



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

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Project Title The Smart Stick	
Abstract Objectives/Goals The white cane that is currently used by visually impaired people, lacks obstacle detection from knee to head height. I was trying to develop a modular attachment for the typical white cane that would enhance its capabilities. Methods/Materials Using an Arduino and a few other materials, I was able to develop an attachment that takes advantage of an ultrasonic sensor to provide haptic feedback about the distance of an incoming obstacle using a vibration motor. This device could be attached to any white cane that visually impaired people typically use. This would ensure the safety of the person using this device as opposed to using the typical white cane that wouldn't detect an obstacle even though it is taller than knee height towards the user. This attachment easily detects those obstacles by sending out ultrasound waves and receiving them to estimate the distance of the obstacle. Results The device puts all the components into a compact form factor that would keep the walking stick light. This device could be easily enhanced to accommodate other attachments and sensors that could provide other forms of feedback. Conclusions/Discussion This device could be sold for a relatively low price to many visually challenged people. Due to the device's low cost, it could be provided everywhere around the world including developing countries. In summary, this inexpensive device can make a typical white cane smarter by alerting the user about obstacles that cannot be detected by a typical white cane.	
Summary Statement I was able to develop a modular attachment for the typical white cane that detects obstacles from knee to head height which is light and inexpensive.	
Help Received I designed and programmed this modular component at home with some online learning about Arduino programming and advice from my father.	