Autonomous Pool Playing Robot

Proof of Concept

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Date	Revision #	Comments	Authors
14/11/2016	0	- Initial document creation	Eric Le Fort
	1	- Software section	Max Moore Eric Le Fort
	2	- Hardware section	Ernest Selman Guy Meyer Andrew Danha Derek Savery

Table 1: Revision History

1 Introduction

1.1 Purpose

1.1.1 Definitions

Table 2 lists the definitions used in this document. The definitions given below are specific to this document and may not be identical to definitions of these terms in common use. The purpose of this section is to assist the user in understanding the requirements for the system.

Table 2: Definitions

Term	Meaning

1.1.2 Acronyms & Abbreviations

Table 3 lists the acronyms and abbreviations used in this document.

Table 3: Acronyms and Abbreviations

Acronym/Abbreviation	Meaning

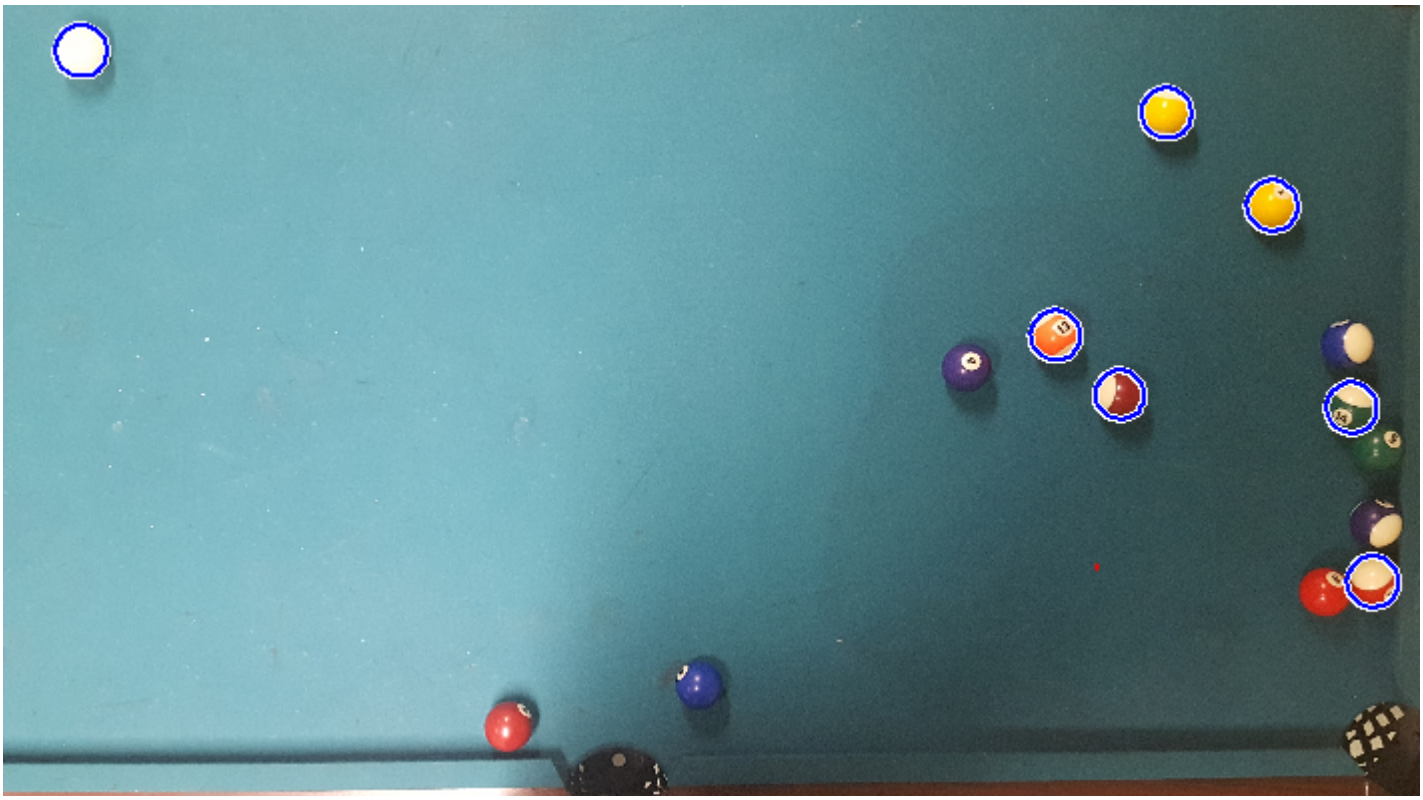
2 Software Proof of Concept

This section will outline the major technical hurdles that must be overcome in order for this project to be a success. For each case, the concern will be discussed followed by the team's plan on how to overcome that issue.

2.1 Visual Recognition Software Usage

For the visual recognition we need to be able to take a photo of the table, followed by having a script run that will recognize the position of balls, and finally be able to save that into a array of positions such that our decision making algorithm can operate easily and successfully.

We felt the best way to prove that we would be able to overcome this challenge would be for us to make a matlab script that at the very least: highlighted and recorded ball positions. As we expected this proved challenging, but after some work with it we have it identifying and recording the position of lightly coloured, or well-lit balls, in the future we will have to work towards recognizing dark balls, or maybe having a better lighting situation. Having said that for now we can be confident that we can recognize stationary balls via picture.



Some problems that we ran into that we think we can easily solve are as follows

- more even lighting, so that we can better catch balls like the purple and green ball.
- a wider angle lens, or lens attachment so that we can take photos from closer to the table.
- some work on the algorithm so that it searches for both more relatively light and relatively dark "circles" in contrast to the background.
- save them as a position of the table, rather than a position in the image, this could be done with either a more cropped photo (centered relatively well on the table) or simply by having Matlab recognize the position of the table (done more easily than the recognition of the balls.)

2.2 Inter-Device Communication

2.3 Shot Selection

3 Hardware Proof of Concept

This section will outline the major technical hurdles that must be overcome in order for this project to be a success. For each case, the concern will be discussed followed by the team's plan on how to overcome that issue.

4 Introduction