

TECHNOLOGICAL INFRASTRUCTURE

Having the Affective Mapping System (AMS) perform to its highest potential requires a thoroughly integrated technological infrastructure. At its core, the AMS is a system for gathering, analyzing, and displaying a large amount of data about a specific area, and this requires a large number of various types of sensors, an appropriate amount of processing capacity, and sufficient built-in displays supplemented by numerous smaller personal information devices. These requirements will be outlined below.

Two classes of sensors are used in the AMS. First are the physical sensors, which include weight sensors built into chairs and tables throughout the library. While load sensing has been shown to have great potential for providing information about an environment,¹ the AMS weight sensors will be used only to determine whether a given space is occupied by a person or object (e.g., a backpack). In addition, volume and temperature in each area will be measured through the use of microphones and thermometers. All of this physical data will be transmitted to a central location for analysis.

The other types of sensors are affective sensors. There are two types of affective sensors, camera-based sensors and wristband sensors worn by library users. The cameras will analyze the body language and facial expressions of library users to determine their mood. Through facial recognition techniques that have been developed and used in other industries,² these sensors will deliver a continuous stream of data on the moods of individuals in the library. The wrist sensors will take advantage of their direct contact with the skin to wirelessly transmit data of their own; this technology has been developed with the goal of being comfortable as well as accurate.³ Wristband usage will be incentivized by a rewards system which transfers funds to each user's campus ID account, which can be used in the library to purchase goods or services.

As a means of further supplementing affective data, users will be able to input information on their emotional state directly into the system via various social networking sites and smartphone applications. While entirely voluntary, the present willingness of individuals to share their emotions via social networking suggests that this option may be a significant contributor of affective data.

Once the data is gathered and analyzed, it will be made available for display. Large, wall-mounted digital monitors will be placed in the library along with terminals where users can pull up information on specific areas of the library in the form of color-coded maps showing the current state of the library or graphs showing trends over time. The displays will be customizable so that each user can request the data most relevant to her. When not actively being used, the displays will play through a pre-determined cycle of data visualizations. It will also be possible for users to view any of this data at any computer terminal in the library or on a personal laptop, as well as on smartphones and other personal information devices.

While the infrastructure requirements of the AMS are significant, the value of the data provided by the system cannot be overstated. Any institution implementing this system will find itself in a position to better understand the dynamics of its various spaces and their users.

¹ Schmidt, A., Strohbach, M., Van Laerhoven, K., Friday, A., & Gellersen, H. (2002). Context acquisition based on load sensing. *Work*, 2498(2002), 333-350.

² "Toyota unveils mood sensing car electronics system." Retrieved from <http://satelliteradioplayground.com/2012/04/23/toyota-nysetm-unveils-mood-sensing-car-electronics-system/>

³ "Q Sensor: Respectful emotion measurement and communication." Retrieved from <http://www.affectiva.com/q-sensor/>