

OFFICIAL ABSTRACT and CERTIFICATION

Category

Is it possible to design a better, safer, reliable, and cost-effective smart Physical Mobility System (smart PMS) for the convenience of a wide range of physically disabled people?

Embedded Systems

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Mobility of disabled people is a steadfast public health issue worldwide. One in every ten people has a short-term or long-term disability which requires a **Personal Mobility System (PMS)** such as wheelchair to maneuver around independently. Traditional PMS (manual wheelchair) had been in use for centuries while an upgraded PMS (battery powered wheelchair) has been in use for few decades and served as a boon to the disabled people who were unable to move manual wheelchair due to lack of personal strength. Beyond that there had not been any significant advancements or breakthroughs in enhancing the personal mobility of the disabled people. The *World Health Organization (WHO)* estimates 70 million people worldwide need advance PMS but hardly 15% have access to it due to unaffordable costs or lack of suitable design features to support complex disabilities arising out of major accidents, surgeries, visual acuity, complete limb loss, lack of motor skills, diseases like arthritis, physical challenges from birth like etc. This research led to the design & development of cost-effective smart PMS embedded systems engineering prototypes incorporating few advanced technologies such as **Gesture Language & Recognition (GLR)** mechanism, **Laser Imaging Detection & Ranging (LIDAR)** sensory mechanism, **Voice Recognition** and **Digital Signal Processing (DSP)**, Sensors, **Radio Frequency (RF) & Bluetooth communication**. Customizable smart PMS that are able to offer combination of advanced technologies, relevant to the needs of the disabled people, will provide exceptional support for various complicated disabilities and significantly improve the quality of life of disabled community at large.

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):

☐ human Participants	☐ potentially hazardous biological agents
☐ vertebrate animals	☐ microorganisms ☐ rDNA ☐ tissue
2. I/we worked or used equipment in a regulated research institution or industrial setting:

☐ Yes	☒ No
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3. This project is a continuation of previous research:

☐ Yes	☒ No
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4. My display board includes non-published photographs/visual depictions of humans (other than myself):

☐ Yes	☒ No
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5. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only:

☒ Yes	☐ No
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6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work:

☒ Yes	☐ No
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This stamp or embossed seal attests that this project is in compliance with all federal and state laws and regulations and that all appropriate reviews and approvals have been obtained including the final clearance by the Scientific Review Committee.