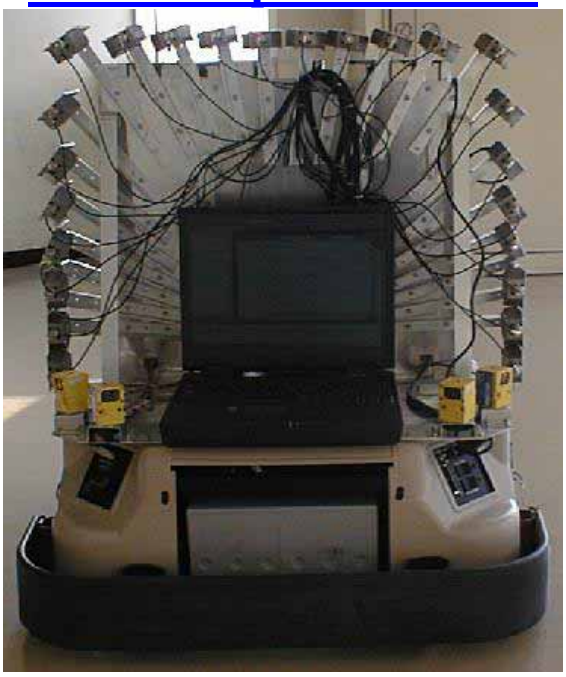
Tunnel Inspection Robot



Prototype of Tunnel Inspection Robot

This work relates the development of an automatic concrete-tunnel inspection system by an autonomous mobile robot. It was motivated by the accidents happened recently, that were caused by the fallen parts of the inner-wall of the concrete-tunnels. This brought about the serious damage of the national property, and led to the great worries of the whole society. Here, we proposed a non-destructive automatic tunnel inspection method. In this method, we aim to inspect the tunnel automatically and completely at high-speed by using non-destructive sensors. For the non-destructive sensors, we employ 24 ultrasonic sensors and 6 video cameras. These sensors are mounted on the same plane in the shape of semi-ring. This ultrasonic-sensor video-camera semi-ring is called as USVC semi-ring. This USVC is mounted on an autonomous mobile to inspect the concrete-tunnel. Experiment results show that this system can detect the deformed inner-wall at the division of 8 mm, when the robot moves at 20 mm/S

Click here for video demo: http://www.tnstate.edu/fyao

For details, see following papers:

1. F.H. Yao, G.F. Shao, R. Takaue and A. Tamaki: "Automatic Concrete-tunnel Inspection Robot System", *Advanced Robotics, the international journal of the Robotics Society of Japan*, Vol.17 No.4, pp319-337, 2003.
2. F.H. Yao, G.F. Shao, A. Tamaki, H. Yamada, K. Kato: "Development of an Automatic Concrete-tunnel Inspection System by an Autonomous Mobile Robot", *Proc. of IEEE International Workshop on Robot-Human Interaction*, Osaka, Japan, pp.74-79, September 27-29, 2000.