# CS 4397: Embedded Computer Systems

## Fall 2021. Assignment 3. Due December 2, 2021

Consider a robot control system that controls a robot to enable it to safely cross a railway track. The robot should use all the sensors available to it to monitor any approaching trains on the track as well as all obstacles (e.g., other robots that may be trying to cross the track at the same time) and determine when and how to cross the track to ensure that it will not be involved in any accidents.

Identify all the inputs to the system and all the outputs of the system based on the set of sensors and actuators available on a BrickPi and LEGO robotic system. Evaluate the capabilities and limitations of the set of available sensors and actuators in the context of the railway crossing requirement. The control system should enable the robot to proceed to the track, monitor the environment, stop in real-time if there is an approaching train, and cross the track as soon as it is safe to do so without colliding with any obstacles, including other robots that may also be crossing the track at that time.

This project involves the implementation of the control program to enable a robotic system to safely cross a railway track. The robot control system should address safety issues (e.g., the robot should not cross the track if there is an approaching train) as well as functional issues (e.g., ensuring that the robot will cross the track within a specified time when it is safe to do so). Hence, the robot should use all the sensors available to it to monitor any approaching trains on the track as well as all obstacles and determine when and how to cross the track to ensure that it will not be involved in any accidents.