HUMAN INTERFACE DEVICE 3D POINTER

PROJECT MEMBERS

ARZU KARATAŞ

GÖKTÜRK BİLGETÜK

METEHAN GÖKSEL KURTULAN

ADVISOR

FARIS SERDAR TAŞEL

CONTENTS

1. Definition
2. Purpose
3. Problem
4. Anaylsis
5. Solution
6. Results and Conclusion
7. References

DEFINITION

Human Interface Device: 3D Pointer

involves an API(Application Programming Interface) and hardware design of a 3D pointer device which is composed of multiple ultrasonic distance sensor connected to an Arduino device.

PURPOSE

1. **Gathering data from multiple ultrasonic distance sensors in real time by using Arduino.**
2. **Computing 3D position of the pointer object.**
3. **Recognizing special gestures.**
4. **Preparing a software package comprising an API.**
5. **Testing the device in virtual 3D environment.**

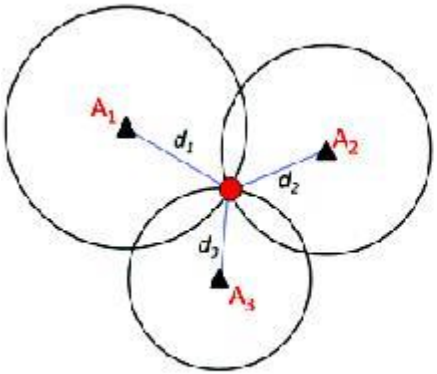
PROBLEM

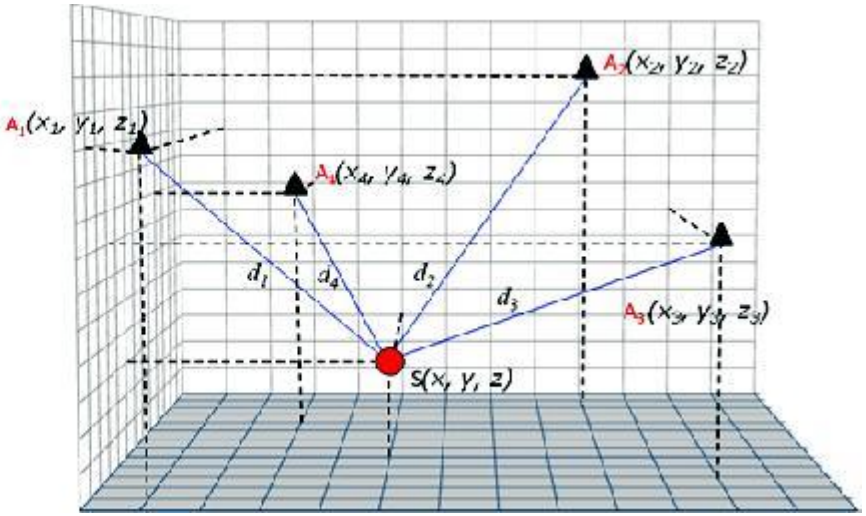
The aim of this study is to transfer the spatial data in real life to the computer in 3D and visualize it in various field.

- **Cost.**
- **Maintenance and installation.**
- **Usage areas.**
- **System sizes.**
- **Interaction requirements.**

ANALYSIS

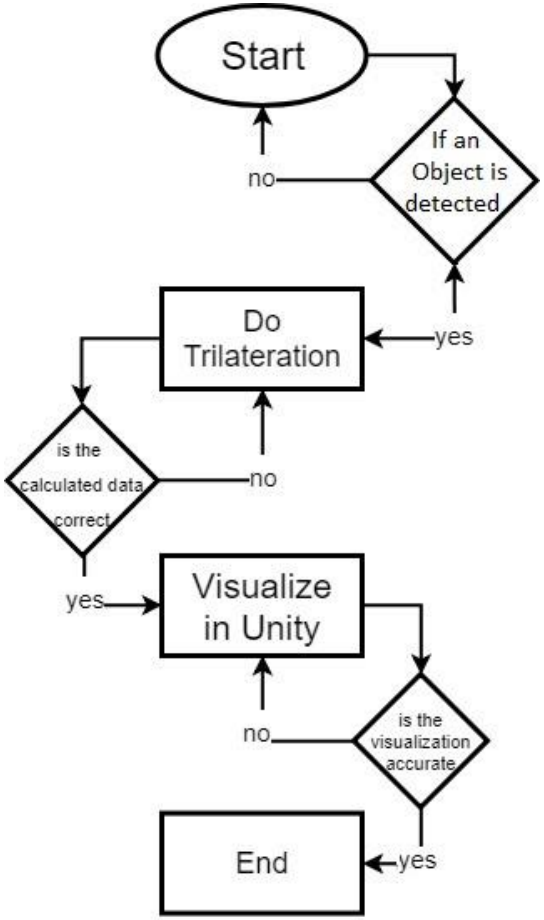
Trilateration Technique





SOLUTION

- **Ultrasonic Sensors**
- **Trilateration**
- **Arduino**
- **Unity**



RESULT AND CONCLUSION

Some companies have developed such devices to mainly use for virtual reality and entertainment. Haptic devices are also used in industry. In this project, a cost efficient, easy-to-setup device will be designed which can be controlled by free hand.

Some Advantages:

- Using 3D applications interactively.
- Ease of maintenance and installation.
- Can be used in desired sizes.
- Providing 3D input for utilization.

REFERENCES

1. Othman, S. N. (2010). Node positioning in zigbee network using trilateration method based on the received signal strength indicator (RSSI). European Journal of Scientific Research, 46(1), 048-061.

2. Bowman, D., Kruijff, E., LaViola Jr, J. J., & Poupyrev, I. P. (2004). 3D User interfaces: theory and practice, CourseSmart eTextbook. Addison-Wesley.

3. Nishida, Y., Aizawa, H., Hori, T., Hoffman, N. H., Kanade, T., & Kakikura, M. (2003, October). 3D ultrasonic tagging system for observing human activity. In Intelligent Robots and Systems, 2003.(IROS 2003). Proceedings. 2003 IEEE/RSJ International Conference on (Vol. 1, pp. 785-791). IEEE.

4. Hazas, M., & Hopper, A. (2006). Broadband ultrasonic location systems for improved indoor positioning. IEEE Transactions on mobile Computing, (5), 536-547.

5. Manolakis, D. E. (1996). Efficient solution and performance analysis of 3-D position estimation by trilateration. IEEE Transactions on Aerospace and Electronic systems, 32(4), 1239-1248.

THANKS FOR LISTENING!

Question?