

Vision Statement

Project Name: Project Bowser

Team Name: Let My People Code

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Introduction:

We hope to introduce the innovative and influential power of Qualcomm in the world of robotics by exploring applications of rovers powered by the processing power of the Snapdragon processor. Our goal is to create an interactive user experience in which the powerful processor is used for innovative and worthwhile tasks, such as entertainment, assistance, and security.

Project Description:

We intend to create one or more demos showcasing the capabilities of the Mini Dragon Rover (MDR) combined with a Qualcomm-powered smartphone. Some possible applications include:

Object Retrieval

The Mini Dragon Rover is fitted with a functional fork lift which is capable of holding steady loads. This application hopes to provide the user the comfort of automated object transportation. By requesting a certain object, the Rover will respond to the user by finding the object and bringing it to the identified destination.

Remote Security Monitor

Since the MDR is equipped with a rotatable mirror which allows camera panning, the Remote Security Monitor will utilize this capability by allowing a remotely located user to access the video feed and potentially take action via the other mechanics of the Rover through a secure, encrypted, connection to the device.

Games

The MDR will make full usage of Qualcomm's revolutionary Snapdragon SoC to challenge users in interactive games which fully utilize the functionalities available on the MDR. A user will be able to play against the AI of an application running on the MDR or against another user. Multiplayer games could even be carried out over internet connections. Possible games include picking up pucks during a time trial, navigating a "mine field", or Jenga.

Educational Interaction

The MDR is uniquely suited to teach important concepts in a variety of fields. By using the fork-lift functionality of the MDR, visualizations of basic math concepts could be constructed (for example,

arrange pucks to represent division or multiplication). Through the usage of the phone's speaker and the MDR's mobility and camera mirror, story books could be read aloud in an interactive fashion (for example, prompting the user to interact with the environment in a manner verifiable by the MDR).

Motivation

The motivation behind this project is to help integrate robotics into modern day technologies in an affordable and easily accessible manner. A lot of phones these days have Qualcomm Snapdragon processors in them, which means that many users will have a seamless transition once the MDR becomes a necessary luxury as this reduces both the cost and the need for users to learn entirely new technologies.

By utilizing all the sensors and processing power of the chipsets found in modern Android phones users would only need to acquire the carriage used by the MDR. Since the majority of the carriage that is currently being used with this project is 3D printed it can be cheaply reproduced and fitted with an appropriately configured IOIO board.

The API that Qualcomm is providing gives access to a set of extra tools on top of the Android SDK which enhances the overall variety of possible user experiences which can be developed on the MDR. Utilizing revolutionary technologies such as Qualcomm's Augmented Reality widens the spectrum of what the MDR will be able to detect and react to, especially when combined with advanced computer vision technologies.

Ultimately, Qualcomm is attempting to enter a new market and give current consumers the greatest value for their phones by introducing new, exciting functionalities. Project Bowser, as developed by both Qualcomm and our team (Let My People Code), will be open source in order to allow outside contributors to add features to the project or utilize the features, and source code, that already exist and create even more exciting uses than those explored thus far.

Milestones

The initial milestone for this project entail deciding which application(s) we wish to create out of the MDR and its API. After we determine which application(s) we are going to make we will move forward to plan out the specifications of the application(s). This will entail flow charts describing the logic flows necessary for the MDR to sense and react to certain situations based on sensors and state transitions. We can then create a simple prototype with only state transitions and manually input signals on "sensor inputs" to be certain that the states transition accordingly and verify that our flow charts are properly designed. Once the prototype is working we will proceed with programming the MDR and have any modified carriages needed for the MDR printed out and constructed. Lastly, we will begin the process of debugging any issues that come up between the prototyping and the final product.

Technologies

The technologies we will be using are the Vuforia (Augmented Reality) Qualcomm API, the MDR provided by Qualcomm, and the standard Android SDK. With these tools, along with standard Java programming, we should be able to complete this project in its entirety.