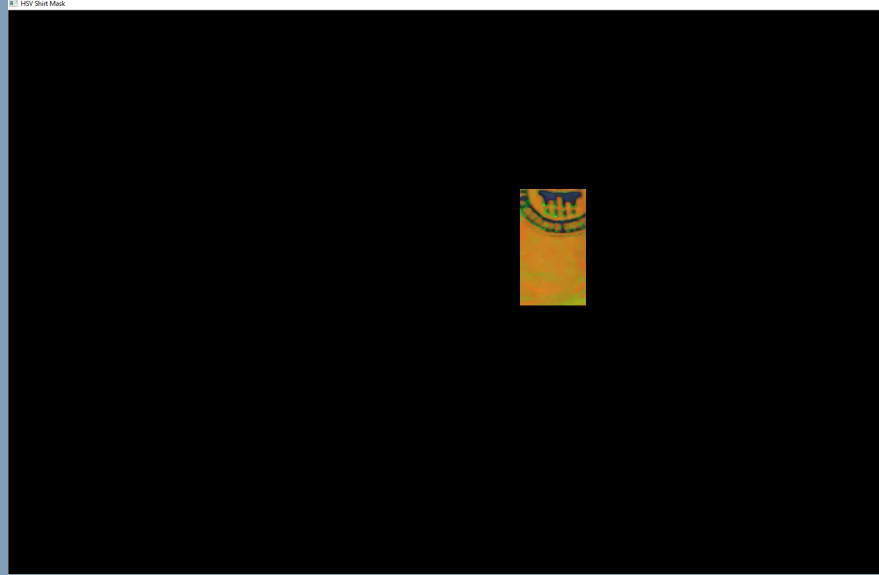
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not effected as



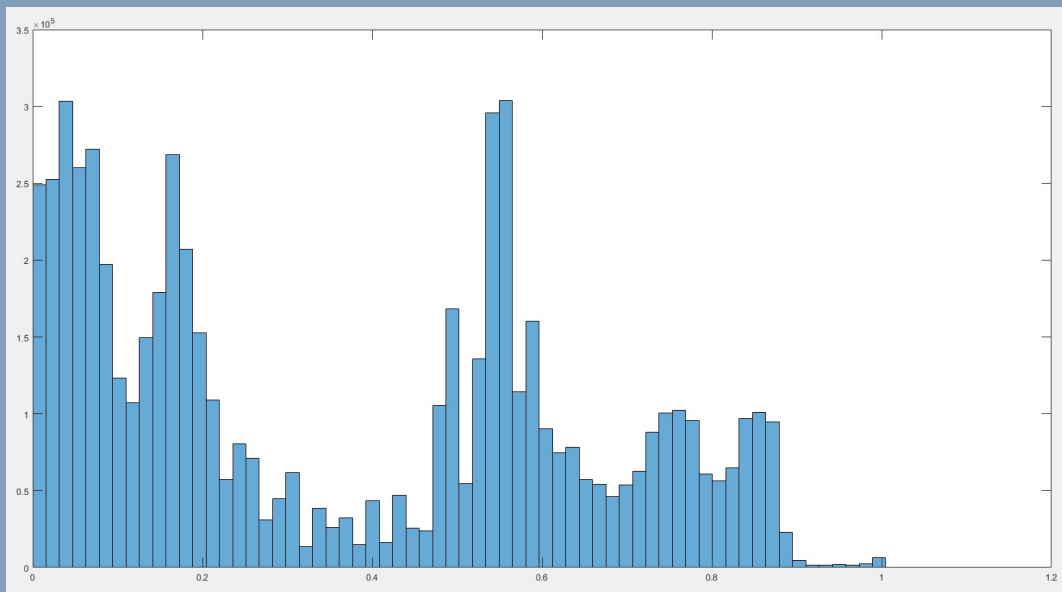
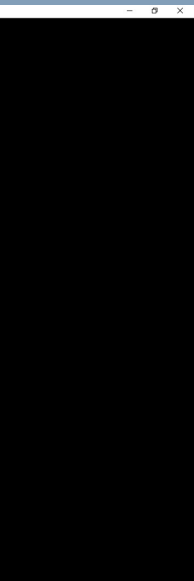
ser

e robot uses
ow far away

Using the `inRange` method
sets threshold values for



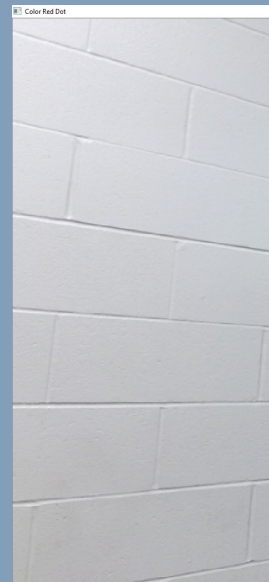
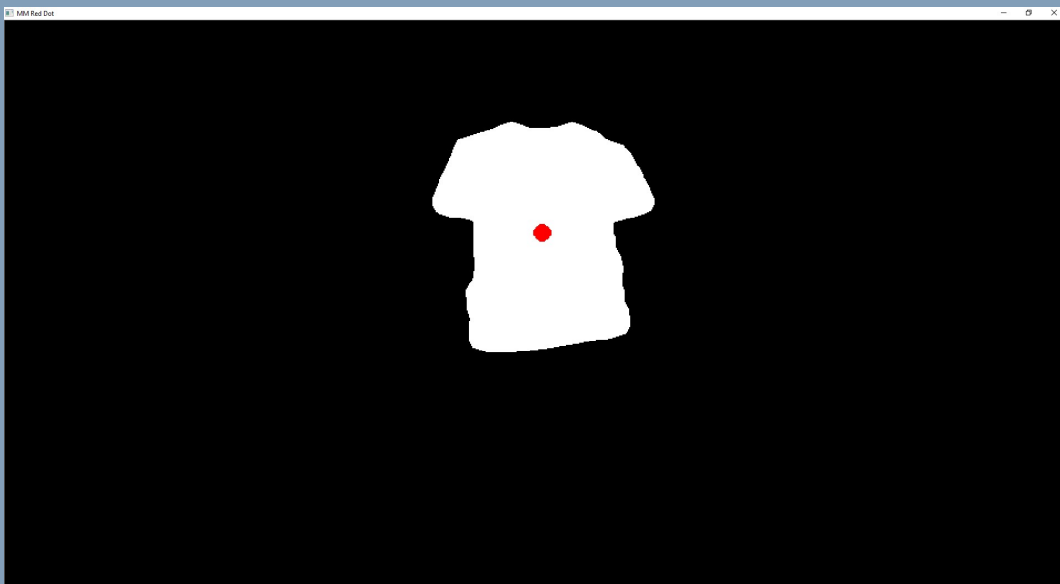
...ability to track people, the robot
based on the user's shirt color.







the user is, which determines how the robot
move.



oot should

