

means for adapting the tactile display means to a portion of the body of a visually impaired person including means for causing the rods to move perpendicular to the surface of the portion of the body; whereby a tactile image is formed by the movement of the rods against the body of the person.

2. The apparatus of claim 1, wherein the imaging means comprises:

at least one high-resolution video camera; and an analog to digital convertor for converting an output signal of the at least one camera into a digital signal.

3. The apparatus of claim 1, wherein the processing means comprises:

memory means for storing the electrical signals as they are received from the imaging means;

filtering means for adjusting features of the electrical signals; and

output means for outputting adjusted and stored electrical signals as processed electrical signals to the tactile display means.

4. The apparatus according to claim 3, wherein the processing means further comprises data base storing means for storing a data base of common object patterns and the international symbols thereof, the patterns including patterns representing:

a traffic signal light;

a mail box; and

a police car;

wherein the processing means compares the data base of common object patterns with the electrical signals from the imaging means for a match, and if a match is determined, outputs processed electrical signals of a corresponding international symbol to the tactile display means.

5. The apparatus according to claim 3, wherein the filtering means performs a Fourier transform to extract object edge information.

6. The apparatus of claim 1, wherein the tactile display means further comprises:

a plurality of auxiliary miniature motors, rack and pinion assemblies and rods which operate to indicate at least the color of the light incident on the imaging means.

7. The apparatus for converting visual images into tactile representations according to claim 1, wherein the processing means comprises:

matrix generation means for generating a matrix of data from the electrical signals, the matrix having an X and a Y dimension, and the data containing depth information; and

wherein the tactile display means grid comprises an X-Y matrix of miniature motors corresponding proportionally to the matrix of data generated by the matrix generation means, the miniature motors being movable in a Z dimension, perpendicular to the X and Y dimensions, by an amount correspondingly proportional to the depth information contained in the data.

8. The apparatus according to claim 1, further for use by a visual and hearing impaired person, the apparatus further comprising:

auditory imaging means for converting sounds into electrical signals;

wherein the processing means also processes the electrical signals from the auditory imaging means; and

wherein the tactile display means also converts the processed electrical signals derived from the auditory imaging means into further tactile images;

whereby the tactile images and further tactile images are felt by the visual and hearing impaired person enabling

them to ascertain information by touch about the world around them that a sighted and hearing person would ascertain through vision and hearing.

9. The apparatus according to claim 8, wherein the further tactile images are produced by tactile vibrations of at least a portion of the tactile display means dedicated to providing the further tactile images.

10. The apparatus according to claim 1, further for use by a visual and hearing impaired person, the apparatus further comprising:

speech analysis means, for detecting and recognizing spoken words, and outputting electrical signals to the processing means corresponding thereto;

wherein the processing means also processes the electrical signals from the speech analysis means; and

wherein the tactile display means also converts the processed electrical signals derived from the speech analysis means into further tactile images, the further tactile images being representations of the spoken words;

whereby the tactile images and further tactile images are felt by the visual and hearing impaired person enabling them to ascertain information by touch about the world around them that a sighted and hearing person would ascertain through vision and hearing.

11. The apparatus according to claim 10, wherein the further tactile images representing spoken words are produced on a dedicated portion of the tactile display means.

12. The apparatus according to claim 1, wherein the processing means comprises text means for processing scanned printed text; and

wherein the tactile display means includes text representation means for providing a tactile representation of scanned text processed by the processing means.

13. The apparatus according to claim 4, further comprising:

auditory imaging means for converting sounds into additional electrical signals;

wherein the processing means is further for processing the additional electrical signals; and

wherein the tactile display means is further for converting the additional processed electrical signals into additional tactile images;

whereby the additional tactile images can be felt by a hearing impaired person enabling them to ascertain information by touch about the world around them that a hearing person would ascertain through hearing.

14. The apparatus according to claim 13, wherein the tactile images are representations of spoken words.

15. The apparatus according to claim 1, wherein the imaging means comprises at least three cameras disposed in a triangular orientation about an object to be imaged; and

wherein the tactile display means rods are disposed to define a spherical initial surface position approximately the size of a regulation tennis ball;

wherein the tactile display means rods retract or extend from the spherical initial surface position under control of the processing means to correspond approximately to the three-dimensional shape of an object being imaged.

16. The apparatus according to claim 1, further comprising distance and speed determining means for determining field of view objects distance and relative speed and producing electrical signals representative thereof to the processing means for processing.