4. System Features

4.1. Mandatory Features

These are the core features hat should be functional at the end of the project.

4.1.1. Voice control

The user is able to put in commands by talking to the Android application. This includes activating predefined movement patterns, as well as controlling the joints of the Arduino Braccio individually. Voice control may be activated through a button in the user interface, or through a keyword said by the user. The most important requirements of this feature is easy usability which includes intuitive commands with high controlling power and low error rate when recognizing speech.

4.1.2. Bluetooth connection

The application is connected to Arduino Uno with Bluetooth connection. This allows the user to move freely through the room without being restricted to a cable. The connection should be stable and easy to create for the user.

4.1.3. Colour detection

With a colour sensor attached to the gripper of Arduino Braccio the application should be able to detect which colour is in front of the sensor and tell the user or use this information to execute further actions. The variety of detectable colour should be high, but will be limited by the sensor hardware.

4.1.4. User interface

The application has user interface which should be easy to use and provide the user with all necessary information.

4.2 Optional Features

These are features which are planned to be realized after the mandatory features have been implemented satisfactorily. During the creation of mandatory features, easy extendibility with optional features will be considered.

4.2.1. Alcohol detection

Similar to the colour sensor, an alcohol sensor attached to the gripper should recognize the alcohol percentage of liquids and tell the user or use this information to execute further actions. The variety of detectable alcoholic percentages should be high, but will be limited by the sensor hardware.

4.2.2. Drink detection

Through the combination of the information provided by colour detection and alcohol detection the application should be able to recognize and differentiate between different drinks by comparing the senor values with a small set of predefined data.

4.2.3. Drink serving

The user should be able to name a drink through voice control. The Arduino Braccio will apply drink detection on different drinks, grab a drink which is detected as a correct one, and hand it to the user.

3.3 Software Interfaces

The used software parts to create and run the system are:

* Android Studio IDE
* Android OS
* Google Voice Recognition
* Arduino Uno sketch
* Arduino Braccio library
* Arduino IDE

The purpose of each component is:

Android Studio IDE: This tool is required to build the main application with the user interface, with will process input by the user and return outputs.

Android OS: The Android OS is required to run the application build in the IDE.

Google Voice Recognition: This feature provided by the Google application can be used with an intent to implement voice recognition.

Arduino Uno sketch: The sketch is a small program uploaded to the Arduino Uno, which makes it possible to communicate with the Android application and perform actions with the Arduino Braccio.

Arduino Braccio library: This library is necessary to create commands for the Arduino Braccio within the Arduino Uno sketch.

Arduino IDE: This IDE is used to create Arduino sketches and upload them to Arduino Uno.